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Draft Environmental Impact Statement

Lower Imnaha Rangeland Analysis

Hells Canyon National Recreation Area
Wallowa-Whitman National Forest

Wallowa County, Oregon

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Lower Imnaha Rangeland Analysis

Draft Environmental Impact Statement

Wallowa County, Oregon
April 2014

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Abstract: This draft Environmental Impact Statement documents five alternatives analyzed in detail for the Lower Imnaha Rangeland Analysis which is a proposal to allocate forage for grazing on four allotments in Hells Canyon National Recreation Area in the vicinity of the confluence of the Imnaha and Snake Rivers. The Lower Imnaha Range Analysis is 35 miles north east of Enterprise, Oregon. Alternatives include A (no grazing), Alternative B (current management), Alternative C modified current management, Alternative D using all allotments in one grazing rotation, and Alternative E using Lone Pine Allotment as a forage reserve.

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Summary

Purpose and Need for Action
The Lower Imnaha Range Analysis (LIRA) project area is approximately 44,000 acres and is located 35 miles northeast of Enterprise, Oregon in Wallowa County, and is within the Hells Canyon National Recreation Area on the Wallowa-Whitman National Forest.
The purpose of the LIRA project is to consider re-authorizing livestock grazing on the four allotments in the project area, Cow Creek, Toomey, Rhodes Creek and Lone Pine, in a manner that is consistent with the Wallowa-Whitman National Forest Land and Resource Management Plan (1990) and the Hells Canyon National Recreation Area Comprehensive Management Plan Final Environmental Impact Statement (CMP, 2003). The analysis is also required under the Rescission Act of 1995 (Public Law 104-19, section 504).

Livestock grazing has been *permitted* on these allotments since the early 1900's (though has occurred for many years prior to then, before the area was established as a National Forest), and continues to be an important contribution to the economy and rural life style of Wallowa County. Grazing is recognized as a traditional and legitimate use of the Hells Canyon National Recreation Area (CMP, and Public Law 94-199, 1975). Periodically, the grazing management strategies and the condition and trends of the vegetation and soils need to be reviewed and evaluated to determine whether to continue the permitted grazing for the established numbers and seasons.

Historic Conditions
There has been a long history, over 300 years, of livestock grazing in the LIRA project area, much of it associated with other settlement and cultivation activities. Mild winters extended the grazing season, and the benches and stream bottoms offered relatively level ground for intensive grazing and cultivation by homesteaders. The decades of concentrated use on these benches resulted in depleted soil conditions and loss of native grassland vegetation that is still in evidence today.

Over the 20th century, as lands in the canyon country became designated as National Forests (beginning with the Imnaha Forest Reserve in 1907), grazing activities became more regulated and adjusted to address effects on other rangeland resources in the canyon, and the number of animals grazed continued to be reduced.

In 2004, permitted grazing on National Forest System lands within the LIRA project area were reduced again to their current use numbers – resulting in the lowest head months of livestock in recorded history in this canyon country. This has allowed the rangeland resources in the area to recover from intensive past management activities.

Current Conditions
Recent monitoring results (2012) from the LIRA project area indicate an overall improving trend in rangeland conditions, measuring multiple indicators of soil, plant, hydrology, and biological crust. However, there are some localized sites, primarily on the benches which had been

historically intensively cultivated and grazed, that still demonstrate some "unsatisfactory" rangeland conditions. Findings from some studies indicate that these sites may have passed a threshold of not being able to recover without intensive and costly restoration efforts.

Proposed Action

The Wallowa-Whitman National Forest purposes to authorize livestock grazing on four allotments, Cow Creek, Toomey, Rhodes Creek and Lone Pine, in the LIRA area. Because winters are mild and summers can be intensely hot and dry in the project area, the grazing season is generally from November through May. The proposed action includes:

- Adjusting season of use and timing of use in pastures to address resource concerns about potential impacts to the threatened plant, Spalding's catchfly, and its habitat, and potential impacts to deep soils on steep north-facing slopes.
- Improving livestock distribution by creating new and re-configured water developments in order to reduce impacts on rangeland resources.
- Decreasing the interaction between recreationist and livestock along popular recreation trails, in campsites along the Snake River, and in wilderness areas.

A more detailed description of the proposed action can be found under the description of Alternatives in this Summary.

Decision to be Made

Based on the effects of the alternative actions, the Area Ranger will decide:

1. Whether to authorize grazing within the LIRA project area.
2. If authorized, the amount, location, seasons and strategies for grazing the four allotments.
3. Mitigations, project design criteria, range improvements and monitoring to reduce the risks of grazing activities negatively impacting other resources and uses of the LIRA area.

The LIRA project was initiated in 2009 and the Wallowa-Whitman National Forest began engagement with the public and communities of interests in 2011 through the scoping process, meetings and field trips with tribal members, interested individuals and organization. The Interdisciplinary Team also discussed the project with the Nez Perce Tribe during regular staff meetings. Though the project was postponed several times since its initiation as priorities and resources shifted on the Forest over the next several years, the project design and objectives have remained relatively stable since its inception. One change is that in 2013, based on some uncertainty of effects of grazing on *Spalding's catchfly*, a listed threatened plant, the Forest decided to document the analysis under an Environmental Impact Statement, rather than an Environmental Analysis.

Issues

There are two key issues, both closely related:

1. ***Spalding's Catchfly*** - There is uncertainty about the extent of the effect of cattle grazing in the LIRA project on Spalding's catchfly or catchfly habitat. Livestock trailing or grazing through a Spalding's catchfly site when soils are moist could shear the plants from their roots. Damage to Spalding's catchfly by livestock eating the plants is a low risk because the cattle have exited the allotments when Spalding's catchfly is most vulnerable to grazing.

The known Spalding's catchfly sites exist primarily on north facing slopes, and in areas that have received high amounts of grazing pressure over the last century. The rate of habitat recovery given the current grazing levels is unknown, and could delay the improvement of Spalding's catchfly habitat. Many of the north-facing slopes are degraded, containing invasive annual grasses. Competition from annual grasses reduces the quality of Spalding's catchfly habitat and impedes seedling establishment.

A change in the amount of use or season of use of the pastures that contain Spalding's catchfly could decrease the potential occurrence of hoof shear to Spalding's catchfly plants and decrease the current levels of impact to vegetation. Decreased impacts to soils and vegetation could allow these sites to move in an upward trend with the assumption that the annuals present on the site would not further out-compete the native vegetation, including Spalding's catchfly

2. ***Deep soils on steep north facing slopes*** - There is uncertainty about the degree of impact on deep soils on steep north-facing slopes due to hoof shear action by cattle grazing in the LIRA project area.

Moist soils on steep north-facing slopes are at risk of displacement under the weight of concentrated cattle use. As a result, soil exposure caused by displacement is evident in localized areas. This creates bare soil subject to non-native annual vegetation to invasion and spread. Soil displacement by hoof shear may also shear the native plant roots out of the ground. Exposed bare soil can also be more prone to erosion. Over time, this condition could decrease the overall soil productivity as well as the seral stage of the vegetation communities that exist in these areas. Soil compaction caused by trampling may negatively affect long term soil productivity and range condition.

Other concerns that arose during the analysis, and are evaluated in theD EIS, include effects of grazing on biological soil crusts, interactions between cattle and recreationists visiting the LIRA area, and management of invasive weeds.

Alternatives

Five alternatives were considered in detail; the No Action Alternative (A) and four action alternatives (B, C, D and E). The action alternatives propose a range of grazing and management activities across the project area. The primay differences between the action alternatives are based on strategies for how cattle graze the pastures, changes in timing, locations, intensities of grazing, and pasture rotations. The amount of cattle use (measured as "head months") remains the same for all action alternatives, except for

Alternative D, which reduces the amount of cattle use on a 3-year rotation of certain pastures.

Alternative A – No Grazing

Under this alternative, grazing would not be reauthorized and the current permit holders would be notified that their term grazing permits would be cancelled after two years (the established process under the Forest Service direction). Alternative A would close the four allotments, eliminating livestock grazing from 43,897 acres of National Forest System lands. Developments built to facilitate livestock management, including allotment and pasture fences, livestock exclosures, and stock water ponds and water troughs would be abandoned. Maintenance of allotment boundary fences would be assigned to the adjacent permittee.

Alternative B – Current Condition

Alternative B would authorize cattle and incidental horse grazing within all of the LIRA allotments. The level of permitted use is the same as it has been since 2004. Minor adjustments in grazing strategies have occurred and are expected to continue as the Forest Service and permittee learn which activities work well and which do not, and implement the improved methods (e.g. combine pastures that had been split in the past for when sheep grazing occurred on these allotments). Under Alternative B, Lone Pine Allotment would remain vacant to permitted grazing in the short term, though it is expected grazing by the Nez Perce would continue under their tribal treaty rights (currently at 50 head months). Use of the Forest Service Granting Process would be used to identify a new Term Grazing Permittee for the Lone Pine Allotment.

Alternative C – Proposed Action

The proposed action would authorize grazing and as described below for each allotment.

Lone Pine (11,138 acres)

- Authorize grazing for up to a total of 1,800 head months of livestock and 33 head months of horse/mule grazing between the dates of December 1 and May 31 to a Term Grazing Permittee, including the head months used under tribal treaty rights by the Nez Perce.
- Use the Forest Service Granting Process to identify a new Term Grazing Permittee.

Cow Creek – (5,824 acres)

- Authorize grazing of a total of 1,255 head months between the dates of November 1 and May 15.
- Move cattle through the ten pastures based on resource condition and meeting utilization standards in key areas.

Rhodes Creek – (22,660 acres)

- Authorize grazing of a total of 4,495 head months of cattle and 97 head months of horse/mule between the dates of November 1 and May 15.

- Move livestock through the 17 pastures based on resource condition and meeting utilization standards in key areas.

Toomey – (4,276 acres)

- Authorize a total of 1,000 head months of cattle grazing between the dates of November 1 and May 15
- Move livestock through the six pastures based on resource condition and meeting utilization standards in key areas.

Alternative D – Rest/Rotation

Alternative D would incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations. This alternative provides additional opportunities for rest and deferment of pastures within all four allotments. There would be a reduction in use (1,800 HM) due to the rest periods scheduled for each allotment. This alternative was driven by the assumption that rest would reduce direct and indirect livestock impacts to *Spalding's catchfly* and at the same time reduce cumulative soil disturbance by livestock when soils are wet or not frozen. A further assumption is that the vegetation in the pastures that are rested could have improved range condition over time by the desirable perennial vegetation being allowed to complete its life cycle without grazing pressure.

Alternative E – Forage Reserve

The Lone Pine Allotment would be utilized as a Forage Reserve through a Temporary Grazing Permit for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. This alternative would also provide rest to adjacent allotments in the Imnaha River Canyon, or other allotments within the Wallowa Mountain Zone with resource concerns. Under Alternative E the same management proposed in Alternative C would apply to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Major Conclusions

1. The history of livestock grazing in the LIRA project area, along with homesteading and intensive cultivation during the 19th and 20th centuries has resulted in depleted soil conditions and loss of native grassland vegetation on the areas of highly concentrated use on the benches and terraces.

2. Rural lifestyles, dependent on local natural resources, are an important component of a sustainable Wallowa County economy. In addition, the cattle industry in the county has a deep-rooted history that local residents value. For many, the livestock industry is a vital part of the Wallowa County identity and tradition. All of the Action Alternatives contribute to opportunities for employment and incomes from grazing on National Forest System lands, ranching/rural lifestyles in Wallowa County, and directly and indirectly benefit local business from grazing operations.

3. Overall, as grazing use and intensity has decreased over the last 100 years, rangeland conditions have improved over historic conditions, and there is a general improvement across the project area. However, there are some localized sites, primarily on the benches which had been historically intensively cultivated and grazed, that still demonstrate some “unsatisfactory” rangeland conditions. These sites may have passed a threshold of not being able to recover without intensive and costly restoration efforts.
4. The LIRA project area is rich in unique native plants, including several species listed as either “sensitive” or “threatened”. Grazing can affect the condition and health of individual plants and their habitat through trampling and direct grazing of plants. The plant of the greatest concern is *Spalding’s catchfly*, because there is uncertainty about the risks associated with grazing interactions. Though mitigation measures proposed under all of the Action Alternatives are expected to reduce that level of risk, it is still expected that grazing may affect or is likely to adversely affect *Spalding’s catchfly*.
5. Effects from grazing on soil, native plant, and biological crust conditions are closely related, and actions that may impact any one of these 3 resources, would be expected to affect the other 2 resources in the same direction (positively or negatively), though the extent and intensity of the impact may vary.
6. The No Grazing Alternative A moves resource conditions toward recovery from historic impacts more quickly than under the action alternatives. However, this Alternative would have negative socio-economic impacts by reducing employment and incomes from managing a grazing operation on National Forest System lands in the project area, and by increasing the financial burden on permittees to purchase replacement forage to support livestock.
7. All of the Action Alternatives are expected to continue to move rangeland conditions in an improved direction, with Alternative D supporting recovery of resource conditions the quickest, followed by Alternatives C/E and lastly by Alternative B.
8. The proposed actions and potential impacts that may occur under the Action Alternatives have been consulted on with the Oregon State Historic Preservation Office, and are scheduled to be consulted on with the Fish and Wildlife Service and National Marine Fisheries Service once a final decision has been made for this project.

Chapter 1 – Purpose and Need

Document Structure

The purpose of this Draft Environmental Impact Statement (DEIS) is to evaluate the potential effects of authorizing livestock grazing on 43,897acres of the Lower Imnaha Range Analysis area (LIRA) which includes four livestock grazing allotments: Cow Creek, Lone Pine, Rhodes Creek and Toomey, all of which are located in Hells Canyon National Recreation Area (HCNRA) of the Wallowa-Whitman National Forest.

An allotment is a designated area of land available for livestock grazing (36 CFR Part 222.1, subpart A item 1). The LIRA allotments are divided into pastures, which are grazing area(s) enclosed or separated from other areas by fencing or other barriers. This EIS will analyze effects at the pasture level.

This document is organized into five parts:

Chapter 1*. Purpose and Need for Action*: This section includes information on the history of the project proposal, the purpose of and need for the project, the proposal for achieving that purpose and need, and significant issues used to formulate alternatives, develop mitigation, and track effects and other resource concerns that did not drive alternatives but were addressed in this analysis.

Chapter 2*. Alternatives, including the Proposed Action*: This section provides a more detailed description of the proposed action, as well as alternative methods for achieving the stated purpose. This discussion also includes possible mitigation measures.

Chapter 3*. Affected Environment and Environmental Consequences*: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource areas (i.e. rangeland, wildlife, botanical resources, etc.). Within each section, the effect of the No Action Alternative is described. The No Action Alternative provides a baseline for evaluation and comparison of the other alternatives.

Chapter 4*. Consultation and Coordination*: This section provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices. The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Additional documentation, including more detailed analyses of project area resources, data specific to the project, public notifications and their responses, and miscellaneous documentation, may be found in the project planning record located at the Wallowa Mountain Office in Joseph, Oregon.

Location of the Analysis Area

The LIRA area is located approximately 35 miles northeast of the town of Enterprise, Oregon and encompasses 43,897 acres. There are 2,823 acres of private land within the project area. The Lone Pine Allotment is located the furthest north and east, ending half way up Deep Creek to the east and confined by the Snake River to the north and Summit Ridge to the south. The next allotment to the south, Rhodes Creek Allotment, is located the furthest south and west; starting just northeast of the Buckhorn Overlook, and ending just north of the Haas Horse Troughs. The majority of the Rhodes Creek Allotment is located in the Lightning and Rhodes Creek drainages; however it also incorporates a portion of Cow Creek near its confluence with the Imnaha River. There is also an island pasture that incorporates part of the Tulley Creek drainage near Spain Saddle on the west side of the Imnaha River. From the Rhodes Creek Allotment boundary the Cow Creek Allotment continues up the Cow Creek drainage to the south and towards Fingerboard Saddle and Lord Flat. Toomey Allotment is directly across the Imnaha River from the Rhodes Creek Allotment to the west, and is bounded by the Snake River and Cemetery Ridge to the north, Spain Saddle to the west, and Tulley Creek to the south (see Map 1).

The LIRA area contains the Lower Imnaha River, Wolf Creek-Snake River, and Cherry Creek-Snake River watersheds and includes the following major streams: Snake River, Imnaha River, Cow Creek, Lightning Creek, Rhodes Creek, and Tulley Creek. The elevation varies from a low of approximately 1,000 feet near the Snake River to more than 5,500 feet on the ridges above the Imnaha River.

The LIRA area encompasses all or part of Township 4 North, Range 48 and 49 East; Township 3 North, Range 48, 49 and 50 East; Township 2 North, Range 48 and 49 East; and Township 1 North, Range 49 East, Willamette Meridian.

The legal description of the location of each allotment follows:

Cow Creek: T02N; R49E; Sec. 2, 3, 11, 10

T03N; R49E; Sec. 9, 10, 15-17, 20-23, 26- 28, 33- 35

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Lone Pine: T03N; R49E; Sec. 1- 4, 10- 15, 22-24, 26

T03N, R50E; Sec. 18

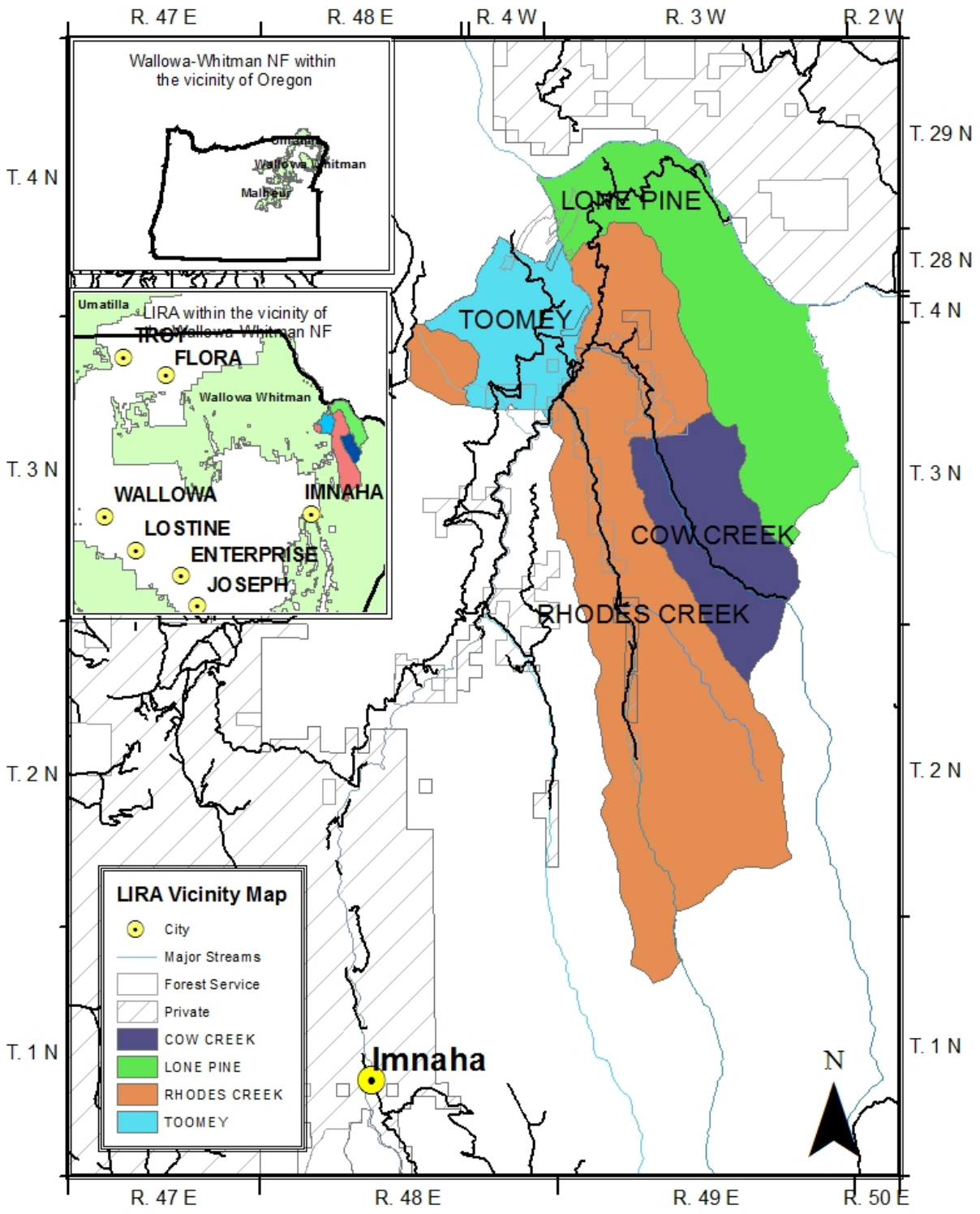
T04N, R49E; Sec. 16-36

Wallowa County, OR

Rhodes Creek: T01N, R49E; Sec. 4, 5, 9

T02N, R49E; Sec. 3-6, 8- 11, 14- 17, 20-23, 26-29, 32- 34

	T03N, R49E; Sec. 4-10, 16- 20, 28-34
	T04N, R49E; Sec. 29- 33
	Wallowa County, OR
Toomey:	T03N, R48E; Sec. 1- 3, 11, 12
	T03N, R49E; Sec. 6, 7
	T04N, R48E; Sec. 25, 26, 34- 36
	T04N, R49E; Sec. 30, 31
	Wallowa County, OR



Map 1. Vicinity map of LIRA analysis area in relation to the state of Oregon, and the Wallowa-Whitman National Forest within Wallowa County.

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Social History

Understanding the history of the LIRA project area and the present day landscape is important to determine if and how management changes are necessary to work towards the desired condition. In the LIRA area there has been a long and rich history of human presence, associated human caused disturbance, and in some areas continuing legacy impacts from those land uses. The 2003 Hells Canyon National Recreation Area Comprehensive Management Plan (CMP) describes the history of the area as described below.

It is theorized that for thousands of years, the HCNRA grasslands have experienced animal impacts as fluctuating populations of elk, deer, and bighorn sheep have grazed the area, and cyclic populations of rodents and insects influenced the vegetation of the area (USDA 2003).

Prior to Euro-American settlement, natural fires and fire managed by Native Americans were common within the HCNRA grasslands. It is generally assumed that the overall result was a grassland landscape that was rarely in a completely late-seral ecological status. Depending upon the severity of fire, amount of wildlife use, insects and disease, or impacts by American Indians' livestock, the HCNRA commonly contained a gradient of vegetative seral states (USDA 2003).

The Nez Perce tribe was the main tribe to historically utilize the land within the project area; it is unknown exactly how long they inhabited the area prior to European settlement. Historic records vouch that Nez Perce were the first to graze this area with their horses as early as a hundred years prior to Lewis and Clark's expedition of 1804 and 1805 (Tucker, 1981). The Nez Perce maintained large numbers of horses, as the horse played a significant role in their mobility and lifestyle. Horse numbers among the Nez Perce were in the multi-thousands in the late 1800's (Reid, 1985). The Nez Perce obtained cattle sometime after 1840, maintaining a viable herd. Their cattle numbers were built up to the multi thousands by 1890 (Reid, 1985). The LIRA area provided winter pasturing for the stock due to the lower elevation, less snow, and available forage. The presence of Nez Perce cattle upon arrival from settlers is the suspected reason for the name "Cow Creek" within the project area.

According to the Historical Sketches of the Wallowa National Forest by Gerald Tucker (1981), the Nez Perce tribe learned to garden from a missionary family by the last name of Spalding in the late 1830's. There were large potatoes and other garden products at their winter villages which included the Imnaha. Also during this time the Nez Perce spent more and more of their time devoted to caring for their stock, horses and cattle, and moving them from spring, summer, and fall pastures and back again to winter pastures near their villages. After the 1863 treaty, nearly all of the improved garden grounds maintained by the Nez Perce were places filed by European settlers to be homesteads. The Nez Perce were driven out of Wallowa County in 1877 after the Nez Perce war, and quickly a pastoral and limited agricultural economy developed by settlers. During the 1880's and 1890's most of the choice lands within the county were patented and the open range (much of the current day LIRA area) was overstocked with horses, sheep and cattle (USDA 2003, Tucker (1981) and LIRA project file).

When Euro-Americans first settled, they developed homestead sites or mining claims within the HCNRA. Many of the homesteads were 160-acres settled by families who struggled to not "starve out". As a consequence, much of the landscape was severely overused from cattle, sheep, horses, and cultivated for the necessity to grow crops (USDA 2003). Cultivation by homesteaders was required to "prove up" on their homesteads to obtain full and outright legal ownership, which occurred across the project area in the flatter areas more conducive to the equipment used during that period. At one time, there were 22 ownerships up Lightning Creek alone (McClaran, personal communication 2009). Cultivation history matters because cultivation can have long lasting impacts on vegetation, soils, and hydrology after crop production and these changes can influence everything that happens on that land after cultivation ceases (Morris and Monaco 2011). These impacts continue to be present within the LIRA area.

President Roosevelt proclaimed the establishment of the Imnaha Forest Reserve in 1907, which combined the Chesnimnus and Wallowa Forest Reserves (proclaimed in 1905) and included additional land principally in the Lower Imnaha, Snake River area, and extended boundaries further toward Powder River. In 1908 the Imnaha Forest Reserve's name was changed to the Wallowa National Forest. It took 26 years to stabilize the boundary of the Wallowa National Forest. During that time an attempt by the Federal Government was made to detach or eliminate a large area of the lower Imnaha River country and Snake River country north of Saddle Creek. This resulted in many petitions by the people inhabiting the area in support of keeping the land within the National Forest. One of the petitions dated October 21, 1916 included the following statement;

> *Experience has taught them that unregulated grazing means over grazing, and over grazing means the denuding of the land and grass and other cover-crops, thus opening the way to certain and rapid erosion of the soil.*

"Most of the people now residing in and near these sections were also residents of the county before the lands were included in the National Forest, and are in the best position to judge as to what will be the result should the boundaries be changed and these lands given over to unrestrained and promiscuous use at any and all seasons….. These people also know that these lands are fully used to the best advantage and that after a few years of unregulated grazing will not support nearly as much stock per acre as they now do."

During the time period after the Wallowa National Forest was formed, grazing use was beginning to be assessed and regulated. However, managers continued to face problems with trespass, determining stocking levels, and accommodating another wave of homesteaders. This is documented by an account by W. Grady Miller written in 1938, one of the pioneer rangers on the Wallowa National Forest stated in his journal:

> "Overgrazing was in evidence over the entire Forest even under the permit system. Regulated grazing was practically impossible the first few years, as stockmen would run what they wanted regardless of trespass proceedings. Around 1910 was first time any reductions were made that actually could be enforced. These reductions were

> necessary to make room for the approximately 100 new homesteaders who filed under the homestead act of June 11, 1906. Any unit of land that was 20% agricultural up to 160 acres could be taken; consequently all lands within the forest that could qualify were filed on. These homesteaders sold out to stockmen, and in 1918 but 5% remained on their original claims……Trespassing stock were numerous and persistent. I had one assignment lasting six weeks as follows: "go out into the Chesnimnus (directly west of LIRA area) country and record all the stock you can find and see if they are in trespass. I put six weeks riding that country, recorded several thousand cattle and horses. On checking up after returning to the Supervisor's Headquarters we found over 400 head of cattle in trespass as well as 125 horses."

These problems were paired with a push from the federal government to supply for food for soldiers, and a shortage of workforce to tend to livestock during the First World War. As a result, cattle and domestic sheep use on the LIRA allotments peaked in the 1920's (USDA 2003) with approximately 29,000 cattle and 60,000 sheep. However, by the 1940's the Forest Service started to control use through more aggressive creation of allotments, and season of use and regulating numbers of livestock (USDA 2003). To demonstrate the reduction in livestock numbers between the 1920's and 1960's, there were recorded to be approximately 11,200 head of cattle and 11,400 head of sheep over the same area in 1961.

Another consideration to the LIRA area from a historical standpoint was access and logistics for moving people, supplies, and livestock. Due to the rough and rugged terrain there are limited areas to move livestock. Historically this matters because these activities have had more intense resource impacts on these areas (stock driveways), and have been occurring for the past century at varying levels commensurate with the number of livestock grazing in the canyon. In the LIRA area there have been two main longstanding livestock driveways, one of which was from the Snake River to the Imnaha over Cactus Mountain (Lone Pine and Rhodes Creek Allotments), and the Tulley stock driveway up Tulley Creek to Spain Saddle. The driveway over Cactus Mountain is described in the USDA 2003 history discussion as "at one time, a fenced lane along Cactus Mountain was used for livestock drives. Use was so heavy that the land was bare of vegetation. Later the lane was abandoned and the fence removed. Vegetation recovery has nearly obliterated the fence line." The other main stock driveway up Tulley Creek was not only grazed as part of the allotment, but used by thousands of animals over the past 200 or more years as ingress and egress from winter to summer range and vice versa by the Nez Perce and consequent stockmen.

Most of the LIRA area prior to 1950 was unroaded, and trails were the main conduit of travel. Most of the supplies that came to the inhabitants of the Lower Imnaha were transported by boat from Clarkston and were accessed by multiday trips over the trail to Eureka bar. Imnaha was the closest service town and was still a multiday pack trip to go for supplies. A more permanent version of the 1903 bridge was built across the Imnaha River near the mouth of Cow Creek in 1924 and 1925 by Wallowa County (Tucker, 1981). The bridge was built because of the danger of crossing the Imnaha during high water and because it was almost impossible to cross cattle, especially young calves. Many cattle were drowned in crossings before the bridge was built. Sheep could not be crossed during high water and temporary bridges built during low water to cross sheep were washed away on the next high water. The livestock were held in the bridge

area until it was suitable to cross the river. In 1948 a road was completed from Fence Creek down the Imnaha to the McClaran Ranch on Cow Creek, and was a turning point for easier access to the area. The bridge was rebuilt in 1954 to accommodate vehicles. Being able to access the Imnaha corridor by vehicle meant supplies, particularly hay could be brought into the canyon more easily, and there was less of a need to produce hay in the canyon. The road also provided a way for more modern equipment to be transported into the canyon, and some areas continued to produce hay into the 1980's.

Many rural communities continue to be dependent upon ranching for their economic livelihood and most of these ranches rely on federal land grazing, either on BLM managed lands or on National Forests, for at least a portion of their grazing needs.

It is the Forest Service's goal to conserve the rich resources of the National Forests and Grasslands while supporting communities greatly dependent upon these very same resources. While grazing is an important use, the Forest Service will continue to move forward with improving its management and preventing degradation of soil, water, and vegetation. (USDA Forest Service Rangelands Website 2013)

Purpose and Need for Action

The purpose of this project is to consider re-authorizing livestock grazing on the four allotments in a manner that is consistent with the direction in the 1990 Wallowa-Whitman National Forest Land and Resource Management Plan (Forest Plan and the CMP).

Livestock grazing has been permitted on these allotments since the early 1900's, and continues to be important to the economy of Wallowa County. Grazing is recognized as a traditional and legitimate use of the Hells Canyon National Recreation Area (CMP, HCNRA Act Sec. 7). Periodically, the grazing management strategies and the condition and trends of the vegetation and soils need to be reviewed and evaluated to determine whether to continue the permitted grazing for the established numbers and seasons.

Assessment of grazing practices and strategies is also directed in order to:

- Comply with the Rescission Act of 1995 (Public Law 104-19, Section 504), which requires the Forest Service to establish and adhere to a schedule for completion of National Environmental Policy Act (NEPA) analyses and decisions on all grazing allotments. Once this Act's authority ends in 2025, permits will not be issued until a NEPA process is completed. Without a NEPA process for the LIRA project area, permits would not be re-issued upon expiration and grazing would not be authorized in the Cow Creek, Rhodes Creek, and Toomey allotments, and a permit could not be issued in the Lone Pine allotment.
- Ensure consistency with other multiple use goals and objectives on suitable lands (*Multiple Use Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resource Act of 1974, Federal Land Policy and Management Act 1976, National Forest Management Act of 1967, Section 7 of the HCNRA Act of 1975, Oregon Wilderness Act of 1984, Omnibus Oregon Wild and Scenic Rivers Act of 1988, and Forest Service Manual 2202.1*)

- Analyze grazing's contribution to the economic and social well-being of communities that depend on range resources for their livelihood by providing opportunities for economic diversity and stability (FSM 2202.14).

The Vision for the Desired Future Condition

The Lower Imnaha Rangeland Analysis project area is at the heart of the Hell's Canyon National Recreation Area and Imnaha River Corridor. The desired future condition for the area is a place dominated by the beauty of the bunchgrass grassland setting, with the Imnaha and Snake Rivers of the Hell's Canyon as the backdrop. The diverse and productive vegetation, mainly composed of blue bunch wheatgrass and Idaho fescue, would be a primary character of the area and would be indicative of what a large, intact native perennial bunchgrass landscape looks like. In the bottoms and higher elevations, diverse timber would add texture to the landscape. Rangeland vegetation, native to the canyon, would be abundant, though there would still be some visible evidence of historical land uses in areas that were intensively cultivated over the last century.

Rangelands would be resilient to wildfires and other natural disturbances. Wildfires would generally be frequent and of low severity, and allow perennial bunchgrasses to grow back quickly to refresh the countryside. Scars from previous fires would be only evident in timber stringers and on charred fence material. Robust grasslands would provide settings for the biologically unique species special to the canyon, including biological soil crusts, to prosper.

The waters of Lightning, Cow, and Rhodes Creek would be clear and cold, contributing to the Imnaha and ultimately the Snake River water. Cottonwoods and other dense riparian hardwoods would provide good shaded habitat for steelhead and Chinook salmon among other aquatic species. Fishing and the opportunity to enjoy the water would bring anglers and recreationists alike to the canyon in the spring time to enjoy the character of the free-flowing Imnaha and Snake Rivers. Visitors and users of the canyon would also enjoy abundant wildlife, including bighorn sheep, Rocky Mountain elk, mule deer, grouse, and large raptors.

Where developed areas exist, they would be rustic in nature and are often associated with homesteads giving the visitor a feeling like they are stepping back in time. The historic sites associated with and typifying the economic and social history of the region and the American West would persist within the project area. Ranching would continue as a valid and traditional use of the land within the canyon, and contribute to the social and economic well-being of Wallowa County. Open space would be preserved, and continue to provide the sense of place that people enjoy about the far northeast part of Oregon.

Management Direction the Desired Future Condition

Management direction is built from years of past experiences with regards to different land uses, and explains how a distinct area of land is to be managed to promote and sustain resources important to the public. It is important because a management direction creates the framework used by land managers to analyze current and proposed land uses, and provide management recommendations. Management direction also generally defines the desired condition, or the

future vision for the landscape of the project area. Because this is a rangeland analysis, the emphasis is on management direction that is focused on range condition and management of livestock grazing in regards to interaction with other important resources.

The difference between the desired conditions of the landscape as described in the previous section and the existing condition (what is currently present on the landscape), paired with public involvement from scoping, provides a starting point for this analysis. Support for the desired condition for the LIRA area includes direction from both the Forest Plan and CMP. Both plans use different terms to define the desired condition of rangelands; the following is an explanation of the similarities and the crosswalk between the two for the LIRA area (also refer to Table 1).

The desired condition outlined in the Forest Plan includes direction to offer livestock forage production where forage is in excess to basic plant and soil needs, wildlife forage is available, and other specific resource conditions are achieved or maintained (pg. 4-3). Basic plant, soil, wildlife and other resource conditions are defined by the Forest Plan specific to each Management Area. The forest is divided into management areas in order to emphasize particular resources or land uses within that geographical area. See Table 2 and refer to Map 2 at the end of this chapter for the location of management areas relevant to the LIRA area.

<u>Potential Natural Community</u> (PNC) defines the biotic community that would become established if all successional stages were completed without interference by humans under present environmental conditions (CMP, 3-148).

<u>Historic Range of Variability</u> (HRV) represents the natural fluctuation of ecological and physical processes and functions that would have occurred in an ecosystem during a specified previous period (CMP, 3-148). In the HCNRA, HRV refers to the range of conditions that were likely to have occurred before the settlement of northeastern Oregon by Euro-Americans around 1850 (CMP, 3-148).

Desired conditions for each management area are described in the Forest Plan (pg. 4-21 to 4-24; 4-51 to 4-54) and on page 7 of this chapter. The desired condition, and resulting direction in the Forest Plan, is to maintain or improve forage range condition. The Forest Plan speaks in terms of ‘satisfactory’ or ‘unsatisfactory’ range forage condition ratings (pg. 4-70 through 4-80, 5-28). In ecological terms ‘satisfactory’ are those rangelands in fair to good condition with a static or upward trend (they are staying the same or improving). Satisfactory condition rangelands are assumed to be represented by mid-late seral plant communities. In 2003 the CMP amended the Forest Plan, and initiated a shift from seeing land management from a production standpoint to land management from an ecological perspective.

The CMP identifies a desired condition for grassland vegetation that ensures continued ecological function and sustainability of native ecosystems. The CMP further directs managers to maintain and/or restore the ecological status of grassland communities in relation to the respective Potential Natural Community (PNC) recognizing their Historic Range of Variability (HRV) and that the potential for some communities may be altered by past land uses (pg. C-31-

32). In other words, setting the baseline as the plant community would be present if there were no human caused disturbances to consider. It is important to note that natural disturbances are inherent in the development of PNC. Seral stages are used to quantify or represent the current departure of a specific site from the PNC for that site. Historically grassland health was measured as range forage condition rather than using ecological status. Below is the table (Table 1) comparing range forage condition and ecological status ratings for reference.

Table 1. Comparison of satisfactory or unsatisfactory range condition as described in the Forest Plan to range forage condition ratings and ecological status.

Range Condition Forest Plan	**Range Forage Condition Ratings** **Forest Plan**	**Ecological Status Seral Stages** **CMP**
Satisfactory	Excellent or good	PNC or late seral
	Fair	Mid seral
Unsatisfactory	Poor	Early seral
	Very poor	Very early seral

In summary, there are two different lines of thought that have been used to assess desired range conditions in the HCNRA 1) range forage condition, and 2) ecological status. For the LIRA analysis, the focus will be on ecological status because it is more consistent with direction in the CMP and is more compatible with modern tools available in range science to assess range conditions (see Rangeland Resources section in Chapter 3).

Changes in Livestock Management

The year after the 2003 CMP Record of Decision was signed, significant changes in the livestock management occurred in the LIRA area. The following information provides an update to better understand what those changes were, and set the scene for the remainder of this chapter.

Current Stocking Rates

Since the turn of the century livestock stocking rates have decreased drastically. The most recent decrease occurred in 2004, when the current permittee of the Rhodes Creek Allotment obtained the Term Grazing Permit to graze the Cow Creek and Toomey Allotments. Prior to this time, the Cow Creek, Rhodes Creek, and Toomey Allotments were fully stocked by different permittees. In addition to the Term Grazing permits, there were also Term Private Land Grazing permits for the Cow Creek, Rhodes Creek, and Toomey Allotments.

In 2004, two changes took place:

1. The permittee on the Rhodes Creek Allotment obtained the Term Grazing Permits for the Cow Creek and Toomey Allotments.

2. The Term Private Land Grazing Permits for all three allotments were discontinued; private land within the project area was no longer waived to the Forest Service for grazing management.

Although the permittee increased their permitted numbers as a whole, there was still an overall decrease from the pre-2004 stocking levels when the areas had been grazed by 3 separate permittees at the same time. The permittee family consciously decided not to fully stock the three Term Grazing Permits, this enabled them to build more flexibility in the grazing rotations, and helped give the land a chance to recover from the intensity of past management. The reduction in cattle entering the Cow Creek, Rhodes Creek, and Toomey Allotments for the permitted grazing season between 2004 and 2014 is approximately 29 percent.

With the exception of one stocked grazing season, the Lone Pine allotment has been vacant for nearly 10 years. As a result of this vacancy, and the fires that have occurred on the allotment, many of the fences and water developments are damaged or in disrepair.

Stocking rates on each allotment will be discussed in more detail in Chapter 3, Rangeland Resources.

Monitoring Results

Recently collected upland Condition and Trend (C&T) and Cover-Frequency monitoring data for the LIRA allotments indicate an improvement in upland range condition as perennial native species and other desirable vegetation is increasing within the project area. However, a few upland areas within the LIRA area are still in unsatisfactory range condition. Despite a decrease in grazing pressure from 2004 to present, these areas are not meeting the requirements for satisfactory rangelands because they occur in an earlier seral stage. The majority of the sites in early and very-early status occur on previously farmed or historically heavily grazed benchlands or bottomlands where annual species have invaded, and those sites have either crossed a threshold or are now dis-climaxed. Dis-climaxed sites are characterized by vegetation communities that are maintained at an earlier seral stage. Areas that are dis-climaxed have also experienced permanent alteration in the soil structure and loss of top soil. The sites that have crossed a threshold have altered to the extent that it is not possible to return them to their PNCs without an expensive and intensive restoration (USDA 2003 and Johnson et al. 1994).

Private Lands

Since 2004, there have not been any private land term grazing permits, and therefore no associated livestock numbers under permit for those private lands. The private land has also not been grazed independent of the term grazing permit. In the Cow and Rhodes Creek Allotments, the private land is located primarily along Cow Creek, Lightning Creek, and the Imnaha River. In the Toomey Allotment, the private land is mostly associated with the benchlands and the Tulley Creek drainage. In 2012, the Forest Service purchased land in the Cow Creek and Toomey allotments, and this land became part of each allotment's Term Grazing permit without an increase in livestock numbers or change in season of use. The other

private land associated with these allotments will remain private and will be used in conjunction with the rest of the permitted area.

Summary

Overall, rangeland conditions within the LIRA area are satisfactory and on an upward trend. The findings of upland condition monitoring and the analysis of riparian condition indicate that the project area is in a mid-seral or later stage and improving. These findings result in the allotments being classified as satisfactory, there are specific upland sites being classified as unsatisfactory. The unsatisfactory condition sites are outlined in Chapters 2 and 3, with appropriate adaptive management and/or mitigations to address the site-specific issues.

Proposed Action

The proposed action was sent to public in August of 2011, initiating a 30-day scoping period. A complete description of the proposed action, include mitigation measures, design criteria, monitoring, and adaptive management actions can be found in Chapter 2. A summary of the proposed action follows:

No previous NEPA analysis has been completed on this activity. The Allotment Management Plans (AMPs) would be developed at the completion of the site-specific analysis and would be implemented fall of 2014. The AMPs would become a modification of Part 3 of the term grazing permit with a letter to the permittee(s) notifying them of this modification (FSH 2209.13, Chapter 90, Section 94.1).

The HCNRA Manager proposes to continue authorizing grazing on four cattle and horse allotments within the analysis area. Stocking of each allotment is described in terms of head-months (HM). A HM is a unit of measure that counts one animal for 30.4 days ((animal units (cow/calf pair) x days)/30.4). In accordance with Forest Service Range Handbook, a cow-calf pair qualifies as one animal in these calculations if the calf is 6 months of age or less. To calculate billing the Forest Service multiplies the annually prescribed grazing fee with the authorized HM.

The proposed action includes:

- Adjusting season of use and timing of use in pastures to address resource concerns about livestock distribution and livestock use patterns. This includes concerns about potential impacts to Spalding's catchfly (*Silene spaldingii*) habitat and deep soils on steep north-facing slopes discovered during the data collection in the project area
- Increasing livestock distribution to promote increased ecosystem health by creating new and re-configured water developments
- Decreasing the interaction between recreationist and livestock along popular recreation trails, in campsites along the Snake River, and in wilderness areas.
- Standards, guidelines, goals and objectives of the Forest Plan and CMP would be followed through monitoring and adaptive management measures.

The proposal for the LIRA area would authorize grazing, management, and the following actions as described below for each allotment.

Lone Pine (currently vacant – 11,138 acres)

- Authorize grazing for a total of 1,800 head months of livestock and 33 head months of horse/mule grazing between the dates of December 1 and May 31.
- Use the Forest Service Granting Process to identify a new Term Grazing Permittee.
- Incorporate 1,640 head months of tribal treaty rights grazing of 50 head from November 15 through May 15 into Term Grazing permitted use such that it does not exceed 1,800 head months

Cow Creek – (5,824 acres)

- Authorize grazing of a total of 1,255 head months between the dates of November 1 and May 15.
- Move cattle through the ten pastures based on resource condition and meeting utilization standards in key areas.

Rhodes Creek – (22,660 acres)

- Authorize grazing of a total of 4,495 head months of livestock and 97 head months of horse/mule between the dates of November 1 and May 15.
- Move livestock through the 17 pastures based on resource condition and meeting utilization standards in key areas.

Toomey – (4,276 acres)

- Authorize a total of 1,000 head months of livestock grazing between the dates of November 1 and May 15
- Move livestock through the six pastures based on resource condition and meeting utilization standards in key areas.

Decision Framework

Based on the effects of the alternative actions, the Area Ranger will decide:

4. Whether to authorize grazing within the LIRA project area.
5. If authorized, the amount, location, seasons and strategies for grazing the four allotments.
6. Mitigations, project design criteria, range improvements and monitoring to reduce the risks of grazing activities negatively impacting other resources and uses of the LIRA area.

Issues

Issues are determined by considering factors that affect public health and safety, address unique characteristics of the geographic area, highly controversial effects, highly uncertain or unknown risk, or are felt to be precedent setting. A significant issue should be well defined, relevant to the proposed action, and within the ability of the agency to address through alternative management strategies.

For this analysis issues brought forward by the public and Interdisciplinary team (IDT) that could best be addressed by forming an alternative or introducing mitigation or monitoring were identified and categorized as 'significant issues' The following two significant issues were developed from comments on the proposed action.

Comments expressed a wide variety of opinions about the proposed action and information to be disclosed or considered for the EIS. Significant Issue 1 was developed to address concerns from tribal staff members, IDT, and regulatory agencies about Spalding's catchfly, a plant listed as threatened under the Endangered Species Act (ESA). Significant Issue 2 was developed to address concerns from multiple entities regarding the condition of deep soils on steep north facing slopes. Appendix A summarizes the scoping comments and describes where in the EIS these comments are addressed, or if they were considered outside the scope of this analysis.

The following issues were generated during the public scoping process, although vegetation and soils are closely inter-related they would be analyzed separately in Chapter 3:

Significant Issue 1 – Spalding's Catchfly

There is uncertainty about the extent of the effect of cattle grazing in the LIRA project on Spalding's catchfly or catchfly habitat.

- Livestock trailing or grazing through a Spalding's catchfly site when soils are moist could shear the plants below the root crown and cause plant or seedling damage or death. Damage to Spalding's catchfly by livestock eating the plants is not a major concern because the cattle have exited the allotments when Spalding's catchfly is most vulnerable to grazing.
- The known Spalding's catchfly sites exist on north facing slopes, and in areas that have received high amounts of grazing pressure over the last century. The rate of habitat recovery given the current grazing levels is unknown, and could prolong the improvement of Spalding's catchfly habitat. Many of the north-facing slopes are degraded, containing invasive annual grasses. Competition from annual grasses reduces the quality of Spalding's catchfly habitat and impedes seedling establishment.

A change in the amount of use or season of use of the pastures that contain Spalding's catchfly could decrease the potential occurrence of hoof shear to Spalding's catchfly plants and decrease the current levels of impact to vegetation. Decreased impacts to soils and vegetation could allow these sites to move in an upward trend with the assumption that the annuals present on the site would not further out-compete the native vegetation, including Spalding's catchfly.

Measures for evaluating this issue are:

- Amount of surface soil displacement from livestock grazing
    - Measure: The change from baseline of the Line-point intercept data showing a reduction in surface soil displacement caused by livestock within the next 10-20 years.
- Long term Spalding's catchfly site populations
    - Measure: The change from baseline in the number of Spalding catchfly plants within the next 10-20 years.
- Range condition demonstrating an upward trend in sites that have potential or actual Spalding's catchfly habitat
    - Measure: Number of Condition and Trend Plots, Cover Frequency Plots, or other method that demonstrates positive changes to soil and vegetation. This could be displayed as an increase in range condition trend, improved seral stage or "state".

Significant Issue 2 – Deep soils on steep north facing slopes

There is uncertainty about the degree of impact on deep soils on steep north-facing slopes due to hoof shear action by cattle grazing in the LIRA project area.

Under past and current management, moist soils on steep north facing slopes are at risk of displacement under the weight of cattle. As a result, soil exposure caused by displacement is evident in localized areas. This creates bare soil subject to non-native annual vegetation to invasion and spread. Soil displacement by hoof shear may also shear the native plant roots out of the ground. Exposed bare soil can also be more prone to erosion impacts such as accelerated surface erosion. Over time, this condition could decrease the overall soil productivity as well as the seral stage of the vegetation communities that exist in these areas.

Soil compaction caused by animal trailing may negatively affect long term soil productivity and range condition.

Measures for evaluating the issue of deep soils on steep north facing slopes are:

- Amount of surface soil displacement from livestock grazing
    - Measure: The change in baseline of Line-point intercept data showing a reduction in surface soil displacement caused by livestock within the next 10-20 years.
- Amount of detrimental impacts of soils
    - Measure: The change in baseline of Line-point intercept plots which demonstrate depth and amount of compaction and signs of accelerated soil erosion in actively grazed areas within the next 20 years.
- Long term monitoring data demonstrating an upward trend in soil condition
    - Measure: Condition and Trend Plots, Cover Frequency Plots, or other methods that demonstrates positive changes to soil condition. This could be a result of an increase in effective soil cover, native deep-rooted plants, and biological soil crusts cover.

- o Measure: Soil stability as measured by standard soil stability test is maintained or improved at line-point intercept, Condition and Trend Plots, or Cover Frequency Plots.

Other issues that were identified the public and/or the Interdisciplinary Team (IDT) during the course of scoping and preliminary analysis of the project area would also be analyzed but were not considered alternative drivers include:

- Range and soil condition: This is a dispute about the extent and intensity of effects from livestock grazing on rangeland health and will be addressed in Chapter 3.
- Biological soil crusts: There is some controversy and uncertainty of livestock impacts to biological soil crusts as identified in the CMP, and the relevance of these impacts on overall rangeland health.

Resource Concerns were also identified by the public and IDT and will be analyzed by alternative in Chapter 3.

- Noxious weeds: Livestock grazing can present risk for weed invasion through the spread of seeds or creation of open spaces for weeds to establish. In Chapter 2 and 3 the mitigation measures and most reasonable methods for preventing and treating weeds are discussed.
- Recreation / Livestock Interaction: Concerns have been expressed regarding effects of seeing cattle, or signs of cattle (manure) on the quality of the recreation experience along trails in the Hells Canyon National Recreation Area and within or adjacent to campsites along the Snake River.

Management Direction

Management direction is derived from a variety of management plans, environmental assessments, and laws, regulations and policy. The LIRA DEIS incorporates by reference the Imnaha Wild and Scenic River Management Plan (1993) and the Wild and Scenic Snake River Recreation Management Plan (1999). The LIRA DEIS tiers to the following analyses: Wallowa-Whitman National Forest Land and Resource Management Plan FEIS and ROD (1990) as amended (including PACFISH 1995), Hells Canyon National Recreation Area Comprehensive Management Plan FEIS and ROD (2003), the Pacific Northwest Invasive Plant Program Preventing and Managing Invasive Plants EIS and ROD (2005), and the WWNF Invasive Plants Treatment Project EIS and ROD in 2010.

Management Areas

Management areas prescribed by the HCNRA CMP FEIS are listed in Table 2 by allotment. Map 2 displays a map of the management areas (MA) within the LIRA area. A summary of the resource objectives that pertain to livestock grazing for each management area follows.

Table 2. Management Area Acres by Allotment in LIRA

Allotment	MA 4 (acres)	MA 7 (acres)	MA8 (acres)	MA 9 (acres)	MA 10 (acres)	MA 11 (acres)	Total (acres)
Cow Creek	13	0	0	2,631	3,180	0	5,824
Lone Pine	8,145	256	1,097	1	1,638	0	11,138
Rhodes Creek	15	593	0	11,853	10,198	2	22,660
Toomey	0	648	0	1	3,626	0	4,276
Total	8,173	1,497	1,097	14,486	18,642	2	43,898

Management Area 4 – Wilderness: The management of this area is for preservation of wilderness qualities, and preserve and protect the natural condition and characteristics of designated lands and to provide for current and future public enjoyment of these areas and their wilderness character. These areas are to remain essentially unaltered and undisturbed by man, with natural ecological processes (including the natural role of fire) permitted to function with a minimum of human interference. Grazing by domestic livestock may occur where established prior to the Wilderness Act.

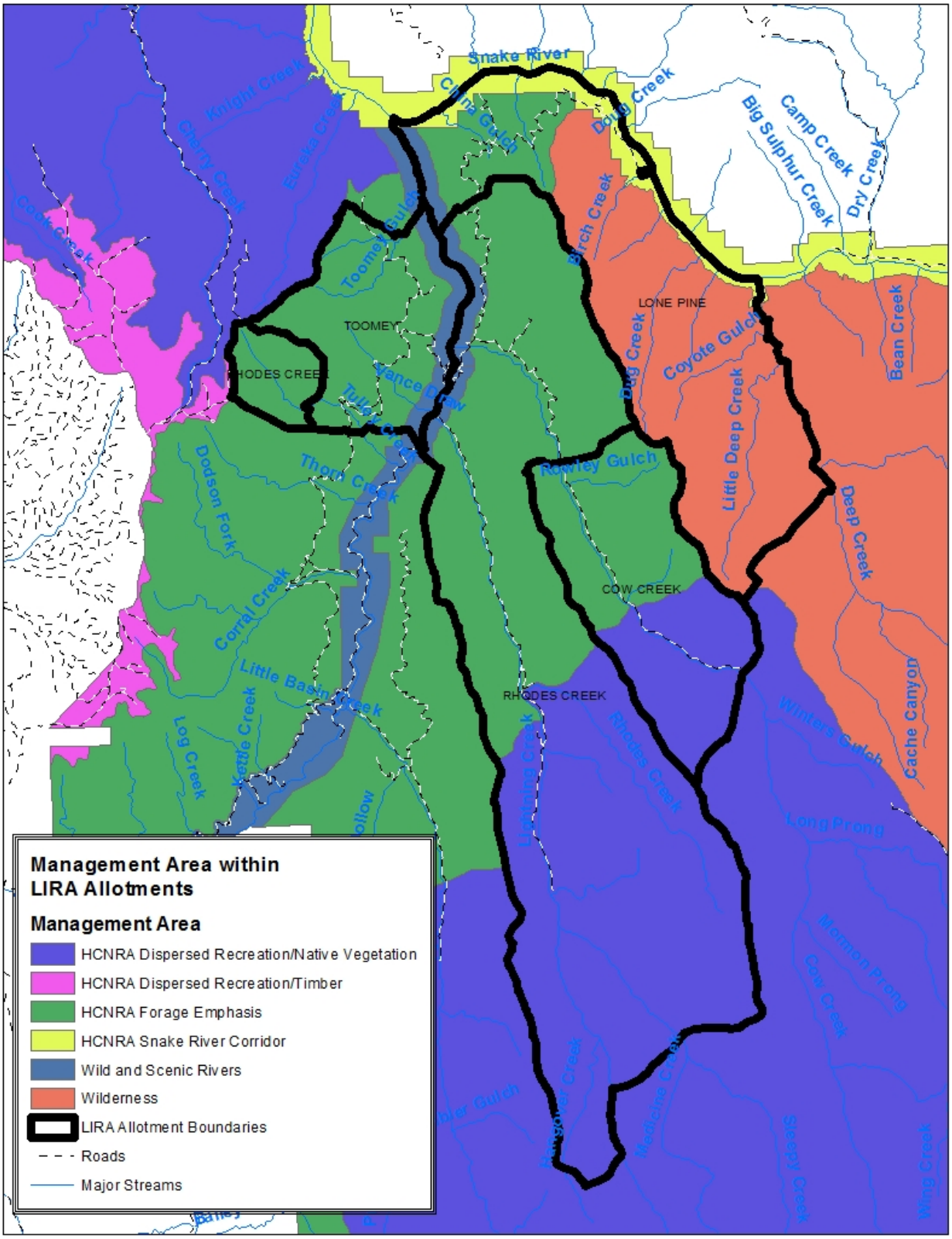
Management Area 7 – Imnaha River Wild and Scenic River: Management in this area is intended to protect and enhance the special values of the Imnaha River. Management of lands, including grazing, will not diminish the rivers free flow, water quality, and outstandingly remarkable values.

Management Area 8 – Wild and Scenic Snake River: The primary management emphasis is to protect and enhance the values for which the river was designated Wild and Scenic under the WSR Act.

Management Area 9 – Dispersed Recreation/Native Vegetation: Manage activities to provide many opportunities for dispersed recreation and to enhance native vegetation. Rangelands will be managed to maintain satisfactory range condition that will be achieved and maintained primarily by nonstructural means.

Management Area 10 – Forage Emphasis: The grasslands will be managed to provide maximum forage production with rangeland maintained in satisfactory condition (desired ecological status) and structural improvements being rustic in nature.

Management Area 11 – Dispersed Recreation / Timber Management: Combine dispersed recreation with timber management on the more productive timber growing sites within the HCNRA. The objective is to provide a variety of tree species, diversity of healthy timber stands, and dispersed recreation opportunities.



Map 2. Management Areas within LIRA Allotments

Goals, Objectives, Standards and Guidelines
Forest Plan

The Forest Plan provides goals, objectives, and standards and guidelines for livestock grazing management within the LIRA area.

Range

1) Forage production in excess to that needed for the health of the plant and soil resources will be made available for harvest by wildlife and domestic livestock within the forage and browse utilization standards and guidelines from the LRMP (1990), (pp 4-51 and 52).

Water

2) Give management and enhancement of water quality, protection of watercourses and streamside management units, and fish habitat priority over uses described or implied in all other management standards or guidelines (p 4-22).
3) Manage livestock grazing in riparian areas so as to avoid measurably increasing water temperatures on Class I streams. On Class II and III streams, management will limit temperature increases to the criteria in State standards (pp 4-23).
4) Mitigate negative impacts causing reduction in water quality to return water quality to previous levels in as short a time as possible (pp 4-23).
5) Enhance streambank vegetation where it can be effective in improving channel stability or fish habitat (pp 4-23).
6) Give areas in which water quality or channel stability are being adversely impacted high priority for treatment to minimize the effects of the impact or to correct the impacting activity (pp 4-23).

Fisheries Resources

7) GM-1 Modify grazing practices (e.g. accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives (PacFish, Appendix C).
8) GM-3 Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish (PacFish, Appendix C).

Threatened, Endangered, and Sensitive Species

9) Habitats will be protected and managed for the perpetuation and recovery of Proposed, Endangered, Threatened and Sensitive species (pp 4-30).
10) Management will strive for maintenance of native and desirable introduced or historical plant and animal species, and will provide for all seral stages in abundance and distribution (pp 4-

Wildlife

11) Habitat will be provided for viable populations of existing native and desirable non-native vertebrate wildlife species (pp 4-2).

Invasives

12) All environmental analyses conducted through NEPA for ground-disturbing activities will consider noxious weed management (Integrated Noxious Weed Management Plan, Decision Notice, Page 2).
13) All projects incorporate noxious weed prevention strategies (Integrated Noxious Weed Management Plan, Appendix D, Page 79).

Heritage Resources

14) Consider the effects of all Forest Service undertakings on significant cultural resources and avoid or mitigate any adverse effects (pp 4-20).

CMP

The CMP provides goals, objectives, and standards and guidelines for livestock grazing management within the LIRA area.

Gra-O1: Manage grassland vegetation to ensure continued ecological function and sustainability of native ecosystems. Maintain and/or restore the ecological status of grassland communities to their PNC, (potential natural community), recognizing their HRV (historical range of variability) (pp C-45).

Gra-O2: Develop management plans for all active grazing allotments which address identified issues and compatibility with the provisions of the HCNRA Act (pp C-45).

Gra-O3: Evaluate rangeland capability and suitability, and present rangeland condition or ecological status in relation to PNC (pp C-45).

Gra-O4: Evaluate annual impacts associated with livestock grazing in relation to established standards and thresholds (pp C-45)

Gra-S1: On lands determined to be unsuitable or not capable for grazing by domestic livestock or determined to be in an unsatisfactory condition, the rangeland vegetation production for these lands would not be allocated to the allotment's carrying capacity. Domestic livestock may still be permitted. In some situations incidental livestock use will be authorized on lands identified as unsuitable. In these situations, livestock will be removed before rangeland vegetation use exceeds 10% and soil disturbance exceeds 10% on lands determined to be unsuitable and authorizing incidental livestock use pp C-45).

Gra-S2: Satisfactory condition will be evaluated during the allotment management planning process. The minimum condition and trend standards must be met for rangelands to be considered as satisfactory.

a. Rangeland vegetation in both uplands and riparian habitats will be in mid seral ecological status with an upward trend or higher condition based on PNC.
b. Soils, this includes soil surface conditions and soil stability will be in a mid-seral ecological status with an upward trend or higher condition based on PNC.
c. Riparian hardwood age class will be in a mid-seral ecological status with an upward trend or higher condition based on PNC.
d. Riparian hardwoods from class distributions show no more than 35 percent in moderate long-term browsing impact class.

For those sites identified in unsatisfactory condition, management practices will be designed to improve ecological status to a satisfactory condition. For sites in a satisfactory condition, management practices will maintain or improve the ecological status.

Where rangeland resources are in an unsatisfactory condition, livestock grazing may continue if the rate of recovery is within 70 percent of the natural rate of recovery (pp C-46).

Gra-S3: Allotment management plans (AMPs) would establish site-specific rates of recovery to achieve the goals for ecological status, soil conditions, and riparian management objectives in conjunction with other applicable resource standards and guidelines contained in this management plan when determining appropriate livestock stocking levels (pp C-47).

Gra-G1: Emphasize enhancement and/or restoration of potential native vegetation (pp C-47).

Gra-G2: Incorporate management considerations in (Johnson and Simon 1987), and (Crowe and Clausnitzer 1997), or other FS approved guides, score cards or keys (pp C-48).

Gra-S4: When determining carrying capacity and range management objectives during the AMP process, include other uses such as wildlife, TE and S species, recreation stock, prescribe fire, ecological goals, and outfitter and guide activities as specified in the HCNRA Act (pp C-48).

Gra-S5: Implement grazing management practices to minimize the potential for transport of invasive plant propagates or seeds, or creation of habitats suitable for establishment of invasive species (pp C-48).

Gra-S6: Implement Forest Plan utilization standards (pp 4-52 and 53 of the Forest Plan) (pp C-48).

Gra-G3: During the allotment planning process evaluate periodic rest and deferred rotation grazing systems (pp C-50).

Gra-G4: Where feasible and desirable, plan and implement restoration projects to improve the health and sustainability of HCNRA grasslands, where current ecological conditions are mid- or earlier-seral status (pp C-50).

Gra-S7: Range improvements would be designed and located to minimize their impact on wilderness, scenic, heritage, fish, wildlife, unique botanical, and other resources (pp C-51).

Wil-O1: Manage historic sites that typify the economic and social history of the region and the American West to conform with the direction and regulations in the *National Historic Preservation Act of 1966*, as amended, and the *Wilderness Act of 1964*.

Wil-S9: Grazing of cattle and sheep where established prior to classification of the Wilderness (pursuant to section 4(d)(4) of the *Wilderness Act*) would continue to the extent it is consistent with the maintenance of the Wilderness resource and priorities established above (36 CFR 293.7). (CMP)

Pacific Northwest Invasive Plant Program Preventing and Managing Invasive Plants ROD

Applicable Regional weed management guidelines are incorporated into this project through the Regional EIS / ROD's (USFS PNRIPP 2005) amendment of the Forest Plan (1990). There are 23 standards for prevention, treatment and restoration associated with the USFS PNRIPP. All will be followed, however, below are the most applicable to range projects (outside of standards governing the actual treatment actions):

1. Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis; fire and fuels management plans, Burned Area Emergency Recovery Plans; emergency wildland fire situation analysis; wildland fire implementation plans; grazing allotment management plans, recreation management plans, vegetation management plans, and other land management assessments (pp 10).

4. Use only pelletized or certified weed free feed on all National Forest System lands. If state certified weed free feed is not available, individual Forests should require feed certified to be weed free using North American Weed Free Forage Program standards or a similar certification process. Choose weed-free project staging areas, livestock and packhorse corrals, and trailheads (pp 12).

6. Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder (pp 16).

4. Prioritize infestations of invasive plants for treatment at the landscape, watershed or larger multiple forest/multiple owner scale (pp 19).

Wallowa-Whitman National Forest Invasive Species Plan

The Wallowa-Whitman National Forest completed the Invasive Plants Treatment Project EIS and ROD in 2010 (2010 Weeds EIS). Most of the existing invasive plant infestations within the LIRA on the WWNF National Forest are covered under this analysis and have proposed herbicide treatments for the high priority weed species.

The 2010 Weeds EIS decision was remanded by the District Court of Oregon in December 2012; therefore specific herbicide weed treatments on the Forest are restricted during the litigation process. The restrictions apply to a portion of the LIRA area and will be adhered to as described in the court order (December 2012, Judge Simon, U.S. District Court of Oregon, issued an "Opinion and Order on Motion for Partial Vacatur").

Imnaha River Wild and Scenic River Management Plan (1993)

The Imnaha River Wild and Scenic River Management Plan (1993) provide standards and guidelines for livestock grazing management within LIRA area.

12. Permit domestic livestock grazing to continue if it is: consistent with the objectives of the individual river segments, protects and enhances the Outstandingly Remarkable Values, and protects water quality (pp 8).

    Forest Plan Standards and Guidelines for range management are acceptable within the river corridor. Any adverse impacts to OR values, water quality, or free flow, even though within Forest Plan Standards and Guidelines, will have immediate action taken to correct impact (pp 8).

13. If livestock grazing is inconsistent with the objectives of the individual river segments, not protecting and enhancing the Outstanding Remarkable Values, or not protecting water quality, modify grazing practices to meet these requirements (pp 8).

14. Make range management structures visually compatible with the Forest Service visual classifications of retention or preservation (pp 8).

Wild and Scenic Snake River Recreation Management Plan (1999)

The Snake River Wild and Scenic River Management Plan (1999) provide standards and guidelines for livestock grazing management within LIRA area.

1. Resources in the management areas within the river corridor will be managed pursuant to the management area direction established in the Forest Plan (pages 4-76 through 4-91) and the CMP FEIS except for the changes described in this plan (pp 1).

2. Individual resources will be managed pursuant to the applicable Forest-wide standards and guidelines established in the Forest Plan (pages 4-18 through 4-56) except for the changes described in this plan (pp 1).

3. Range Permit livestock grazing to the extent that it is compatible with range and river management objectives (pp 5)

Analysis Files

The analysis files that support this Environmental Impact Statement are available at the Wallowa Mountains Office in Joseph, Oregon.

Public Involvement

Scoping

Public scoping for LIRA was initiated on April 1, 2010, with the project's inclusion on the quarterly Schedule of Proposed Actions. On August 16, 2011, a letter describing the proposed action was mailed to 159 individuals, organizations, and agencies for their comment. These individuals, organizations, and agencies included grazing permittees, tribal representatives, state and federal resource management agencies, special interest organizations, and interested publics.

The Permittee holding the grazing permits on these allotments were included throughout the process. The scoping efforts generated responses from nine agencies, organizations, tribe or individuals. Comments are documented in letters, meeting notes, phone conversations, and e-mails. Refer to Appendix A for a list of the scoping comments and responses.

To clarify the proposed action, a field trip was held in the fall of 2011, and follow-up meetings, telephone conversations, and e-mails were made between the ID team (interdisciplinary team), and those who submitted comments. Much of the correspondence focused on what information should be provided in the environmental analysis. Information obtained from the scoping process is contained in the LIRA project file.

Consultation with Tribal Governments

Contacts were made throughout the analysis process with staff members of both the Nez Perce Tribe (NPT) and the Confederated Indian Tribes of the Umatilla Reservation (CTUIR). Meetings were held in the office and in the field. The following meetings were held in which the LIRA project was discussed. These meetings are supplemented by various other contacts through e-mail, telephone conversations, and meetings.

- Field trip to review the project area and address the proposed action was held on November 7, 2011 with NPT tribal staff and the LIRA IDT (Interdisciplinary team).
- Field trip to discuss tribal archaeology concerns was held on November 10, 2011 with NPT and FS archaeologists, range specialist/NEPA coordinator, area ranger.
- Meeting with NPT tribal staff members, and the IDT to discuss concerns and questions that resulted from the field trips was held on December 15, 2011.

- Meeting with NPT tribal staff members and a tribal leader to discuss the development of the proposed action was held on April 24, 2012.
- Staff-to-staff meeting with NPT tribal staff members to discuss the project, provide updates, including the development of alternatives was held on January 23, April 3, and June 19th 2013 respectively.
- Government-to-government meeting with CTUIR Board of Trustees to discuss the project and provide updates was held on April 16, 2010, August 31, 2011, May 9, 2012, and August 23, 2013 respectively.
- Staff –to-staff meeting with CTUIR Natural Resources committee staff members to discuss the project and provide updates was held on January 7, 2010, March 14, 2011, February 22, 2012, and May 20, 2013 respectively.
- Staff –to-staff meeting with CTUIR Fish and Wildlife committee staff members to discuss the project and provide updates was held on February 9, 2010, May 10, 2011, March 27, 2012, and June 25, 2013 respectively.
- Staff –to-staff meeting with CTUIR Cultural Resources staff members to discuss the project and provide updates was held on February 16, 2010, May 17, 2011, March 27, 2012, and June 25, 2013 respectively.

Chapter 2 – Alternatives

Five alternatives were considered and analyzed by the interdisciplinary team (IDT). Alternative A- No Grazing, and Action Alternatives B, C, D and E are analyzed in detail in the DEIS and are described below. An additional alternative was considered but not analyzed in detail.

Alternatives Considered but Not Analyzed in Detail

An alternative was considered by the IDT that would reduce the number of livestock authorized on allotments by a percentage and then follow with monitoring to determine if increasing livestock numbers is appropriate. The original intent of this alternative was to provide an alternative that would achieve an increased rate of recovery for vegetation. This alternative was considered, but not analyzed in detail because Alternative A accomplishes this, and Alternatives C and D also provide for increased rates of vegetation recovery. Rangeland condition results show the allotments overall are classified as being in satisfactory rangeland condition.

Alternatives Considered and Analyzed in Detail

The Cow Creek, Lone Pine, Rhodes Creek and Toomey allotments contain lands identified as suitable for domestic livestock grazing in the WWNF Forest Plan and HCNRA CMP FEIS. It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (FSM 2203.1, USDA Forest Service 2005a). By regulation, forage producing lands will be managed for livestock grazing where consistent with land management plans (36 CFR 222.2 (c)). In general current management is consistent with the goals, objectives, standards and guidelines of the Forest Plan and CMP, as described in Chapter 3.

Alternative A - No Grazing

Under this alternative, grazing would not be reauthorized and the current permit holders would be notified that their term grazing permits would be cancelled after two years, pursuant to Forest Service Handbook (FHS) 2209.13 part 16.24, and Code of Federal Regulations (CFR) 36 CFR 222.4(4)(1). The FSH and CFR regulations indicate that a two-year notification is required prior to cancelling a permit, except in emergency situations. Alternative A would close four allotments, eliminating livestock grazing from 43,897 acres of National Forest System lands. Permits would not be issued for any of the four affected allotments unless a subsequent NEPA analysis and decision to restock the allotments was made.

Maintenance of range developments on the allotments would no longer be the responsibility of the permittees. Developments built to facilitate livestock management, including allotment and pasture fences, livestock exclosures, and stock water ponds and water troughs would be abandoned. Facilities available for use by permittees during the grazing season would be managed through the Term Grazing Permit, a different permit, or agreement. Permittees who participated in the development of range improvements would be reimbursed for their amortized share, consistent with direction in FHS 2209.13, Chapter 70. Developments built to reduce

wildlife effects to resources, such as water developments and big game exclosures, would remain in place and would continue to be maintained by the Forest Service. Maintenance of unassigned allotment boundary fences would be assigned to the adjacent permittee.

Action Alternatives

The action alternatives are B, C, D and E.

The results of monitoring would determine if adaptive management strategies are needed to work towards the desired future condition. Since adaptive management is part of the proposed action, the specifics of the adaptive management strategies are included in three of the action alternatives. Adaptive management, as defined in 36 CFR220.3, is a system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes, and if not, to facilitate management changes that would best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.

Elements Common to All Action Alternatives (Alternatives B, C, D and E)

The following actions are common to all action alternatives because they would formalize changes in pasture boundaries that is already occurring on the ground, work to improve site specific conditions that have been a concern, identify and assign areas and timing of livestock concentration.

Cow Creek Allotment

- Remove the fences between the Schleur, Upper Schleur, Fingerboard, Upper Fingerboard, Salt Gulch and Upper Salt Gulch, and combine pastures into one pasture and referred to as Fingerboard (note: six of the pastures within the Cow Creek Allotment are a legacy of when the original ranch was homesteaded and intensely grazed by sheep and are no longer practical grazing units for cattle).

- The fence between Upper Rowley and Rowley pastures would be removed and the pastures combined into one pasture and referred to as Rowley (note: the Upper Rowley pasture was used by sheep herders to keep the sheep in the rims of Summit Ridge. The allotment is no longer grazed by sheep, therefore the fence is no longer necessary)

Rhodes Creek Allotment

- Install a gate constructed with traditional materials at the head of the designated recreation trail #1713 also known as the Eureka Bar Trail, at the first rim location from the trailhead to keep livestock from accessing the trail and the closed area. The gate would be located within T3N, R49E, Section 6.

- Construct a water development consisting of a spring box, trough, and less than 300 feet of pipeline in the Westside Cow pasture of the Rhodes Creek Allotment, located in T3N, R50E, Section 17 NE. The purpose for this development is to increase livestock use on the southern end of the pasture.

- Rotate use between the North Roy, South Roy, Bull pastures.

- Incorporate the Tulley pasture of the Rhodes Creek Allotment into the Toomey Allotment where it is a more logical management unit given both its location and geography (note: the Tully pasture is the only "island" pasture in the Rhodes Creek Allotment west of the Imnaha River, see Map 1). This would result in a gain of 1,014 acres to the Toomey Allotment coming from the Rhodes Creek Allotment.

Toomey Allotment

- Continue to use the Tulley stock driveway as the main ingress/egress route for cattle between the Chesnimnus area and the Cow Creek, Rhodes Creek, and Toomey Allotments.

- Reconstruct the fence between Upper and Lower Spain Saddle pastures to prevent drift of livestock, ensuring use only during specified grazing times.

- Redevelop Tips Trough; however the design of the redevelopment varies depending on the Alternative. Under alternatives B, D, and E the redevelopment would be at the spring source and would serve one pasture. Under alternative C it would be a more complex water system serving multiple pastures, see more specifics described in Alt C below.

Lone Pine Allotment

- Restrict use of Dug Bar Facility for concentrated livestock management (ie. branding, vaccinating) annually from March 20th -April 10th during the high traffic recreation use to reduce potential conflicts between livestock and recreational users, and permittees and recreational users.

- Grazing use by the Nez Perce Tribe would reduce the head months available to a Term Grazing Permittee and would be decided on annually at the annual operating meeting. Prior to permitting livestock to graze through a Term Grazing Permit, the potential permittee must be willing to accept that the level of stocking could be reduced or vary from year to year contingent on Nez Perce Tribal grazing. The Lone Pine allotment would be analyzed for a maximum of 1,833 head months (33 head month are for horses) from December 1 to May 31.

Project Design Criteria (PDCs) Common to All Action Alternatives

The following PDCs apply to all action alternatives (Alternatives B, C, D and E). PDCs are put into place as a prevention technique based on past knowledge of livestock management activities and are aimed to prevent future potential impacts to particular resources as discussed

below; these criteria are more general in nature than mitigation measures and apply to the whole project area or one allotment unless otherwise specified:

Rangeland

- The Term Grazing Permits for the current permittees would be modified to include the maintenance responsibility for any new fences and range improvements initiated by the decision made for the management of the LIRA area.

- Cattle would be removed from the pasture or allotment when utilization standards have been met or by the "off date" specified on the permittee' s AOI. Grazing extensions may be granted if allowable use guidelines would not be exceeded and only after an appropriate inspection is conducted to determine whether it is feasible for an extension to occur.

- Salt would not be placed in ephemeral draws. When available, salt would be placed on already hardened surfaces like roadbeds or rock outcrops, ¼ mile away from draws, streams, rivers or TES plant occurrences, unless site-specific conditions warrant an Area Manager approved salting location within one of the zones listed above. Additionally, salt would not be placed in areas next to open roads, campsites or trails. Salt would be used as a tool to improve cattle distribution.

- Every reasonable effort would be made when designing and constructing range improvements within the NRA portion of the allotment to insure a "rustic" appearance, when those improvements may impact the recreational experience of the public (CMP).

- When soil conditions are saturated, low stress handling techniques (Cote, 2004) would be used to move livestock. Livestock that are trained to respond to low stress handling techniques can be easier for riders to control and move on one trail as one herd versus scattering and taking side trails, which could potentially cause more soil disturbance. Livestock would be moved and "placed" to distribute them on less steep slopes that would be less prone to hoof shear impact.

Invasive Plants

- To reduce the potential for weed spread from known noxious weed patches, known weed occurrences within allotments would be depicted as "Areas to avoid concentrating livestock use (except those occurrences known only from open road edges). This information would be provided to the permittee by the district Invasive Plant Manager. Avoid concentrating ground disturbing activities in these areas, including but not limited too; salting, new water developments, unloading, round-up, and stock driveways – unless the area is deemed at a low risk of weed spread because of treatment success. Coordinate by providing livestock management information with the district Invasive Plant Program.

- Permittees would be provided with a current list of noxious weeds of concern on the Forest, and a map of those known to occur within the LIRA area. Permittees would also

be asked to add noxious weed locations that they know about, but are not currently identified on the map.

- To reduce the risk of introducing noxious weeds, any seed used in the maintenance of water developments or in restoration projects would be certified "weed free". Seed priority would be given to local sourced native species in compliance with Region 6 restoration materials guidelines.

Plants including Proposed, Endangered, Threatened, or Sensitive (TES) including Spalding's catchfly

- A map titled "Areas to avoid concentrating livestock use" would be made to indicate Spalding's catchfly and known sites of TES plants that could be sensitive to livestock grazing. Locations would include ¼ mile buffer unless site-specific conditions dictate otherwise and the Forest Service concurs. The map would be provided to permittees and reviewed at the annual operating meeting.

Wildlife

- The two livestock watering locations proposed for development or reconstruction would be designed to enhance wildlife habitat for species that utilize the area at the water source. The riparian area, including the source and overflow, would be fenced to exclude livestock and the water piped to a trough outside the fenced area. Water troughs would not exceed 24 inches in height, include the placement of escape ramps in the troughs for birds and small mammals and checked on a two year rotation by a combination of the Wallowa Mountain Zone wildlife and range specialists.

- In order to reduce hazards to big game animals, all fences that are new construction, or reconstruction of old fences, would not exceed 40 inches from the top wire to the ground. The bottom wire would be 16 inches above the ground to allow wildlife to go under the wire. A full description of wildlife friendly fencing techniques is contained in the project file (USDI, USDA, Fences 1988).

Cultural Resources

- To ensure protection of archaeological sites, site-specific surveys would occur prior to implementation of any new ground disturbing activities (i.e. improvements).

- To ensure protection of archaeological sites, if cultural resources are located / relocated during implementation of any action, work would be halted and the Wallowa-Whitman National Forest Archaeologist would be notified. The cultural resource would be evaluated and a mitigation plan developed in consultation with the Oregon SHPO if necessary.

Riparian Areas

- To reduce cattle impacts on riparian vegetation and stream channels, permittees would select stock driveway locations that avoid riparian areas except at needed crossings, and would ride and herd cattle as needed throughout the grazing season to reduce cattle grazing and trailing in riparian areas. An exception to this is the use of the Tulley stock driveway.

Scenery

- Water troughs shall be of a color that does not stand out and draw visual attention. Existing troughs that are a visual distraction shall be painted or replaced.

Allotment-Specific PDCs:

Lone Pine Allotment

- Minimize physical impacts to the recreational trail systems by avoiding cattle trailing during times when the soils are saturated.

- Trailing livestock to the Lone Pine allotment would be on an approved route on the Dug Bar Road with approved overnight stops in the Imnaha River Corridor if they are on NFS lands or lands where the management is waived to the Forest Service. Specific routes and locations of approved overnight areas can be found in the project file.

- Manage livestock to reduce time spent near campsites and trailheads, minimize the time they spend in riparian areas, schedule pasture rotation to minimize livestock recreationists interactions.

- Plan for coordination between recreation and allotment management to avoid conflicts. Items such as; time and location of activities (recreation and livestock); location of facilities and their influence on high use areas; communication between resource managers, permittees, and visitors.

Toomey Allotment

- If possible livestock shall be moved up or down the Tulley stock driveway when soil is dry or frozen.

Mitigation Measures Common to All Action Alternatives

The following are mitigation measures common to all action alternatives (Alternatives B, C, D and E). Mitigation measures address potential impacts by avoiding adverse impacts, minimizing adverse impacts by limiting activities, or rectifying adverse impacts through rehabilitation. In addition to the mitigation measures listed below, measures are included from the Forest Plan, as amended, and any agreements reached during the Endangered Species Act consultation

process. Mitigation measures would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the Annual Operating Instructions to provide for further protection of resources.

All Allotments:

- To minimize the effects to the soil and vegetation resources the Tulley stock driveway would continue to be the main ingress/egress route for cattle between the Chesnimnus area and the Cow Creek, Rhodes Creek, and Toomey Allotments.

- In pastures with Spalding's catchfly, employ the following steps as described below to protect the plants and their habitat and the soil resource particularly in deep soils on steep north facing slopes. The trigger point for changing management would be the same for both Spalding's catchfly and soil impacts on deep soils on steep north facing slopes. Research about Spalding's catchfly is limited to date. As a result management strategies proposed are aimed at improving vegetation and soil condition serves as a proxy for maintaining viable Spalding's catchfly habitat. These same management strategies would respond to the other significant issue of deep soils on steep north facing slopes with the intention of reducing soil disturbance by livestock.
  Annually, it would be the responsibility of the Forest Service to work with the permittee at the AOI meeting to determine if there is flexibility in the grazing schedule and/or number of cattle to reduce or rest pastures where there are concerns due to previous year's livestock use. It that is not effective the following strategies would be implemented;

- Increase riding and herding of livestock to distribute livestock in other areas of the pastures that are not as prone to hoof shear and have available forage. This would be the responsibility of the permittee.

- If the above change in management is not fully effective and the allowable use is exceeded within a pasture as determined by short term implementation monitoring, then the season of use in the pasture where the exceedence occurred would decrease by up to two weeks the following grazing season.

- If the increased management (riding and herding) and decrease in the season of use of pastures where the allowable use has been exceeded does not reach the desired condition as determined by long term effectiveness monitoring, then a decrease of up to 10% of the stocking numbers for each pasture would occur.

- Long term monitoring on or adjacent to the areas of concerns would be conducted to determine long term trend (see monitoring section) and if the adaptive management triggers are appropriate in working towards maintaining or improving the site. This is the responsibility of the Forest Service range specialist. Specifically for soils concerns the modified line-point intercept protocol for soil surface condition may be used stand alone or with other monitoring methods (see Soils Resource report for more information).
- A combination of the above management strategies would be implemented depending on the outcome of long term effectiveness monitoring.

- If the long term effectiveness monitoring demonstrates that the desired condition has been reached the permittee may be authorized during the AOI meeting to increase the number or livestock or extend the season of use with approval from the Area Ranger within the effected pastures.

Rhodes Creek Allotment

- Protect a heritage site In the Willow Springs pasture of the Rhodes Creek Allotment, at the Willow Springs Pond area, (T4N, R50E, Section 30 SESE) from livestock impacts. This would be the responsibility of the District archeologist in conjunction with the District range specialist and permittee. This includes but is not limited to fencing, water development further down the drainage, strategic rock placement, and shade reduction to discourage livestock from congregating in the area.

Lone Pine Allotment

- To minimize the conflicts with recreationists and impacts to visual quality use of the Hospital Area would be limited to sick animals and no more than 10% of the herd would be allowed to be in the Hospital area throughout the course of the grazing season (30 animals). Not to exceed 60 head months for the total grazing season unless otherwise approved by the Area Manager. This is the responsibility of the permittee.

- To minimize the conflicts with recreationists, livestock would not be allowed to water out of the Snake River by fencing or herding. This is the responsibility of the permittee. If herding is unsuccessful for three consecutive years a fence would be constructed to act as a physical barrier between the livestock and the Snake River. The fence location and design with appropriate materials would be coordinated between the District range specialist, recreation specialist, archeologist, and permittee.

- To minimize impacts to recreationists the criteria listed below for areas along the Snake Wild and Scenic River corridor, and popular trails within the allotment would be used;
  - Salting locations would not be located within 100 yards of trails #1726, 1727 and 1707, and the Dug Bar Road, and not within the Wild and Scenic boundaries of the Imnaha River and Snake River or ¼ mile of developed campsites. Responsibility of the permittee.
  - Dead livestock would be removed or destroyed within 24 hours of observance or notification if they are located within 300 feet of the Snake River, developed campsites, trails #1726, 1727, and 1707, the Dug Bar road, Dug Creek, Birch Creek or Deep Creek. Responsibility of the permittee.

- To minimize impacts to cultural sites, protect inventoried cultural sites within the allotment including. This would be coordinated between the District range specialist, archeologist, and the permittee.

- To minimize impacts to visitors and the interpretive site livestock would not be permitted at the Nez Perce National Historical Park interpretive site at Dug Bar. This area would be fenced and is the responsibility of the permittee (grazing or outfitter/guide) utilizing the Dug Bar facility.

- To protect the historical and recreational value of the Nee-Me-Poo National Historical Trail (#1727) the permittee would minimize livestock trailing during periods when the trail is wet and muddy and not using the Lone Pine Saddle as a herding area for livestock.

- To minimize conflict with recreationists the permittee(s) are to keep livestock out of the Deep Creek confluence with the Snake River and Robinson Gulch area. It has been closed to livestock grazing in previous management plans. If this cannot be done successfully with riding and herding for three consecutive years, a fence may be constructed as a mitigation measure and is considered in this analysis as a potential range improvement to be constructed. The specific fence location and design with appropriate materials would be a cooperative range improvement and coordinated between the District range specialist, recreation specialist, archeologist, and permittee.

Monitoring Common to All Action Alternatives

Monitoring required by higher order plans, such as the Forest Plan or CMP would be adhered to. Unless otherwise identified, completion of these monitoring measures is the responsibility of the Forest Service who administers the allotments. Monitoring that is unique to the proposed actions is listed below;

Short term, Implementation Monitoring (1-3 years)

- Complete utilization monitoring as needed during the grazing season at designated key areas to ensure end of season standards can be met. Key areas are locations within the pasture that are representative of the livestock use within the pasture. Key areas are determined by the Forest Service Range Specialist with input from other resource specialists and may be added or moved (for example moving a key area closer to an Spalding's catchfly occurrence) in order to more adequately determine livestock use within the project area.

    - Utilization monitoring would be completed using the appropriate approved sampling protocol as directed in FSH 2209.21 Chapter 20.

    - In areas where soil disturbance by livestock is a concern, soil disturbance monitoring would be implemented every one to two years using a line-point intercept protocol

- Administrative inspections and monitoring, see Rangeland Resource Report for additional information.

Long term, Effectiveness Monitoring (3-10 years)

- Complete trend monitoring using the appropriate methodology needed to identify trends for particular upland attributes and to include biological soil crusts and soil disturbance (Parker 3-step, ecoplot, cover/frequency, line point intercept etc.) every 3 to 5 years on sites in unsatisfactory condition and every 8 to 10 years on sites in satisfactory condition.

- To identify tends in soil conditions, use the modified line-point intercept for soil surface condition protocol.

- New long term monitoring sites may be added in the vicinity of Spalding's catchfly to determine trends in the areas where the occurrences of the plant are.

When pastures are found to be in unsatisfactory condition, modified utilization standards are required to work towards achieving the desired condition for the site (Forest Plan and CMP). One method of changing livestock management is to change the utilization standard. To reduce livestock grazing pressure on an area a more stringent utilization may be applied. Once utilization standards have been met, the permittee must move livestock to the next available grazing unit. If this is the last unit in the schedule, and adequate forage is available, the permittee may be given the option to move livestock into an approved pasture used earlier in the grazing season. If, in accordance with monitoring results, this is not feasible, then the permittee must remove livestock from the allotment. If livestock are removed from the allotment prior to the permitted off-date in any three out of five years, then there may be a need to modify the numbers of permitted livestock or the season of use on that allotment. An average head month calculation, for all five years, would be conducted and the permitted numbers or season of use may be modified. However, if no early removal has been necessary, and residual utilization measures show that there is excess forage available at the end of the season, then the authorized officer may identify a need for added analysis to potentially increase the authorized head months for that specific allotment.

If continued long-term monitoring identifies other areas in unsatisfactory condition (upland or riparian) then a site-specific desired condition would be identified and livestock management would be modified. If conditions on unsatisfactory condition sites continue to decline the allowable use is reduced. This could happen through reduction in season of use, reduction in numbers of permitted livestock, modification of salting protocols, identification and development of other off-site water, construction of enclosure fences, or other actions designed to reduce the use of livestock on rangelands. If construction of new water developments, or enclosure fencing are needed, further site-specific NEPA analysis would be necessary. Project Design Criteria, mitigation and monitoring measures would be included in the AMPs for each allotment.

Timing

The timing for the beginning and end of the grazing season, and the dates for movement to a new pasture is estimated in the each allotment, and in the annual operating plan. However, timing varies each year based on factors such as range readiness, climatic fluctuations, utilization standards, and resource conditions. Use would be authorized before each permitted

season and would outline total number of livestock and on/off dates for that grazing season. However, total use would not exceed the total permitted head months as identified in the term grazing permit. Utilization standards and resource conditions then determine livestock placement or movement within the grazing season.

Private Land

Although there is private land within the allotments, there have been no Term Private Land Grazing Permits associated with any of the private lands within the project area since 2004. When discussing management within the allotments in the project area, there is mention of private pastures. Private pastures are on private land, and may be used in conjunction with pastures within the LIRA allotments. However, the grazing within private pastures is conducted in one of two ways; 1) the pasture is completely fenced and used separately from any other pastures within an adjacent allotment (generally these are areas where the cattle are fed hay), or 2) the fence between the private land and the allotment pastures is non-existent or in disrepair and the private land is grazed within the same stocking rate and season of use as the adjacent allotment pasture. Direct and indirect effects would not be analyzed for the private pastures and private land because management on those lands is not waived to the Forest Service. However, the cumulative effects of those private pastures would be considered in Chapter 3.

Alternative B – Current Management

Alternative B, this alternative is authorizing livestock (cattle) and an incidental level of horse grazing within the LIRA allotments (Table 2-1). The level of permitted use would be similar to past levels that have been authorized through term grazing permits (FSH 2230, 2231.11 and 2231.13), which are administered each year by annual instructions and authorized by the payment of grazing fees (FSH 2230 2231.41). A detailed pasture-by-pasture description of current management is in the range section of Chapter 3 in the existing condition. Everything in current management is proposed to continue in Alternatives C and D with additional actions to address issues (see Chapter 1, Issues) unless otherwise explained.

Table 2-1. The current authorized use within the LIRA analysis area on the Term Grazing Permit.

Allotment	Number of pastures	Livestock Type	Permit Type	Permitted Numbers	Duration	Head Months
Cow Creek	10	Cattle	Term	231	11/1-12/31 2/1-5/15	1,255
Lone Pine	6	Cattle Horse or Mule	Term	300 6	12/1-5/31	1,800 33 horse
Rhodes Creek	17	Cattle Horse	Term	784 500 784 15	11/1-2/15 2/16-4/15 4/16-5/15 11/1-5/15	4,495 97 horse
Toomey	6	Cattle	Term	184	11/1-12/31 2/1-5/15	1,000

This alternative requires permittees to achieve proper livestock distribution through herding and salting techniques and maintenance of existing water developments and fencing. Stocking levels and season of use are discussed in the description by allotment section below. Stocking of each allotment is described in terms of head-months (HM). A HM is a unit of measure that counts one animal for 30.4 days. A cow-calf pair qualifies as one animal in these calculations if the calf is 6 months of age or less.

The grazing systems for Alternative B are described below. Refer to Maps in Chapter 3 and below for the allotments and pastures.

Cow Creek Allotment

A total of 1,255 head months of livestock would be authorized on the 5,824 acre Cow Creek Allotment annually between the dates of February 1 through May 15. The Cow Creek allotment is currently divided into ten pastures; West Cow Creek, Rowley, Upper Rowley, Fingerboard, Upper Fingerboard, Schleur, Upper Schleur, Salt Gulch and Upper Salt Gulch, and Deer Creek. For the Cow Creek allotment, this would be to combine Fingerboard, Upper Fingerboard, Schluer, Upper Schluer, Salt Gulch, Upper Salt Gulch and Deer Creek into one pasture named Fingerboard. For the same reason, Upper Rowley and Rowley would be combined into a pasture named Rowley. West Cow Creek and Deer Creek boundaries would remain the same.

The Cow Creek Allotment is currently managed under a rotational system and as part of a larger grazing system that includes Rhodes Creek and Toomey allotments, as well as private land. The Cow Creek Allotment would continue to be managed under an elevationally-determined rotational grazing system within the pastures. Generally, in the beginning of March the cattle would enter the allotment after they have calved and move from the lower to higher elevation during the grazing season until mid-May. Pasture moves are based on resource condition and utilization standards (Forest Plan) in key areas. At the end of the authorized season of use, the livestock would be herded back through the lower elevation pastures to exit the allotment, utilizing roads to avoid trailing on steep slopes with soil concerns or through riparian areas.

Under this alternative, grazing would continue to be managed to maintain desired upland and riparian conditions. Grazing in areas identified in unsatisfactory condition would be managed as earlier discussed. Table 2-2 is an example of the grazing system for the Cow Creek Allotment. Table 2-1 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Cow Creek Allotment would not be exceeded, although the number of head and dates may vary from pasture to pasture based on anticipated weather, utilization, and/or resource conditions using knowledge based off of the previous grazing season and what is known about these factors prior to the next grazing season. These adjustments are generally made at the AOI meeting; however may be adjusted during the grazing season as more is known about the weather, utilization, and resource conditions

Table 2-2. Current authorized use in the Cow Creek Allotment that would continue under Alt B

Alternative B, Cow Creek Allotment Grazing Rotation						
Pasture	Head	Feb	Mar	Apr	May	Exit
Rowley and Upper Rowley (cattle are combined into one herd from multiple herds in Rhodes Creek Allotment with staggered entry)	75	15--	--14	from E. Bench Lightning		
	125*		1--14	addition from private land		
	300		15--30	from Foster		
	350				1--15	Exit**
Upper Schluer/ Schluer/Salt Gulch/Upper Salt Gulch	50			1--30		
Fingerboard	100			1--30		
Deer Creek	200			1--30		
West Cow Creek	25-50	15--	--30	from E. Lightning Bench		
	25			1--30	exit different route	

*Indicates re-entry of livestock onto allotment from private land

** Indicates exit would be using the Tulley stock driveway

In mid-February, as the cattle are calving, the livestock start entering the Rowley pasture from the Rhodes Creek Allotment from the East Lightning Bench, Foster, and private land pastures until there is a herd of 300 cow/calf pairs. The cattle graze in Rowley pasture until the end of March. They are then split into three herds; one herd goes to the Upper Schluer, Schluer, Salt Gulch, and Upper Salt Gulch pastures; the second herd goes to Fingerboard; and the third herd goes to Deer Creek for the month of April. A small group from East Lightning Bench and enters West Cow Creek in February and remains there until the beginning of May. Due to the geography of the area, it is shorter distance and safer for the riders that they enter from the Lightning Creek bench and trail the cattle north and east staying at bench level elevation rather than coming up from Cow Creek, see Map. In early May all of the cattle within the allotment are gathered and processed (calves are branded and vaccinated) at the corrals at the Litch place, herded back into Rowley pasture for two weeks, and then herded out of the Cow Creek Allotment to exit the Imnaha canyon by mid-May.

A map of this allotment can be found at the end of this chapter.

Rhodes Creek Allotment

A total of 4,495 head months of livestock would be authorized on the 22,660 acre Rhodes Creek Allotment annually between the dates of November 1 and May 15. A total of 97 head months of horse grazing would occur in the Homestead pasture within the allotment and on adjacent private pasture. The Rhodes Creek Allotment is currently divided into 17 pastures including; Sleepy Breaks, Lightning/Hangover, Butcherknife, Rhodes Creek, North Roy, South Roy, Bull Pasture, East Lightning Bench, West Lightning Bench, Westside Cow, Willow Springs, Holmes, Foster, Homestead pasture, Tulley, and private land pastures (not counted). Alternative B would incorporate the Tulley pasture into the Toomey Allotment, which would reduce the number of pastures in Rhodes Creek to 16. Other than the reduction in pasture numbers, the

rotation schedule that is currently in use would continue under Alternative B. Please refer to Table 2-3 for an example of the grazing rotation.

This allotment is currently managed under a rotational system and as part of a larger grazing system which includes Cow Creek and Toomey allotments, as well as private land. A decreased stocking rate has occurred on this allotment as a result of the current permittees acquirement of Cow Creek and Toomey allotments in 2004. The later season of use (March-May) of the Lightning Creek bench pastures has significantly reduced since that time. The pasture use within the allotment is based on the elevation and weather conditions. Under this alternative the allotment would continue to be managed under an elevationally-determined rotational grazing system within the pastures. When the cattle enter the allotment they would be placed in the higher elevation pastures up the Lightning and Rhodes Creek drainages. The cattle would move from pasture to pasture during the grazing season, with moves based on resource condition and utilization standards in key areas (refer to PDC section for more explanation). In the higher elevations the cattle may also be moved earlier depending on the weather, as it snows and the forage is no longer readily available, the livestock would be moved to lower elevation pastures where the forage is exposed. The cattle would be moved into pastures in adjacent allotments (Toomey and Cow Creek Allotments) before and during the calving period which begins in March and a portion of the herd would be moved back into the lower elevation pastures in the Rhodes Creek Allotment before exiting the allotment for the grazing season. At the end of the authorized season of use, the livestock would be herded utilizing existing trails and roads to avoid trailing through riparian areas before being moved off the allotment. For the Rhodes Creek Allotment this is mainly the Dug Bar Road and the road adjacent to the Lightning and Rhodes Creek drainages.

Under this alternative, grazing would continue to be managed to maintain desired upland and riparian conditions. One aspect unique to this project area when compared to allotments grazed in the summer is that it is important to take into consideration short winter day lengths and potentially hazardous weather caused by snow and ice when moving livestock, these factors may lead to longer move times or earlier or delayed move dates between pastures depending on the conditions. Grazing in areas identified in unsatisfactory condition would be managed as earlier discussed. The following, Table 2-3 is an example of the grazing system for the Rhodes Creek Allotment. Overlapping days in rotation is due to the time it takes to trail cattle from one pasture to another pasture, or another allotment within the project area. The Table 2-1 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Rhodes Creek Allotment would not be exceeded, although the number of head and dates may vary from pasture to pasture based on weather, utilization, and/or resource conditions.

In mid-November the cattle would be moved from the Chesnimnus Allotment down into the Imnaha Canyon via the Tulley stock driveway, through the Toomey Allotment. About 140 cows and 40 bulls would remain in the Toomey Allotment (see Toomey Allotment description and narrative). The rest of the herd would continue on to the east and would be herded into the high elevation pastures in the Rhodes Creek Allotment, which are located up the Lightning Creek drainage, farthest to the south. The herd is broken into four herds at this stage in the grazing season for entry into the “breaks” pastures. Approximately 400 go to Sleepy Breaks, 250 go to

Lightning Creek, Lightning/Hangover, 80 go to Butcherknife, and 80 go to Rhodes Creek. Up to 40 cattle from those herds that graze in the breaks that the permittee determines a need to watch them more carefully may be placed in the North and South Roy, as well as the Bull pasture during that time where they are more easily accessible in case they need medical attention. After the cattle have moved onto the benches the bulls (approximately 40) use North Roy, South Roy, and the Bull pasture until April. The current permittee owns a ranch house up the Lightning Creek drainage which makes it more feasible to tend to the livestock daily. In the beginning of January, the weather effectively drives the cattle back toward the north boundaries of the breaks pastures, towards the lower elevation "bench" pastures.

Table 2-3: Current authorized use in the Rhodes Creek Allotment that would continue under Alt B

Alternative B, Rhodes Creek Allotment Grazing Rotation									
Pasture	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Sleepy Breaks	400	1--	--	--5					
Butcherknife	80	1--	--	--10					
Rhodes Creek	80	1--	--	--10					
Lightning Creek, Lightning/Hangover	250	1--	--	--20					
North and South Roy (hospital) (up to)	20			hospital	15--	--	--	--5	
Bull Pasture (up to)	20			hospital	15--	--	--	--5	
Private Land (Lightning/Cow Ranch)	110			21--	--	--15			
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
West Lightning Bench	200			11--	--28	100 head to Willow Springs 100 head to Toomey			
East Lightning Bench	500			6--	--28	100 go to Holmes, 25 to Westside Cow, 175 to Foster, 200 to Johnson Canyon			
				21--	--28				
Holmes	100			21--	--10				
Westside Cow	25			21--	--10				
Foster	175			21-	--10				
Johnson Canyon (Toomey Allotment)	200			21--	--10				
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Holmes	200				11--	--15	added 100 from Johnson Canyon		
Westside Cow	125				11--	--30	added 100 from Johnson Canyon		
Foster	225*				11--	--20	added 50 from private		
Willow Springs	170*					1--30	added 70 from private		
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit

East Lightning Bench	75						1--30		
West Lightning Bench	100						1--30		
Sleepy Breaks	175							1--30	Exit
Tulley									

*Includes cattle returning to allotments from private land

Between January 5 and 15 the cattle are gathered and sorted according to their Body Condition Score (BCS). The BCS is a numerical system used to suggest the relative fatness or body composition of the cow. Cattle that have a lower BCS are thinner cattle that have higher nutritional needs. These cattle are split off to be put on feed (hay) on private land. On average, about 110 of the cattle would need additional forage for 30-60 days to maintain a desirable BCS. Once the harshest part of winter has passed, these livestock would be gradually put back onto the pastures on Rhodes Creek, Cow Creek, or Toomey allotment pastures. All cattle that remain on the allotments would be redistributed into other portions of the Rhodes Creek Allotment for the remainder of January and February, with the exception of one herd that would go to the Toomey Allotment for approximately three weeks on the way to other Rhodes Creek pastures, and another herd that would go to the Cow Creek Allotment on the bench level (closest pasture to East Lightning Creek Bench in the Rhodes Creek Allotment). Calving season; the pastures closer to the Cow Creek ranch house would make checking on the cattle more accessible to the permittee. Once calving has mainly concluded, the cattle (now cow/calf pairs) would be redistributed into several groups that would be placed in the Cow Creek and Toomey Allotments, with some going back into portions of the Rhodes Creek Allotments. In May the livestock would be gathered and staged to exit the Imnaha Canyon around May 15 via the Tulley stock driveway, up to the Chesnimnus Allotment and private land. Refer to Table 2-3 and Table 2-4 and associated maps for more detailed information. The main pastures used at this point in the grazing season through the beginning of April would be East and West Bench Lightning, Willow Springs, Holmes, and Foster. February - March is also the main calving season, the pastures closer to the Cow Creek Ranch are used. Once the calving season has mainly concluded the cattle (now cow/calf pairs) are redistributed into several herds which are placed in Cow Creek and Toomey Allotments. Some cattle return to pastures within the Rhodes Creek Allotment. See Table 2-2 and Table 2-4 and associated maps for more detailed information and description. In May the livestock are gathered and staged to exit the Imnaha Canyon around May 15th via the Tulley stock driveway en route to Chesnimnus Allotment and private land.

Maps of this allotment can be found at the end of this chapter.

Toomey Allotment

A maximum of 1,000 head months of livestock grazing would be authorized in the 4,276 acre Toomey Allotment annually between the dates of November 1 through May 15. The Toomey Allotment is currently divided into six pastures including; Upper Spain Saddle, Lower Spain Saddle, Spring Gulch, Johnson Canyon, Toomey, and private land pastures. Alternative B would incorporate the Tulley pasture of the Rhodes Creek Allotment into the Toomey Allotment.

The addition of the Tulley pasture would make 7 pastures in the Toomey Allotment. This allotment is currently managed under a rotational system and as part of a larger grazing system which includes Cow Creek and Rhodes Creek allotments as well as private land. Under this alternative the rotational schedule that is currently in use would continue and grazing would continue to be managed to maintain desired upland and riparian conditions. Grazing in areas identified in unsatisfactory condition would be managed as earlier discussed. Table 2-4 is an example of the grazing system for the Toomey Allotment. Table 2-1 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Toomey Allotment would not be exceeded, although the number of head and dates may vary from pasture to pasture based on climatic condition, utilization, and/or resource conditions.

Table 2-4: Current authorized use in the Toomey Allotment that would continue under Alt B

Toomey Allotment Grazing Rotation										
Pasture	Herd	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Upper and Lower Spain Saddle	T1	140 40 bull		1--31						
Johnson Canyon	T1	140 40 bull			1--31					
	R4	200				21--	--10	from E. Lightning Bench		
Private land (Cow Creek Ranch)	T1 herd splits	140 total 70 70				1--30 1--	--15	to Spring Creek to Willow Springs		
Private land and Rhodes Creek Allotment	Bulls	40 bull				1--	--	--	--15	Exit
Toomey	T2	100	from Holmes				16--	--	--15	Exit
Upper and Lower Spain Saddle	T4	100	from W. Lightning Bench					1--	--15	Exit
Spring Gulch	T1*	70					1--	--15		
Tulley Creek	T1	70						15--	--15	Exit

*Re-entering allotment from private land

Cattle are placed in the Upper and Lower Spain Saddle in December, about 140 cows and 40 bulls. They are moved into the Johnson Canyon pasture in January, then the cows are taken to private land at the Cow Creek Ranch and the bulls are left on the private land at the Tulley Creek Ranch through the rest of the grazing season. A herd from Rhodes Creek comes over to Johnson Canyon pasture to be staged to move to other Rhodes Creek pastures, about 200 from

February 20 to March 10. This also facilitates the cows calving closer to the ranch houses where they can be more closely monitored. The cattle that were taken to the Cow Creek Ranch private land re-enter the allotments in two herds, one herd of 70 reenters into the Willow Springs pasture (Rhodes Creek Allotment) on March 1, and the other herd of 70 enters March 15 into Spring Creek. In early March a herd from the Rhodes Creek Allotment, Holmes pasture, are brought to the Toomey allotment to graze in the Toomey pasture before exiting the allotment in May. The cattle placed in Spring Gulch pasture move one more time into the Tulley Creek pasture until they exit the allotment in May. Cattle from Rhodes Creek Allotment are placed into Upper and Lower Spain Saddle in early April to be staged to exit the allotment around May 15th. There is an area closed to livestock grazing by the Imnaha River, see map of Toomey Allotment for location.

A map of this allotment can be found at the end of this chapter.

Lone Pine Allotment

The Lone Pine allotment is currently vacant due to the previous permittees permit cancellation due to non-compliance; the permit was not cancelled due to resource concerns. Alternative B would permit the level and system of grazing that was in place most recently (before the permit was cancelled in 2010). A total of 1,833 head months of livestock grazing would be authorized in the 11,138 acre Lone Pine Allotment between the dates of December 1 and May 31, annually. The Lone Pine Allotment is currently divided into six pastures; Big Canyon, Birch Creek, Dug Creek, Little Deep Creek and the Hospital Area. A horse pasture is also adjacent to the Dug Bar facilities. The rotation is only within the Lone Pine Allotment. The livestock have rotated through the pastures in this allotment in a loop from north to south, then back east to west. Under this alternative the rotation schedule that is currently in use would continue. Refer to Table 2-5 for an example of the grazing rotation.

Under this alternative, grazing would continue to be managed to maintain desired upland and riparian conditions. Grazing in areas identified in unsatisfactory condition would be managed as earlier discussed. Table 2-5 provides an example of the grazing system for the Lone Pine Allotment and Table 2-1 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Lone Pine Allotment would not be exceeded, although the number of head and dates may vary from pasture to pasture, based on climatic condition, utilization, and/or resource conditions.

Table 2-5. Current authorized use in the Lone Pine Allotment

Alternative B, Lone Pine Allotment Grazing Rotation							
Pasture	Head	Dec	Jan	Feb	Mar	Apr	May
Big Canyon	300	1--31					16-31
Birch Creek	300		1--15				1--15
Dug Creek	300		16--31			16--30	
Little Deep Creek	300			1--	--15		
Hospital Area	Limited livestock use						
Horse Pasture	6	1--	--	--	--	--	--31
Hayfield	Closed to livestock grazing						

The livestock would enter the Lone Pine Allotment via the Dug Bar road the first of December; the cattle would spend the first month in the Big Canyon pasture, and are rotated through the pastures working towards the east. The Birch Creek pasture would then be grazed for the first two weeks of January, and then the Dug Creek pasture for the second two weeks of January on the way to Little Deep Creek. The largest pasture, Little Deep Creek, would be grazed for 45 days during February thru mid-March. The cattle calve primarily in the Little Deep Creek pasture. Mid-march the livestock (now cow/calf pairs) are herded back towards the west, spending two weeks in the Dug Creek pasture, and two weeks in Birch Creek. Finally the cattle spend two weeks in Big Canyon before exiting the allotment on May 31. The Hayfield is closed to livestock grazing. The Horse pasture is available to horses for the grazing season from December 1 – May 31, it is also available as a holding facility for working livestock in the adjacent corrals and loading area. The Hospital pasture is available for sick or injured animals that need to be in a smaller pasture in order to receive proper care, and would not be used for a feeding ground or for more than 10% of the herd at one time. The Hospital pasture is visible from the road going to Dug Bar. Due to the absence of livestock accessible private land accessible to livestock within the allotment boundary, and the remote location with steep, narrow roads to access the Dug Bar facility in inclement weather, weed free hay may be stored at the Dug Bar Facility to feed the livestock in case of emergency. It is up to the permittee to decide whether or not to store hay at Dug Bar, and an approved contingency plan including the amount and the time the hay is to be stored and where it would be fed must be agreed to by the Area Manager prior to the grazing season.

A map of this allotment can be found at the end of this chapter.

Alternative C, Proposed Action

Alternative C represents the Proposed Action. The proposed action is similar to Current Management in Cow Creek, Rhodes Creek, and Lone Pine allotments, with several site-specific changes to management in the Toomey Allotment. These changes include creation of an additional pasture and adaptive management driven grazing rotation plan, as well as reconstruction and addition of water improvements. This alternative was driven by the

significant issues and other analysis issues identified by the public and interdisciplinary team. The following proposed actions would change current management on the Toomey Allotment:

Description by Allotment

Toomey Allotment:

- A new pasture, Big Pine pasture, would be created from a portion of the Lower Spain Saddle Pasture as a way to control livestock use near an occurrence of Spalding's catchfly. Refer to Map at the end of this chapter.

- Tips Springs (also known as Vance Draw Spring or # 16045906) would be re-developed to incorporate both the Spring Gulch pasture and the Big Pine pasture of the Toomey Allotment. Tips Springs is located in Vance Draw at T3N, R49E, Section 1 NWSW.

- The grazing schedule for this allotment would be adjusted so that pastures with known Spalding's catchfly sites or areas with deep soils on steep north facing slopes would be grazed to reduce soil disturbance and ensure that the standards, guidelines, goals and objectives of the guiding documents are met. This schedule would include:

    - Upper Spain Saddle pasture would be used in a two-year rotation where one year the pasture would be used only as a driveway, and the following year as a spring pasture and driveway.

    - Big Pine pasture would be used in a two-year rotation where one year the pasture would be rested and the following year used as a pasture. The season of use during the grazing year would be decided at the annual operating meeting. Refer to the Big Pine pasture description in this discussion.

- Research about Spalding's catchfly is limited to date. As a result management strategies proposed are aimed at improving vegetation and soil condition serves as a proxy for maintaining viable Spalding's catchfly habitat. These same management strategies would respond to the other significant issue of deep soils on steep north facing slopes with the intention of reducing soil disturbance by livestock. If after initial monitoring, or after long term trend monitoring, it is found that the standards, guidelines, goals and objectives are not met for Johnson Canyon and Toomey pastures, than the following grazing schedule would occur within that pasture:

    - Toomey pasture would be used in a two-year rotation where one year the pasture would be rested, and the following year used as a pasture. The season of use during the grazing year would be decided at the annual operating meeting. Monitoring of this pasture would include utilization standards and line-point intercept at key areas to ensure compliance.

    - Johnson Canyon would be used in a two-year deferred rotation grazing schedule where one year the pasture would be grazed in the fall (November 1 – December 31) and the following year the pasture grazed in the spring, (February 15 - May

15). Spring grazing would only be for a two month time frame within the dates allocated. Monitoring of this pasture would include utilization protocols and line-point intercept to ensure soil compliance.

- For the Johnson Canyon pasture, if it is found that the sites with known catchfly or steep deep soil north-facing slopes are not recovering at the expected rate of 70% of the natural rate of recovery, or meeting soil alteration standards within three years of implementation of the schedule described above, then the deferred rotational schedule of this pasture would change where the pasture would be grazed in the fall one year (November 1 – December 31), and in the spring the following year (January 15 through March 15).

- After three grazing seasons of implementation the above deferred rotation schedule, if it is found that the sites with known catchfly or steep, deep soil north-facing slopes are still not recovering at the expected rate 70% of the natural rate of recovery, or meeting soil alteration standards, then a rest rotational schedule of use would occur where the pasture would be grazed in the fall one year (November 1 – December 31), in the spring the following year (January 15 through March 15), and rested the third year.

- Regardless of the scheduled season of use for the Johnson Canyon pasture, the pasture would be used as a driveway to herd the livestock out of the canyon. For this reason, this pasture would be used every spring by groups of cattle (three to four groups consisting of 150 to 250 cow/calf pairs each), where the cattle would overnight in the pasture in an area that does not contain catchfly or steep, deep soil north facing slopes.

Cow Creek, Rhodes Creek, and Lone Pine allotments

The Tulley pasture is currently an island pasture of the Rhodes Creek Allotment. Under this alternative, the Tulley pasture would become part of the Toomey Allotment. This would result in a gain of 1,014 acres to the Toomey Allotment coming from the Rhodes Creek Allotment.

The remainder of proposed actions for the Cow Creek, Rhodes Creek and Lone Pine allotments are the same as described under Alternative B, including grazing rotations.

Alternative D:

Alternative D represents the greatest change from current management across the project area. Alternative D would incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations. This alternative provides additional opportunities for rest and deferment of pastures within all four allotments. The reduction in use (1,800 HM) would be realized by the rest periods scheduled for each allotment. This alternative was driven by the assumption that rest would reduce direct and indirect livestock impact to Spalding's catchfly and at the same time reduce cumulative soil disturbance by livestock when soils are not dry or frozen. A further assumption is that the vegetation in the pastures that are rested could have improved range condition over time by the desirable perennial vegetation

being allowed to complete its life cycle without grazing pressure. The actions to change current management on the four LIRA allotments are as follows:

- This Alternative would allow for rest from grazing 1 year in every 3 years for the entire Toomey Allotment.
- This Alternative would allow for rest from grazing 1 year in every 3 years in the Rowley pasture in the Cow Creek Allotment.
- This Alternative would allow for rest from grazing 1 year in every 3 years in the East and West Lightning Bench pastures in the Rhodes Creek Allotment
- This Alternative would allow for rest from grazing 1 year in every 3 years in the entire Lone Pine Allotment.
- The grazing rotation in the Lone Pine and Cow Creek allotments would be changed, allowing for deferment between spring and winter grazing 2 in 3 years (meaning use in winter one year, use in the spring the next year).

Description by Year and by Allotment

The LIRA allotments would have rest pastures in each allotment on a 3-year rotation. Not all pastures within the all the allotments would be rested. The following description is by allotment and by year.

Year 1:

Cow Creek:

The Rowley pasture would be rested, however it would be used to trail through en route to other Cow Creek Allotment pastures, or to exit the allotment via the road. Use that would be scheduled in the Rowley pasture would be absorbed into the adjacent pastures, of Willow Springs, Holmes, and Foster. This would be accomplished by allowing the livestock to remain in those pastures for up to two additional weeks before moving into the remainder of the pastures in the Cow Creek Allotment. Use in Upper Schluer, Schluer, Salt Gulch, Upper Salt Gulch, Fingerboard, and Deer Creek would be extended two weeks. See Table 2-6 for an example of the grazing rotation.

Table 2-6. Alternative D, Year 1 Cow Creek Allotment Grazing Rotation

Alternative D, Year 1 Cow Creek Allotment Grazing Rotation						
Pasture	Head	Feb	Mar	Apr	May	Exit
Rowley	REST					
Fingerboard	150			1--	--15	
Deer Creek	200			1--	--15	
West Cow Creek	25-50	15--	--30	from E. Lightning Bench		
	25			1--30	exit different route	

Rhodes Creek:

For this alternative the rotation through the Rhodes Creek Allotment would remain the same as current management, however the numbers throughout the season would change. Livestock going into the Rhodes Creek Allotment would be reduced by about 160 head. Those cattle would go directly into the Lone Pine Allotment for the grazing season, along with 140 head from the Toomey Allotment, for a total of 300 head in the Lone Pine Allotment (see Table 2-7).

Table 2-7. Alternative D, Year 1 Rhodes Creek Allotment Grazing Rotation

Alternative D, Year 1 Rhodes Creek Allotment Grazing Rotation									
Pasture	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Sleepy Breaks	360	1--	--	--5					
Butcherknife	60	1--	--	--10					
Rhodes Creek	60	1--	--	--10					
Lightning Creek, Lightning/Hangover	210	1--	--	--20					
North and South Roy (hospital) (up to)	20			hospital	15--	--	--	--5	
Bull Pasture (up to)	20			hospital	15--	--	--	--5	
Private Land (Lightning/Cow Ranch)	110 140			21-- 21--	-- --	--15 --31			
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
West Lightning Bench	180			11--	--28	90 head to Willow Springs 90 head to Westside Cow			
East Lightning Bench	260			6--	--28	100 go to Holmes, 25 to Westside Cow, 135 to Foster			
				21--	--28				
Holmes	100			21--	--10				
Westside Cow	25			21--	--10				
Foster	135			21-	--10				
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Holmes	150*				11--	--15	added 50 from private		
Westside Cow	165*				11--	--30	added 50 from private		
Foster	185*				11--	--20	added 50 from private		
Willow Springs	190*					1--30	added 100 from private		
					350 head to Cow Creek Allotment				
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
East Lightning Bench	150						1--30		
West Lightning Bench	190						1--30		
Sleepy Breaks	150							1--30	Exit
Lightning Creek, Lightning/Hangover	190							1--30	Exit

*Indicates re-entry onto the allotment from private land

Toomey Allotment:

The entire allotment would be rested. Toomey would only be used for ingress/egress of cattle from the Chesnimnus Allotment during moves in Nov/Dec and May through the Tulley stock driveway. Since there is no Term Private Land Grazing Permit issued to the McClaran Ranch, use of the Tulley Creek Ranch and adjacent private land may occur, that would be independent of this analysis. Cattle that would have been grazing in the Toomey Allotment would go directly to the Lone Pine Allotment.

Lone Pine Allotment:

Cattle would trail from the Chesnimnus area through the Toomey Allotment and to the north via the Dug Bar Road to the Lone Pine Allotment. Lone Pine would be used in a rotation from the south to the north with 300 cows. Calving would begin around March 1. The permittee would be allowed to utilize the specified buildings at Dug Bar to tend to the livestock. Use in Birch Creek unit would be consistent with mitigations for recreation/livestock interactions. Livestock concentration around the house (intensive calving, working, sorting, branding) would not be allowed during the high use time at Dug Bar (March 20 – April 10). The corral at the Dug Bar house would receive very limited use, and livestock would be hauled to private land on Cow Creek if more than 3 days recovery for the animal is needed. Use of the Hospital Area would be limited (less than 10% herd total). It is up to the permittee to decide whether or not to store hay at Dug Bar, and an approved contingency plan including the amount and the time the hay is to be stored and where it would be fed must be agreed to by the Area Manager prior to the grazing season. Refer to Table 2-8.

Table 2-8. Alternative D, Year 1 Lone Pine Allotment Grazing Rotation

Alternative D, Year 1 Lone Pine Allotment Grazing Rotation							
Pasture	Head	Dec	Jan	Feb	Mar	Apr	May
Big Canyon	300					1--	--15
Birch Creek	300				16--30		
Dug Creek	300			1--	--15		
Little Deep Creek	300	1--	--31				
Hospital Area	Limited livestock use						
Horse Pasture	6	1--					--31
Hayfield	Closed to livestock grazing						

Year 2:

Cow Creek:

During Year 2 of Alternative D the Cow Creek Allotment rotation would be deferred, meaning that the livestock would rotate in the opposite direction and graze the higher elevation pastures earlier in the grazing season (January-February). The cattle would rotate to the lower elevation

pastures before exiting the allotment. The plants being grazed during the spring in year 1 would be grazed during the dormant season in year 2. The Cow Creek herd for this rotation would stay independent of the rest of the livestock herds after they are sorted out of the Rhodes Creek break pastures. After the cattle enter the allotment, they would be sorted into two herds, one that remains on the west side of Cow Creek, the other on the east side of Cow Creek. They would be brought back together the last two weeks in May to be staged to exit the allotment via the Tulley stock driveway to the Chesnimnus area. Refer to Table 2-9.

Table 2-9. Alternative D, Year 2 Cow Creek Allotment Grazing Rotation

Alternative D, Year 2 Cow Creek Allotment Grazing Rotation							
Pasture	Head	Jan	Feb	Mar	Apr	May	Exit
Upper Schluer/ Schluer/Salt Gulch/Upper Salt Gulch	50	10--	--15				
Fingerboard	100	10--	--15				
Deer Creek	150	10--	--15				
February 10-20 the cattle are gathered and redistributed into two herds one is placed on the west side of Cow Creek, the other on the east side of Cow Creek until the cattle are staged to exit the canyon.							
West Cow Creek	100		16--	--31			
Westside Cow (Rhodes Creek Allotment)	100				1--	--31	
Rowley	200		16--	--31			
Foster (Rhodes Creek Allotment)	200				1--15		
Holmes (Rhodes Creek Allotment)	200					16--31	Exit
	300	May 15-31 herd re-combined and trailed to Johnson Canyon					

Rhodes Creek:

Use in the Rhodes Creek Allotment in year 2 would be significantly reduced from current levels by resting the East and West Lightning Bench pastures for the grazing season. Trailing would be authorized through the East and Lightning Bench pastures to access other allotments and pastures. The rotation would begin by utilizing the Rhodes Creek breaks pastures, which include Sleepy Breaks, Butcherknife, Rhodes Creek, and Lightning Creek and Lightning Hangover, from the beginning of November through the middle of January. The cattle are then gathered and sorted into four herds. One herd would go to Lone Pine for the rest of the grazing season via the road in the Lightning Creek drainage and the Dug Bar road. The second herd would go to Cow Creek for the rest of the grazing season via the Lightning Creek Bench and over Windy Ridge to the Cow Creek drainage. The third herd would go to Willow Springs pasture, and the remainder of the cattle would go to private land to be put on feed. The cattle that are on private land would re-enter the Toomey Allotment, with the exception of those that join the Willow Springs herd; they would exit the canyon via the Tulley stock driveway. The Willow Springs herd would then trail back to the Sleepy Breaks pasture for April and May before being staged to exit the canyon via the Tulley stock driveway. The Tulley pasture is used for

two weeks as livestock exit the allotment. The Tulley pasture (on the Toomey Allotment side) is used for two weeks as livestock exit the Toomey Allotment. Refer to Table 2-10.

Table 2-10. Alternative D, Year 2 Rhodes Creek Allotment Grazing Rotation

Alternative D, Year 2 Rhodes Creek Allotment Grazing Rotation									
Pasture	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Sleepy Breaks	400	1--	--	--20					
Butcherknife	80	1--	--	--20					
Rhodes Creek	80	1--	--	--20					
Lightning Creek, Lightning/Hangover	250	1--	--	--20					
North and South Roy (hospital) (up to)	20			hospital	15--	--	--	--5	
Bull Pasture (up to)	20			hospital	15--	--	--	--5	
Private Land (Lightning/Cow Ranch)	110			21--	--	--15			
Takes up to 14 days to gather cattle (850 head) out of the breaks and sort them into herds to move to other allotment, pastures, or private land.									
Then herds of cattle are trailed to:	300	Go to Lone Pine Allotment between 1/10-1/20							
	300	Go to Cow Creek Allotment between 1/10-1/20							
	140	Go to Willow Springs between 1/10-1/20							
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
West Lightning Bench	REST								
East Lightning Bench	REST			Will be trailed through en route to Cow Creek and Lone Pine Allotments (via road)					
For use in Westside Cow, Foster, and Holmes see Cow Creek Allotment Rotation									
	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Willow Springs	140			21--	--28	add 50 from pvt.			
	190					1--31			
Sleepy Breaks	190			would need to trail through East Lightning Bench en route to Sleepy Breaks			1--	--30	Exit

Toomey Allotment:

The Toomey Allotment would include a herd of 140 cattle that grazes in Upper and Lower Spain Saddle during December, is rotated to Johnson Canyon, and then the livestock would be taken to private land to be fed during February. Within the first two weeks of March the cattle are re-entering the allotment in two herds, one herd goes into Toomey, the other into Spring Creek and then to Tulley Creek. A group of 50 head of cattle from the private land would join the Willow Springs herd for the remainder of the grazing season. The cattle in the Toomey Allotment remain in the allotment until mid-May and are the first group to exit the canyon via the Tulley

stock driveway en route to the Chesnimnus area. In this rotation Johnson Canyon pasture is used once. The Tulley pasture (Rhodes Creek Allotment) is used for two weeks as livestock exit the Toomey Allotment. Refer to Table 2-11

Table 2-11. Alternative D, Year 2 Toomey Allotment Grazing Rotation

Alternative D, Year 2 Toomey Allotment Grazing Rotation									
Pasture	Head	Nov	Dec	Jan	Feb	Mar	Apr	May	Exit
Upper and Lower Spain Saddle	140 40 bull		1--31						
Johnson Canyon	140 40 bull			1--31	these cattle go to private land to go on feed				
Private land (Cow Creek Ranch)	140 total					1 -- 16--	Come back to an allotment from pvt. in 3 herds to Willow Springs, Toomey, and Spring Creek between 3/1 and 3/15		
Private land (Tulley Ranch)	40 bull				1--	--	--	--15	Exit
Toomey	100	from private				16--	--	--15	Exit
Spring Creek	100			from private		1--	--15		
Tulley Creek	100						15--	--15	Exit

Lone Pine Allotment:

The Lone Pine Allotment cattle would come directly from the Rhodes Creek Allotment breaks pastures, trailed over the Dug Bar road, and begin the grazing rotation in the Big Canyon Pasture. The rotation would be deferred (when compared to the year 1 rotation), meaning the cattle would be grazing in an opposite direction through the pastures from north to south, starting in Big Canyon and ending in Little Deep Creek. The cattle would be trailed out of Little Deep Creek by being herded over Summit Ridge over to the Cow Creek drainage, and brought back north via the road, then exit the Imnaha River Corridor by being brought up the Tulley stock driveway back to the Chesnimnus area. Calving would begin around March 1. The permittee would be allowed to utilize the specified buildings at Dug Bar to tend to the livestock. Use in Birch Creek unit would be consistent with mitigations for recreation/livestock interactions. Livestock concentration around the house (intensive calving, working, sorting, branding) would not be allowed during the high use time at Dug Bar (March 20 – April 10). Use of the corral at the Dug Bar house would be very limited, and livestock would be hauled to private land on Cow Creek if more than 3 days recovery for the animal is needed. Use of the Hospital Area would be limited (less than 10% herd total). It is up to the permittee to decide whether or not to store hay at Dug Bar, and an approved contingency plan including the amount and the time the hay is to be stored and where it would be fed must be agreed to by the Area Manager prior to the grazing season. Refer to Table 2-12.

Table 2-12. Alternative D, Year 2 Lone Pine Allotment Grazing Rotation

Alternative D, Year 2 Lone Pine Allotment Grazing Rotation							
Pasture	Head	Dec	Jan	Feb	Mar	Apr	May
Big Canyon	300		10--	--15			
Birch Creek	300			16--31			
Dug Creek	300				1--	--15	
Little Deep Creek	300					16--	--15
Hospital Area	Limited livestock use						
Horse Pasture	6	1--	--	--	--	--	--31
Hayfield	Closed to livestock grazing						

Year 3:

During year three of the Alterative D, the Cow Creek, Rhodes Creek, and Toomey Allotments would be grazed the same number and season as during current management and the Lone Pine Allotment would be rested in its entirety.

Alternative E:

The Lone Pine Allotment would be utilized as a Forage Reserve through a Temporary Grazing Permit for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. This alternative was driven by the public, permittees, and multiple congressional inquiries regarding available forage due to losses from wildland fires in adjacent areas from 2006-2012. This alternative is also driven by the IDT to potentially provide rest to adjacent allotments in the Imnaha River Canyon, or summer grazed allotments with resource concerns. Under Alternative E the same management proposed in Alternative C would apply to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Lone Pine Allotment:

A total of 1,800 head months of livestock grazing would be authorized in the 11,126 acre Lone Pine Allotment between the dates of December 1 and May 31, annually. The Lone Pine Allotment is divided into five pastures; Big Canyon, Birch Creek, Dug Creek, Little Deep Creek and the Hospital Area. There is also a horse pasture adjacent to the Dug Bar facilities. The rotation for the forage reserve is only within the Lone Pine Allotment. All pertinent management direction, standards, etc. related to the Term Grazing Permit still apply to the use of the Forage Reserve through a Temporary Grazing Permit.

The Lone Pine Allotment forage reserve would be available for existing Term Grazing Permittees upon request in writing to the Forest Service for 3 out of 5 years, but for no more than 3 consecutive years. The use of a Temporary Grazing Permit would be reviewed annually. If compliance issues arise, the permittee may not be able to utilize the Forage Reserve a second year and would be responsible for finding alternative forage.

The Lone Pine Allotment Forage Reserve could be used for one of two reasons. The following priorities would apply:

> First priority: Provide forage if allotments are impacted by fire and unavailable for grazing, the Term Grazing Permittee must be taking non-use for resource protection on their allotment (s) to qualify. Use of the Forage Reserve can be for up to 1-3 years depending on the need.
>
> Second priority: Provide relief for livestock grazing areas of concerns on other allotments, riparian, upland, rest after prescribed fire (if needed), etc. Permittee must agree to non-use resource protection on their allotment, and must agree to use it during the fall-spring months (12/1-5/31) regardless of what season of use their Term Grazing Permit is for. Use of the Forage Reserve can be for up to 1-3 years depending on the need. If demand exceeds the supply of forage a local panel could assist the Area Manager in making the decision of who is able to utilize the forage reserve.

Grazing rotation through the forage reserve would be decided on at the annual operating meeting within the sideboards of the schedule, project design criteria, and mitigations included in this analysis.

Use of the forage reserve could be up to two permittees at a time, but both permittees cattle would be run together as one herd. If there is more than one permittee, the number of head months per operator (up to authorized number of head months) would be agreed to during the annual operating meeting including the Area Manager, Range Program Lead, and Range Specialist.

If necessary, which potential permittee who will get to use the Forage Reserve would be determined in cooperation with possibly Wallowa County NRAC or Wallowa County Stockgrower's input in the case there are several permittees that express interest in using the Forage Reserve. Maintenance of all or part of the range improvements would be the responsibility of the persons utilizing the Forage Reserve; the first priority would be maintenance of the fences that border closed areas, then pasture boundaries. A predetermined amount of hay can be stored at Dug Bar Facility to feed sick animals or in case of emergency. Any leftover hay would be removed by the permittee utilizing the Forage Reserve within a year of the last use period, or ownership transferred to the next user if there is a documented bill of sale provided to the Forest Service documenting the transaction. All hay transported to and stored at the facility would be certified weed free.

Trailing of livestock (in and out of the allotment) will be determined prior to the Temporary Grazing permit being issued and is limited to the Dug Bar road, and stopping and overnighting at designated areas. Trailing through Cow Creek Allotment to or from the Lone Pine Allotment could also be authorized, but would be dependent on agreement with the private landowner.

Forage reserve use would be coordinated with the Nez Perce Tribe grazing use in the Lone Pine Allotment on an annual basis so that total head months are not exceeded.

Alternative Comparison and Summary

Tables 2-13 and 2-14 display comparisons of the alternatives.

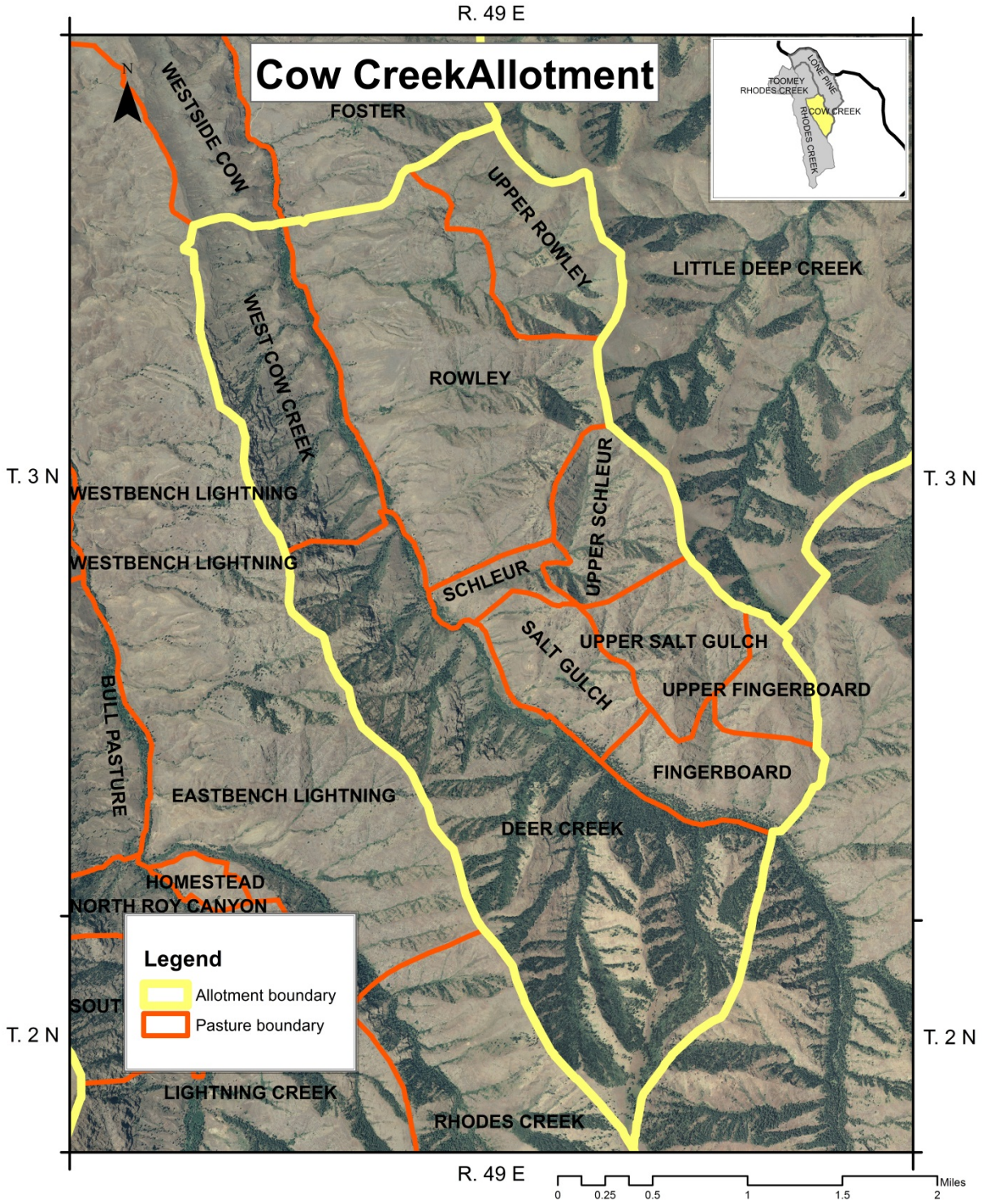
Table 2-13. Comparison of Alternatives for the LIRA AREA

Authorized Grazing Levels					
Allotment	Alt A	Alt B	Alt C	Alt D	Alt E
Cow Creek	0	1,255	1,255	Year 1: 1,255 Year 2: 793 Year 3: 1,255	1,255
Lone Pine	0	1,833	1,833	Year 1: 1,833 Year 2: 1,833 Year 3: 0	1,833
Rhodes Creek	0	4,592	4,592	Year 1: 4,592 Year 2: 3,254 Year 3: 4,592	4,592
Toomey	0	1,000	1,000	Year 1: 0 Year 2: 1,000 Year 3: 1,000	1,000

Table 2-14. Key indicators by Alternative within the LIRA ANALYSIS AREA (+ indicates positive measure)

Significant Issue and Indicators	Alt A	Alt B	Alt C	Alt D	Alt E
Significant Issue 1 – Spalding's catchfly (*Silene spaldingii)*					
Relative rate of recovery towards desired future conditions using range condition as a proxy for *Silene spaldingii* habitat	+++++	+	+++	++++	+++
Issue 2 - Deep soils on steep north facing slopes					
Relative rate of recovery towards desired future conditions	+++++	+	+++	++++	+++

Map 3. Map of the Cow Creek Allotment



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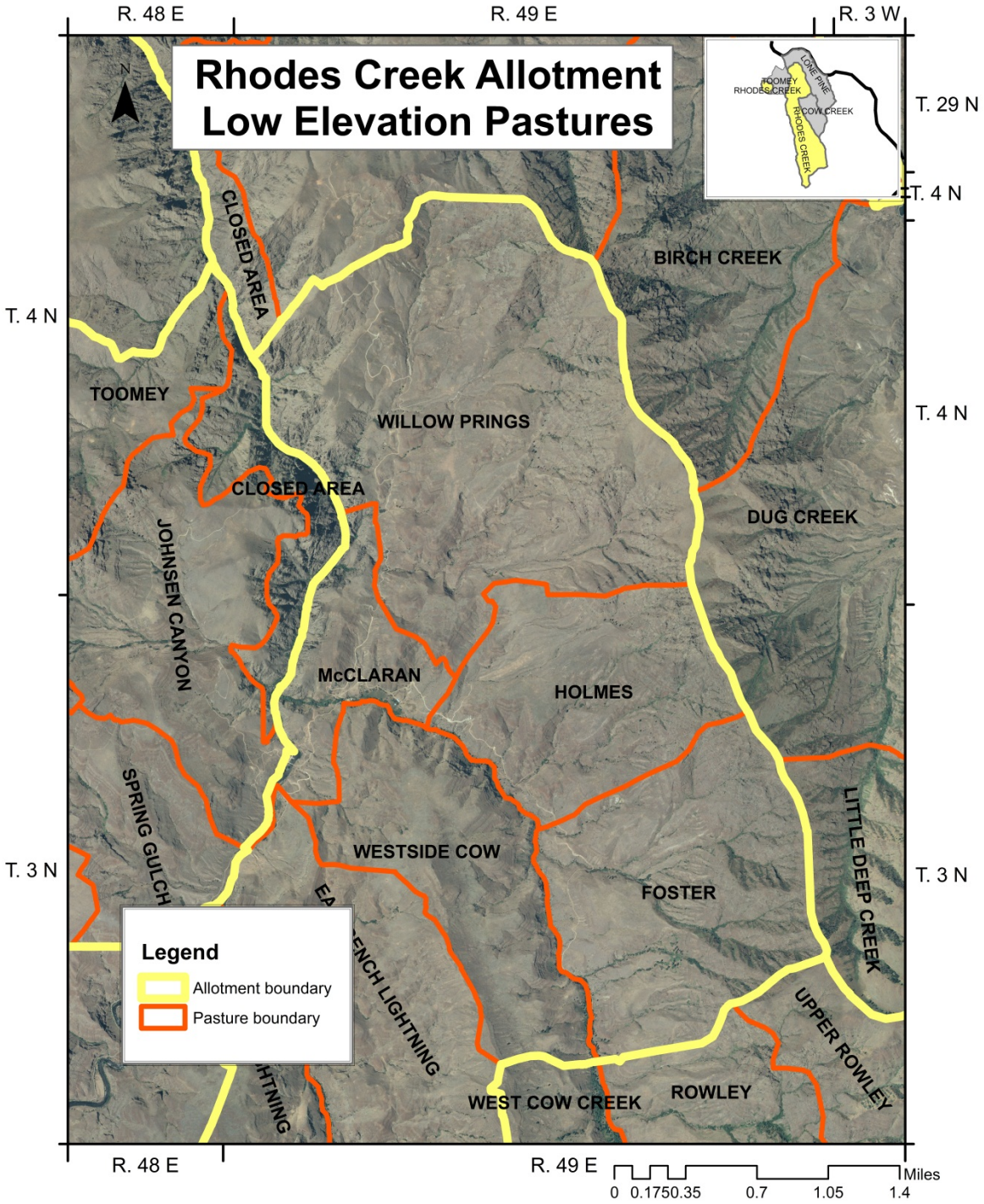
Map 4. Map of the Rhodes Creek Allotment (Low Elevation Pastures)



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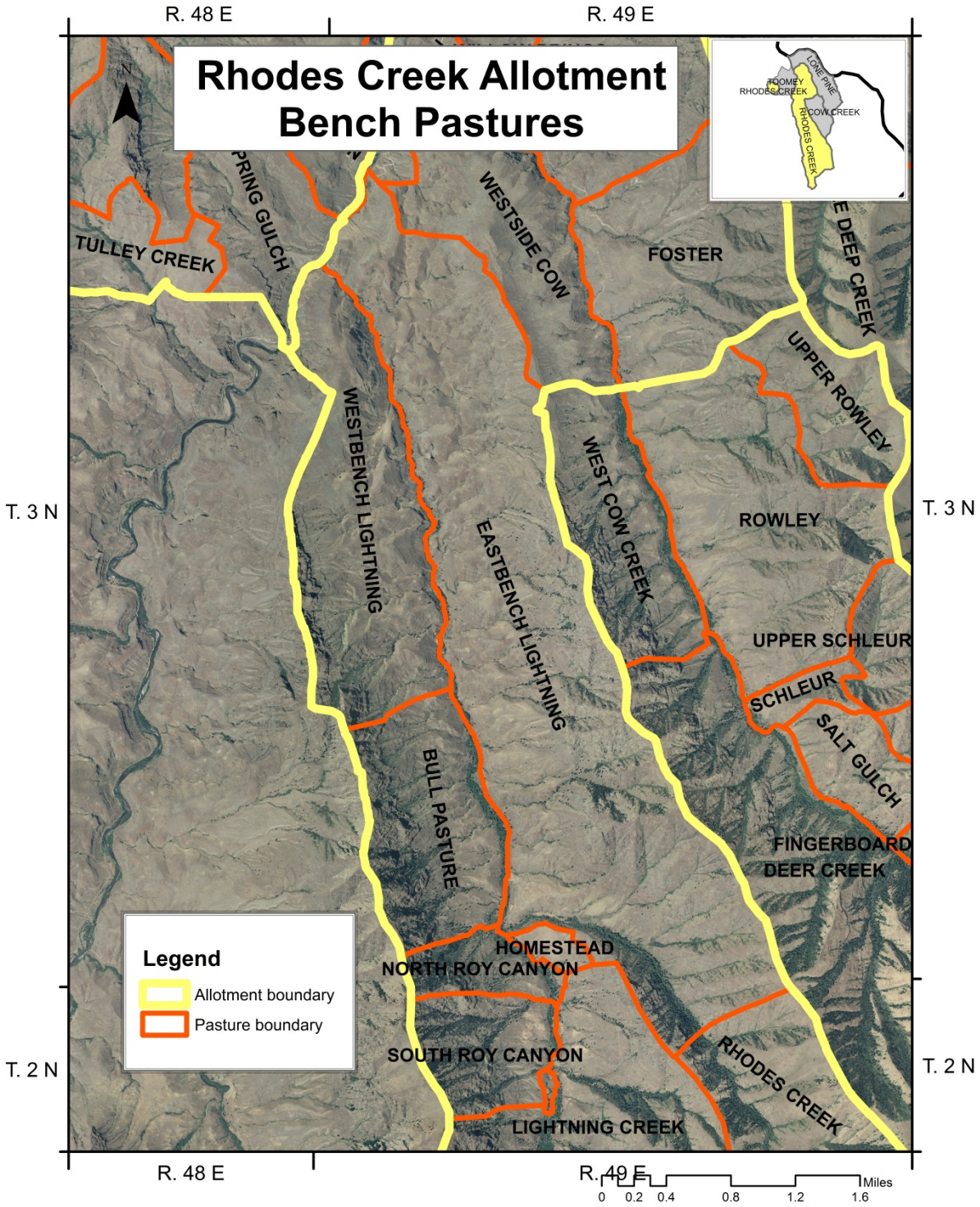
Map 5. Map of the Rhodes Creek Allotment (Bench Pastures)



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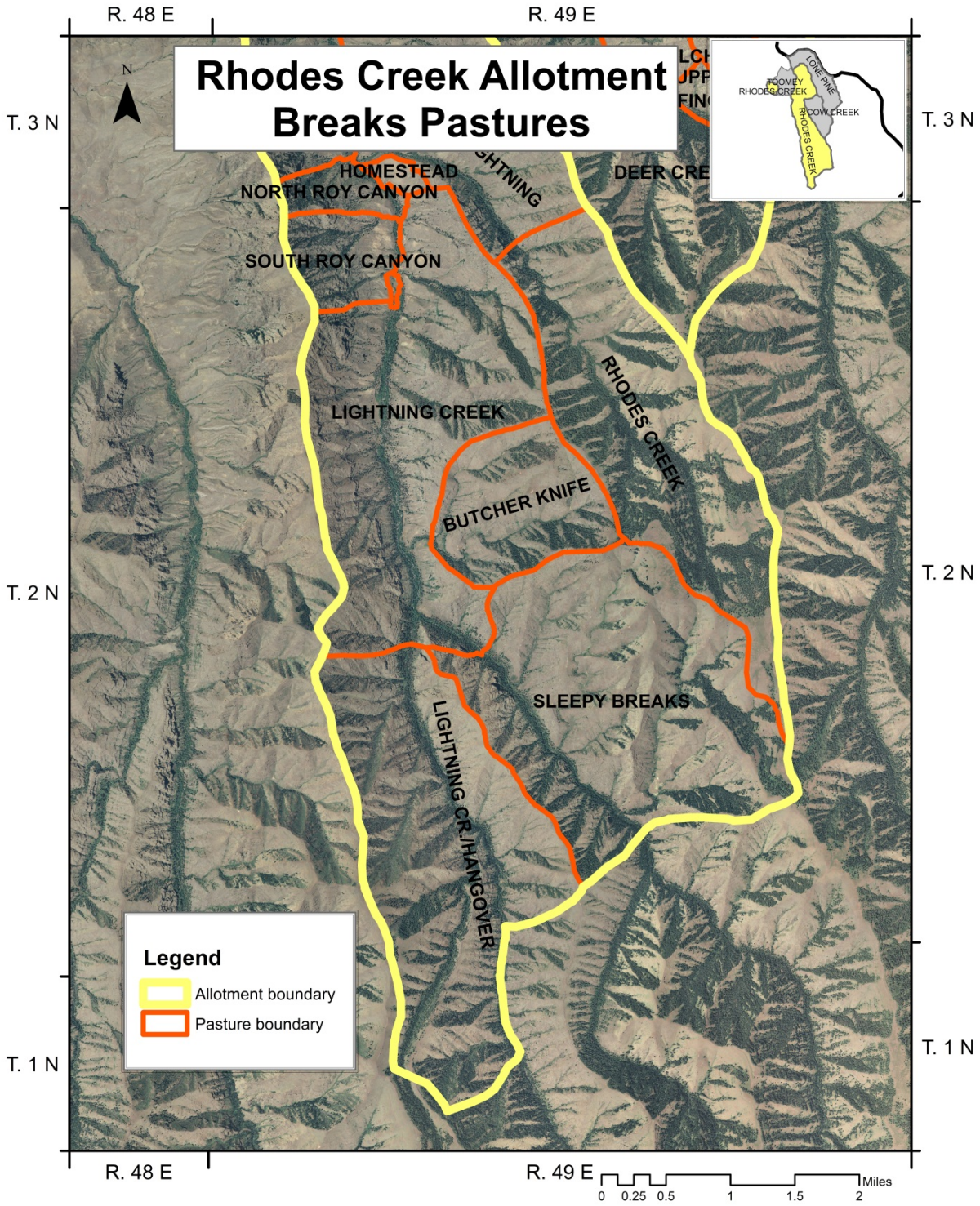
Map 6. Map of the Rhodes Creek Allotment (Breaks Pastures)



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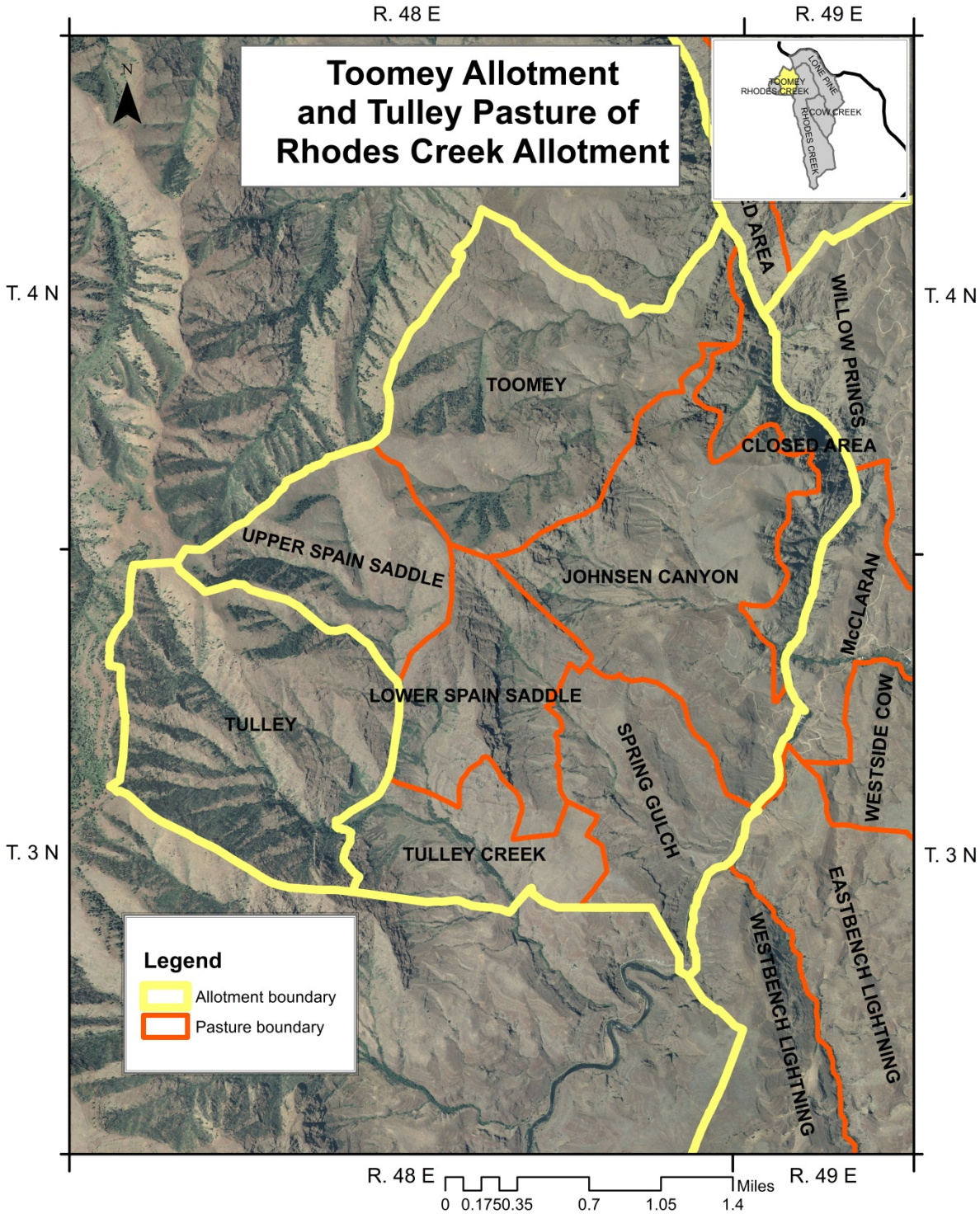
Map 7. Map of the Toomey Allotment



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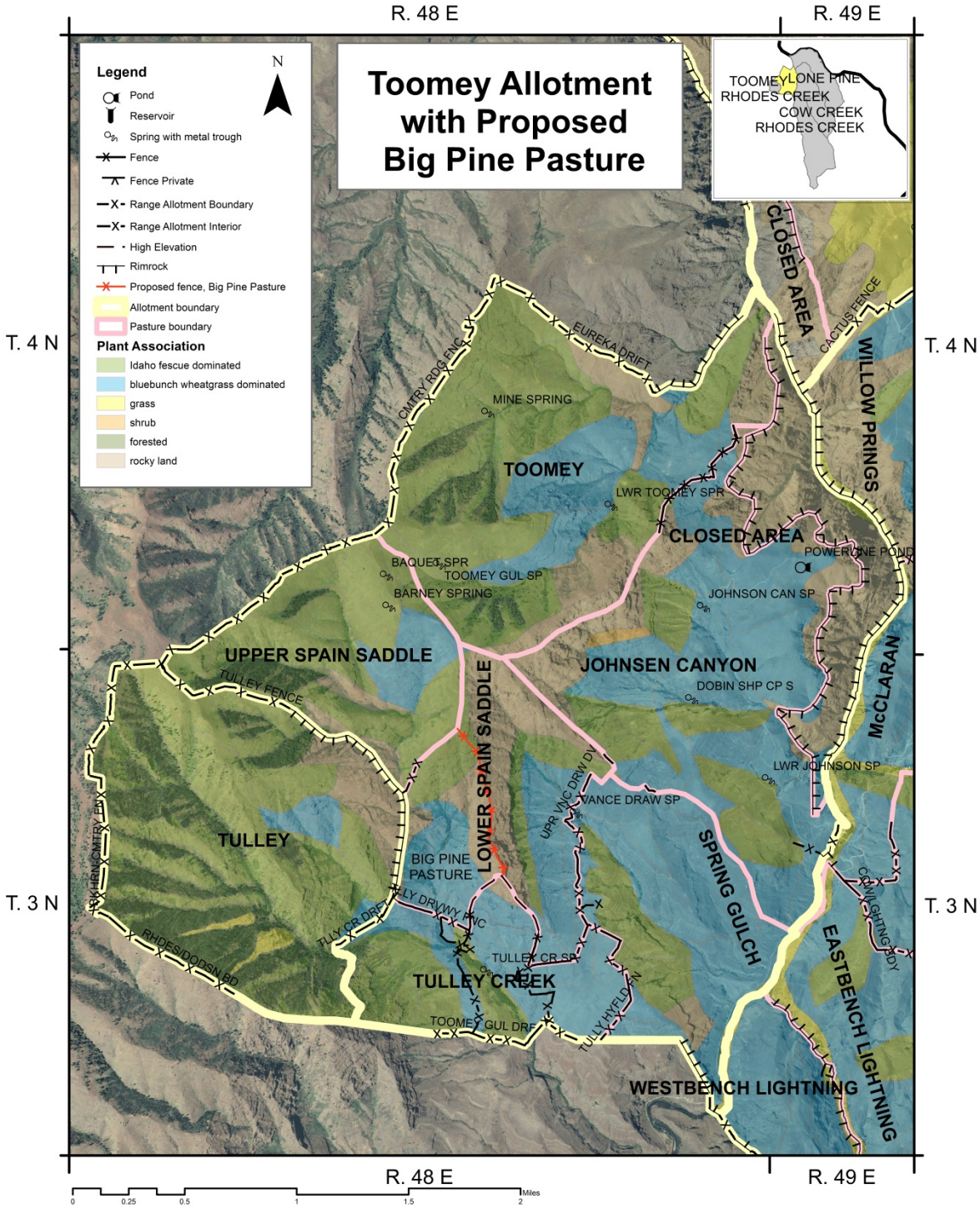
Map 7a. Map of the Toomey Allotment with Big Pine Pasture fence



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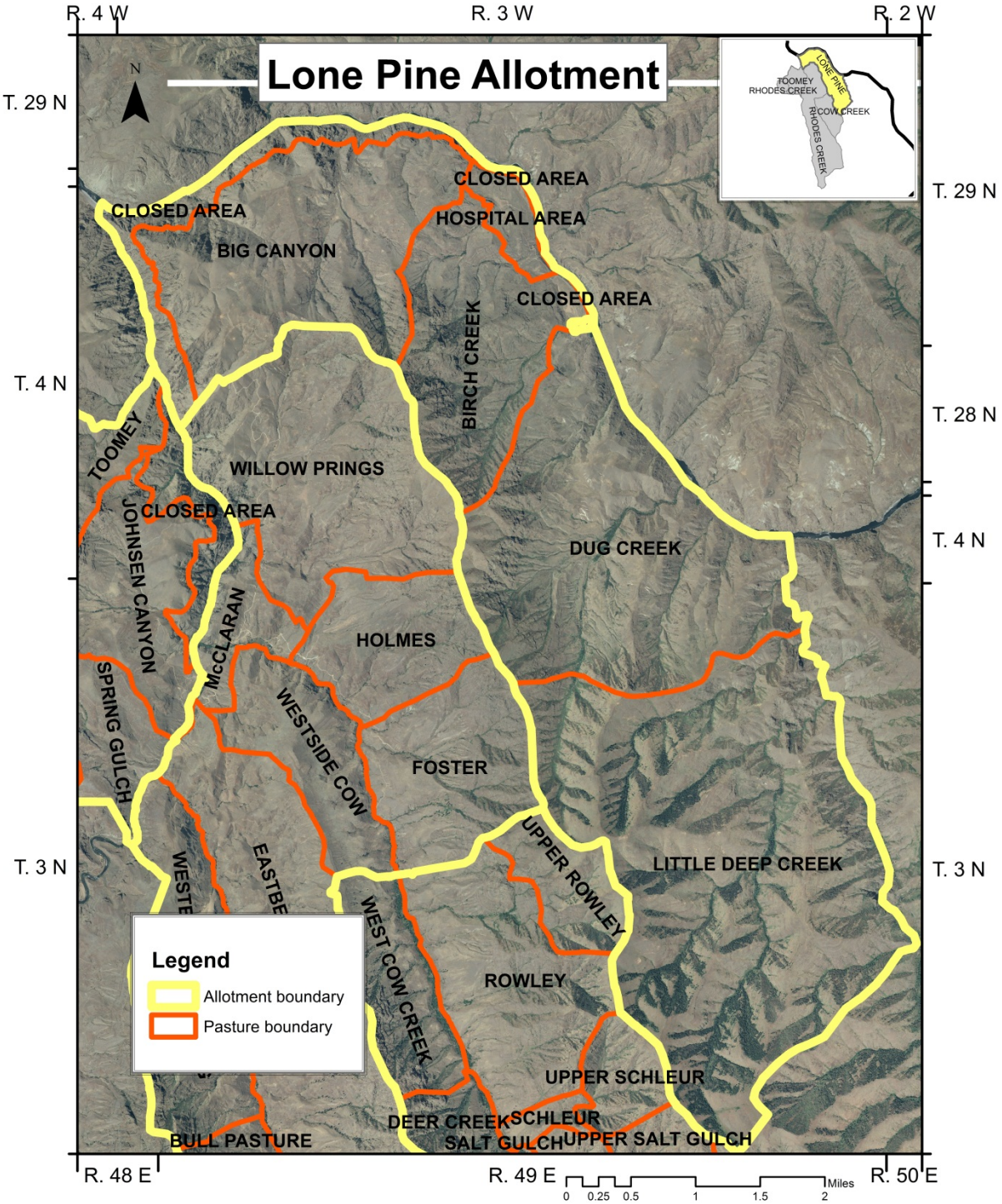
Map 8. Map of the Lone Pine Allotment



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Chapter 3 – Affected Environment and Environmental Consequences

Chapter 3 describes the environment and environmental consequences relevant to this analysis. It focuses on the resources that are relevant to or affected by the scope of the analysis: range, botanical, soils, aquatic, wildlife, recreation and scenery, and specially designated areas. The chapter concludes with a discussion of specifically required disclosures. The analysis in this chapter is derived from specialist reports, biological assessments, and biological evaluations contained in the analysis file.

Cumulative effects are analyzed in this chapter. Each resource area identifies the specific actions and activities that were considered to overlap with the direct and indirect effects of the proposal and alternatives, for specifics refer to each resource section. The general actions and activities considered for cumulative effects are shown in the following table.

Table 1 – Cumulative Actions within the LIRA Area

Activity	Description	Status
Road Maintenance	Blading gravel roads and cleaning culverts	Ongoing
Dispersed Recreation Use	Camping, recreational driving, and collecting forest products	Ongoing
Noxious Weed Treatment	Treating known noxious weed patches by hand pulling, biological agents, or herbicide application by hand.	Ongoing
Private Land Grazing	Grazing private land not within WRAA allotments	Ongoing
Big-Game Population Management	Managing objectives for big-game populations	Ongoing

To understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment to the present.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action

over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this (EA or EIS) is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

"CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making. (40 CFR 1508.7)"

For these reasons, the analysis of past actions in this chapter is based on current environmental conditions unless otherwise noted.

Rangeland Resources

Introduction

The purpose of the LIRA EIS is to evaluate the potential effects of authorizing livestock grazing on 43,898 acres of the Lower Imnaha Range Analysis area (LIRA). LIRA includes four livestock grazing allotments: Cow Creek, Lone Pine, Rhodes Creek and Toomey, all of which are located in Hells Canyon National Recreation Area (herein referred to as HCNRA) of the Wallowa-Whitman National Forest (See Map 1).

This Rangeland Resource section will also document the existing condition of the rangelands within the LIRA area boundary in relation to the desired condition as defined by management direction, and actions proposed to maintain or work towards those desired conditions, as well as evaluate the effects of the proposed action and the alternatives to the proposed action.

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The list of standards and guidelines are a subset of all applicable Land and Resource Management Plan (Forest Plan) direction that this project is being analyzed for consistency can be found in Chapter 1 of this DEIS.

Management areas prescribed by the Wallowa-Whitman National Forest Land and Resource Management Plan (LRMP) or Forest Plan and the Hells Canyon National Recreation Area Comprehensive Management Plan FEIS are listed by allotment in Chapter 1. Map 2 in Chapter 1 displays a map of the management areas (MA) within the LIRA area. For more details about each management area refer to the Rangeland Resource specialist report in the project file.

Hells Canyon National Recreation Area Comprehensive Management Plan DEIS: Hells Canyon National Recreation Area-wide Standards & Guidelines (2003)

The list of objectives, standards and guidelines are a subset of all applicable Hells Canyon National Recreation Area Comprehensive Management Plan DEIS (CMP) direction that this project is being analyzed for consistency can be found in Chapter one of this DEIS.

Other Direction

Capability and Suitability

Rangeland capability is defined as the potential of an area to produce resources under an assumed set of management practices at a given intensity. The Wallowa-Whitman National Forest refined this definition for capable rangeland by establishing criteria for capable lands based on land type, inherent native forage production, conifer or shrub canopy cover, soil depth, slope, elevation, and available water (USDA 1999) and further modified the definition using the Blue Mountain Forest Plan revision team's draft Range Suitability/Capability process (USFS 2009). The combined suitability and capability analysis constitutes a Suitability Determination. A Suitability Determination is not a decision to graze livestock on any specific area or land, nor is it a decision about or estimate of livestock grazing capacity. Suitability Determination are not intended to imply that livestock will be precluded from being found on lands that may be modeled as other than suitable or capable.

A geographic information systems (GIS) model that calculates suitable and capable lands based off of existing data layers was created and used on the LIRA area. The model suggests a total of 6,423 acres of suitable and capable lands were identified within the LIRA area. The results of this model were used to determine stocking rates within the allotments of the LIRA (Table 3-2). Stocking rates were determined by dividing the total number of capable acres by the total head months (head month (HM): one month's use and occupancy of the range by a cow/calf pair) used per allotment. Stocking rate is not synonymous with carrying capacity. Carrying capacity is considered for this analysis as the number of animals or plants that can be maintained over a specific period of time on a specified amount of land without damage to either organisms or the habitat (CMP, 2003).

The capability model for the LIRA area has been determined to be conservative for calculating capable acres based off of field visits, past annual allowable use monitoring, and information gathered at assessment and long term monitoring sites. Areas that are not considered capable due to the model's calculations have proven to have a less than 45% slope, more productive plant communities and soils than those modeled. Discrepancies between the model and the ground have not been quantified; the model has not been validated across the whole project area. As time progresses and more site specific information are gathered the capable model should be more refined. Currently the model is meeting the basic requirements for a Suitability Determination for Forest Planning purposes.

Rangeland suitability is defined as the appropriateness of applying certain management activities to an area of land. On the Wallowa-Whitman National Forest, rangelands are termed suitable unless they are developed campgrounds, administrative sites, exclusive use special use areas, fenced road rights-of-way, Research Natural Areas (RNA) where the establishment report excludes grazing as a use, wilderness where grazing was not permitted at the time of wilderness designation, long-term enclosures, municipal watersheds, town-sites, areas administratively closed to livestock grazing and lands, which have been shown to be uneconomical to manage under any reasonable management system (USDA, 1999). Based on the above criteria, there are 45 acres of unsuitable land because they were closed due to a past decision, primarily areas administratively closed to grazing to prevent conflicts with recreationalists or are acres associated with administrative sites.

The CMP directs that lands determined to be not capable or determined to be in an unsatisfactory condition would not be allocated to the allotment's carrying capacity. Carrying capacity is not based off of the results of the Suitability Determination. Carrying capacity is based off of what forage is available for livestock to consume in a specified time and place without causing damage (CMP 2003). Most of what is in unsatisfactory condition in the LIRA area are areas with slopes less than 10% that are on the "benches" or other areas that likely have been historically cultivated, hayed, or heavily grazed during the homesteading era. These areas are described in the CMP as "altered" and that term was not strictly defined. For the purpose of this analysis "altered" areas are those which have crossed a threshold, and are not going to move towards the desired condition of mid-late seral or PNC without active restoration regardless of timing, intensity, or frequency of livestock grazing. Currently these areas are dominated by invasive annual grasses, particularly cheatgrass and other annual bromes. The areas less than 10% slope comprise approximately 400 acres across the project area. Not all areas under 10% slopes are in unsatisfactory condition, and estimated 70% acres are considered to be in unsatisfactory condition and have crossed a threshold based off of past field visits and inspections, monitoring, and other information what was gathered during the course of this analysis. Livestock would still be authorized to use these areas to trail through to more desirable forage or water, and would graze them lightly. Although many of the specific records to document how carrying capacity for all of the LIRA allotments was determined historically was lost during the 2010 Wallowa Mountain Office fire, the carrying capacity was calculated for previous grazing management through production studies these areas were considered in "very poor" or "poor" condition and were not figured into the carrying capacity per the direction given that time because they did not produce much forage for livestock. Currently the same altered areas are not allocated to the LIRA allotments carrying capacity and are consistent with CMP direction.

Table 2. Stocking rates for allotments within the LIRA Analysis Area.

Allotment	Capable Lands (FS only)	Permitted Head Months (HM)	Acres/HM
Cow Creek	1,322	1,255	1.05
Lone Pine	3,162	1,800	1.75
Rhodes Creek	6,687	4,495	1.48
Toomey	2,096	1,000	2.01

Effects Analysis Methodology

Specific Methodology

The analysis takes into consideration both the Forest Plan and CMP management direction. The Forest Plan provides direction to identify the condition of rangelands but generally relies heavily on forage condition and not ecological status. The CMP requires that ecological status is considered when identifying the condition of an allotment. The CMP identifies a desired condition for grassland vegetation that ensures continued ecological function and sustainability of native ecosystems. The CMP further directs managers to maintain and/or restore the ecological status of grassland communities in relation to the respective Potential Natural Community (PNC) recognizing their Historic Range of Variability (HRV) and that the potential for some communities may be altered (CMP C-31-32). Potential Natural Community (PNC) defines the biotic community that would become established if all successional stages were completed without interference by humans under present environmental conditions (CMP, 3-148). In other words, using as a baseline, the plant community that would be present if there were no human caused disturbances to consider. It is important to note that natural disturbances are inherent in the development of PNC. Historic Range of Variability (HRV) represents the natural fluctuation of ecological and physical processes and functions that would have occurred in an ecosystem during a specified previous period (CMP, 3-148). In the HCNRA, HRV refers to the range of conditions that were likely to have occurred before the settlement of northeastern Oregon by Euro-Americans around 1850 (CMP, 3-148). Seral stages are used to quantify or represent the current departure of a specific site from the PNC for that site. Ecologically, satisfactory range conditions are those in at least mid-seral stages while unsatisfactory range conditions are those in mid (while trending downward), early, or very early seral stages (CMP 2003). See Table 3.

Table 3. Comparison of range condition ratings between the Forest Plan and HCNRA FEIS

Range Condition Forest Plan (1990)	Range Forage Condition Ratings Forest Plan (1990)	Ecological Status Seral Stages CMP (2003)
Satisfactory	Excellent or good	PNC or late seral
	Fair	Mid seral
Unsatisfactory	Poor	Early seral
	Very poor	Very early seral

Since grassland health was historically measured using range forage condition and soil stability, many of the long term monitoring plots were installed to determine range conditions using these

measures. A scoring system was developed that could compare forage and soil ratings over multiple visits to a permanent monitoring point (Table 3) However, since forage condition, and not ecological status (as required by the CMP), was used to complete this scoring system, it was necessary to use a broader approach to evaluate the status of each allotment in the project area. While forage condition and score is discussed, there was less reliance on these measures when identifying allotment condition than past range analyses.

Table 4. Forage and Soil Stability Score and Condition Equivalent

Score Rating	Condition Equivalent
76-100	Good
51-75	Fair
26-50	Poor
0-25	Very Poor

During the last 20 years, the rangeland profession has adopted Alternative procedures for rangeland condition evaluation, including state-and-transition models, thresholds, and rangeland health (West-oby et al. 1989). The need for Alternative evaluation procedures originated from the inability of the traditional method of range condition and trend analysis to account for the entire spectrum of vegetation dynamics that occurred on rangelands (Dyksterhuis 1949).

State and Transition Models are tools based on data and rangeland site knowledge that can visually demonstrate the changes to plant communities as a result of natural and/or human caused disturbances. State and Transition models utilize the same combination the ecological concepts used to support PNC and HRV as discussed in the CMP, paired with additional relevant site data and knowledge of plant responses to management activities. These models are becoming more important resource in order to assist managers and help determine the potential of a rangeland ecological site in order to move towards a desired condition, identify the causal factors for improvement or degradation of an ecological site, or identify if the site has been too severely altered to be able to move towards PNC without active restoration. In a basic sense the ‘states’ in a State and Transition model show the range of plant communities possible given the physical rangeland site characteristics. The ‘transition’ demonstrates the natural or human caused disturbances that can or have occurred, and what the resulting plant community could be post disturbance (Figure 1). Work by Stringham et al. in 2003 is a more technical reference to explain State and Transition models, and is within the list of references cited. The PNW-GTR-641 title “Bunchgrass Plant Communities of the Blue and Ochoco Mountains: A Guide For Managers” by C. Johnson and D. Swanson is also a good reference to describe the State and Transition concept as they apply to bunchgrass communities.

The other important situation depicted by a State and Transition model is when the ecological site has been so severely disturbed that it has crossed a threshold in which it will not improve without an active restoration strategy. In situations where ecological sites have crossed this threshold, restoration through modification of livestock management is not possible. These areas must be managed for modified goals and objectives recognizing a new potential condition and rate of recovery for the new transitioned state.

To summarize, the desired condition for rangelands are defined by layers of management direction. The CMP identified a desired condition where HRV objectives with the *Public LURs* definitions of satisfactory condition (i.e., fair range forage condition with an upward trend or better) are met by attaining a mid-seral ecological status with an upward trend or higher condition based on the PNC, and recognizes that some communities have been altered, changing the PNC (pp C-45). Conceptually, the desired condition is shown in Figure 1 as state A. The CMP directs management of ecological sites in state A are to be managed to maintain their current state, and ecological sites in states B and C are managed to transition toward state A (Stringham et al. 2003, Swanson and Johnson 2008, and Bestelmeyer et al. 2009). In situations where ecological sites have crossed a threshold (state D), restoration through livestock management is not possible. These lands are considered to be in unsatisfactory condition, and may have continued livestock use along as the rate of recovery of these sites is within 70% of the natural rate of recovery (CMP 2003 pp C-38). Because of the time and expense to restore the condition of sites that have crossed a threshold (which could in include but is not limited to tillage, seeding, irrigation, chemical pre or follow up treatments, protection from wild and domestic ungulates), there are not any plans to do active restoration on a large scale in the near future within the LIRA area. Additional research would be needed to determine what the capability of the lands to be restored is, and identify what the appropriate strategies to implement are to be the most successful and effective with limited personnel and budgets.

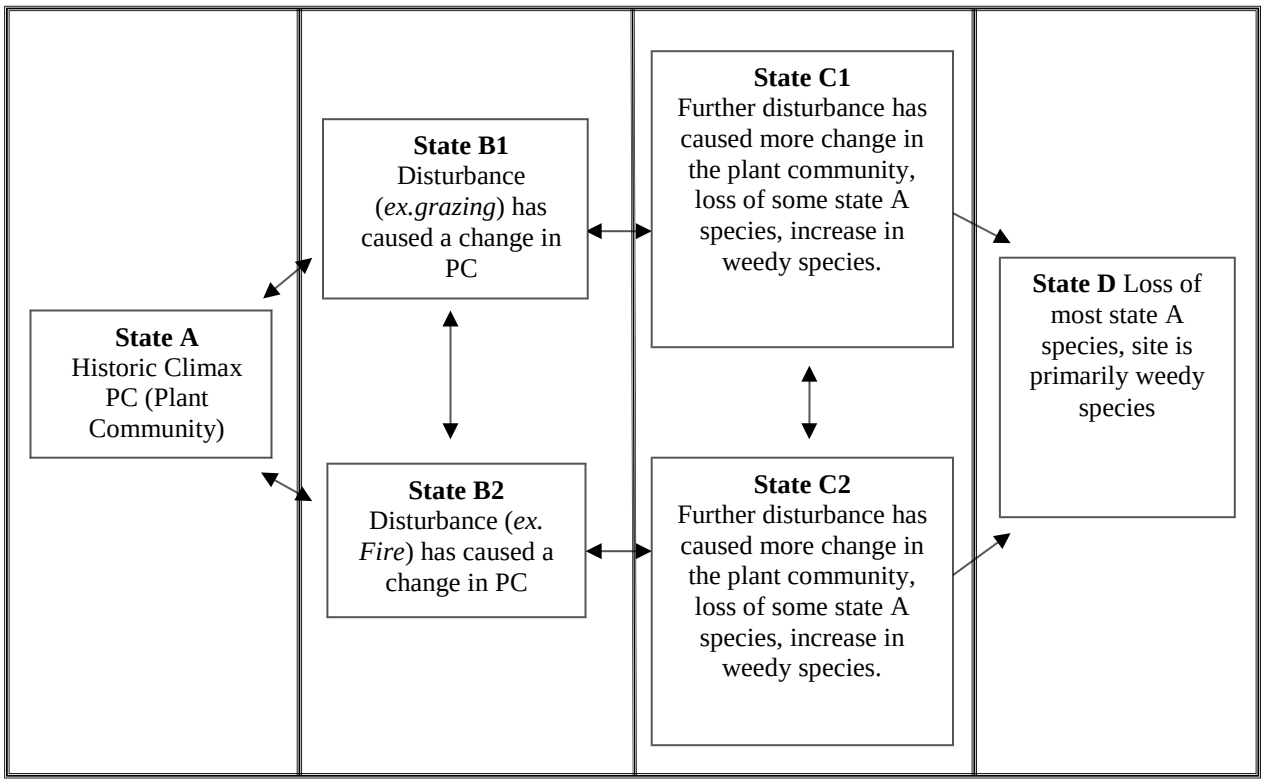


Figure 1. Example of the State and Transition Principles

*Note: plant communities respond differently to disturbance. This figure should only be used as a guide for understanding the principles of state and transition models.

Analysis within the LIRA project area has taken a two-step approach, first collecting information through qualitative rangeland and riparian assessments, and followed by quantitative monitoring that continues historical monitoring for trend, and establishing new monitoring plots as needed. These two steps were performed by range management personnel, other resource management specialists, and ecologists during visits to the project area to evaluate the condition of the allotments from an ecological perspective. Allotment condition was derived using a combination of assessment techniques including Interpreting Indicators of Rangeland Health (IIRH) and Proper Functioning Condition, and quantitative monitoring including Parker Three-step Condition and Trend (C & T) plots, Line-point Intercept, stream and riparian health assessments and surveys (see Fisheries and Hydrology Resource Report) and aerial reconnaissance. For more information relating to the assessment and monitoring protocols refer to the Rangeland Resource Specialist Report in the project file. In areas where long term trend monitoring was not available professional judgment (including review of available data, historic accounts, utilization records, and past grazing management) was utilized to assess range condition.

During the course of this analysis there are further plots that would need to be established to determine the actual effectiveness of the proposed livestock management depending on the selected Alternative into the future.

Both the CMP and Forest Plan identify utilization standards to assure continued maintenance or improvement of the vegetation and soil conditions. Maximum utilization standards have been set for both upland and riparian vegetative communities depending on the management goals and condition of these areas. Utilization of upland herbaceous vegetation is generally measured by percent removed by weight, while herbaceous vegetation use in riparian areas is measured by amount of residual stubble height remaining, including regrowth, at the end of the grazing season (Monitoring Vegetation Attributes). Utilization on woody shrubs is measured as the amount of annual growth removed by grazing animals. These utilization standards are set to represent the maximum levels of use by both wildlife (within agreed upon management objectives) and permitted livestock.

Rangeland condition can be inferred from reviewing past compliance with utilization standards and evaluating the effects of grazing and browsing on rangelands. This information can be used in the short term to determine resource use levels and needed adjustments in management and can be considered along with other monitoring data to identify the achievement of management objectives.
Allowable utilization standards for satisfactory and unsatisfactory rangeland condition are described in Tables 6. The identified standards represent a resource management level from the Forest Plan where “Livestock are managed to achieve full utilization of allocated forage”. This management level has been used in the past on the allotment within the LIRA project area with the associated standards applied at all key areas on the allotments. It is however, often necessary to move key areas if it is determined that the existing key area is not representative of livestock utilization within the area, pasture, or allotment. Many areas within the allotments

that have unavoidable livestock concentrations such as salt grounds, water developments, gateways, or corrals are not designated as key areas as they represent areas of congregated livestock use and are not representative of use throughout the pasture. These concentration areas are generally a very small percentage of the total land area within an allotment. Utilization triggers are identified for each key area as a point in time measurement when livestock management will be adjusted to ensure that standards are not exceeded.

Table 5. Allowable CMP utilization standards for livestock managed within the LIRA Allotments

Season (general months)	Phenology of key species	Utilization Standard
Fall/Winter (mid to late October – February, March, or April depending on the elevation, aspect, and weather patterns for a given year)	Period begins when key cool season perennial species have achieved dormancy and ands just prior to initiation of new growth in the spring (green-up).	Maximum forage utilization is set at 60% of key species on a site specific basis.
Early Spring (March or April depending on the elevation, aspect, and weather patterns for a given year)	Period when the key cool season perennial species initiate growth (green-up) and begin shoot elongation and extends through the period of maximum carbohydrate use and beginning of carbohydrate storage. It ends prior to the time the soil moisture is expected to become limiting to the extent that essentially full re-growth cannot be assured. Livestock would be removed from the unit based on ensuring that adequate soil moisture exists at the time of removal to provide for essentially full re-growth.	Maximum forage utilization is set at 60% of key species on a site specific basis
Late Spring (April-May depending on soil moisture)	Period when the key cool season perennial species are still growing but soil moisture is beginning to limit growth. Livestock removal is not planned to occur during the time when assurance can be made that essentially full re-growth would occur.	Maximum forage utilization is would be the same as established by the Forest Plan for the standard summer grazing season (see Table 6)

Table 6. Allowable Forest Plan utilization standards for livestock managed within LIRA Allotments

Condition Rating	Upland			Riparian	
	Herbaceous		Shrubs	Herbaceous	Shrubs
	Forested	Grassland			
Satisfactory	45%	55%	40%	4”	40%
Unsatisfactory	0-35%	0-35%	0-30%	>6”	0-30%

Affected Environment/Environmental Consequences

History of LIRA area

The Social History of the LIRA area is documented in Chapter 1 of this DEIS. This section continues the history from the 1950’s and 60’s, when the Forest Service focused on rangeland vegetation and livestock forage utilization to determine vegetation conditions and stocking rates for allotments.

Beginning in the 1960’s utilization, carrying capacity and rangeland condition studies were conducted to determine carrying capacity and use patterns resulting in additional adaptations to the permitted numbers, grazing seasons, and added improvements (i.e. allotment boundary and pasture divisions fences and water developments). Condition and trend plots (C&Ts) were established and an understanding of the ecology of the area was incorporated into management of the allotments. Reviewing inspections in the 2210 Allotment files from the 1950’s and 1960’s by range managers during that time indicate that the condition of the LIRA area had improved from pre 1950’s conditions based off of management changes imposed during that time period. Although it is anecdotal, there is a strong pattern of notes indicating it “the best I have seen in years” or the “range has really improved” including notes from Forest Service Regional Ecologist at the time indicating that the most rapid improvement in rangeland condition likely happened during this time period.

Trying to manipulate vegetation that was historically disturbed towards “desirable” perennial species in the LIRA area has had little success over the years. This included seeding of perennial species for increased forage rather than native perennial species. Seeding projects occurred in the 1960s across the LIRA area (pers communication, McClaran 2012), many of the specific records of seedings done by the Forest Service have been lost due to the office fire, but there is one from the Willow Springs pasture of the Rhodes Creek allotment where they tried to reseed an area taken over by cheatgrass and sand dropseed. They planted 10 acres of a western wheat, Whitmar wheat, and Russian wild rye using a drill. There is no evidence that the species planted were successful in the records or visible on the ground today, as none of them persist with any abundance during recent field visits. There is about 3 acre stand of Whitmar wheat still evident at the Foster place bench which is in the Foster pasture of the Rhodes Creek Allotment which was likely planted at the same time. In 1990 a seeding trial was completed in the Willow Springs pasture. The Willow Springs trial had 13 different species of perennial

species that were native (local), native (not local) and non-natives and was protected by an exclosure. The species inside the exclosure had with little success. Only four species remained by 1996, the last remaining bluebunch wheatgrass plant, was lost during the 2011 Cactus Mountain fire. On the Snake River when Dug Basin was still under private ownership the landowner burned red threeawn to encourage desirable perennials growth, according to the records it helped it be more palatable for the cattle but did not yield the intended result. Seeding the benches and burning red threeawn were tactics tried in other areas of the canyon within the LIRA area (pers communication, McClaran 2012) with the same failed result.

Livestock Management, including the introduction of written plans evolved over the decades after 1950. Permittees and the Forest Service worked together using the best knowledge at the time to create livestock use plans to improve range conditions, see table 7 for a brief history of what they included and what permittees were directed to manage for. It is assumed that the management strategies were similar amongst all the LIRA allotments, the following pulls portions out of different plans to show the change over time in management direction of grazing within the allotments. Table 8 shows the number of livestock ran on each allotment in general over a decade. The general pattern has been a reduction in livestock over time, and increase in allotment acres by the addition of pastures from adjacent allotments or the purchase of private land by the Forest Service.

Table 7. Livestock Management Plan over the Decades

Plan Era	Allotments Involved	Use standards
Pre 1965	No written management plans located, only permittee instructions (annual basis)	In directions to permittees in 1965: optimize distribution, install water developments, and strategic fencing to leave more forage to improve range conditions from very poor or poor to a better condition, no specific use standards
1976	All Allotments within the LIRA area	Imnaha-Snake grazing system started: allows grazing on a unit during the current growing season until growth on key species reaches indicated height on ungrazed areas within the unit (agronomy cages or the like). Livestock are then removed assuming there is still soil moisture to insure regrowth of key plants to maturity and seed ripening. For the Lightning Allotment (now part of Rhodes Creek Allotment), this meant 6” stubble height on bluebunch wheatgrass and 4” stubble height on Idaho fescue. In the 1978 grazing plan for Rhodes Creek the fall-winter standard for residual stubble height for both bluebunch wheatgrass and Idaho fescue was 2”.
1983	Lone Pine C&H Allotment Range Management Plan	Allowable use and key species concept introduced in 1982, standards in Annual Grazing Plan. First mention of promoting ecological development in vegetation.

Plan Era	Allotments Involved	Use standards
2003	All Allotments in NRA, HCNRA CMP	See Table 6, allowable use incorporated into Annual Grazing Instructions.

The other thing that changed over time was the allotment boundaries; the following is a timeline of the changes that are documented:

- Lone Pine: The private land within the allotment in was acquired by the NFS in 1978, the Little Deep pasture was added from an adjacent allotment in 1981.
- Rhodes Creek: Originally began as Lightning Creek Allotment in the 1920's (current day East and West Bench Lighting, North and South Roy, Bull, Rhodes Creek, Sleepy Breaks, and Lightning Creek Pastures) and was combined with the Lower Cow Creek Allotment (current day Willow Springs, Foster, Holmes, Westside Cow, and Tulley (now in Toomey)) around 1975. In the late 1980's Sleepy Breaks, and Lighting Creek/Hangover pastures were added.
- Cow Creek and Toomey Allotments have stayed fairly consistent. They were used in conjunction with the Dodson-Haas Allotment (adjacent to LIRA area) as the Lower Imnaha Allotment in the 1960s through the 1980s.

Table 8. Number of livestock over time within LIRA Area

Allotment (Average cattle use from 11/1-5/15, unless otherwise indicated)				
Decade	Cow Creek	Rhodes Creek	Toomey	Lone Pine
1940	Unknown number	2930 sheep 400 cattle	Converted to cattle use 1922, Unknown # of cattle in 1940	1790 sheep
1950	400 between Cow Creek and Toomey	841 (average)	400 between Cow Creek and Toomey	400
1960	400 between Cow Creek and Toomey	885	400 between Cow Creek and Toomey	400
1970	442 between Cow Creek and Toomey	885(Rhodes Creek formed from Lightning and Lower Cow Creek Allotments)	442 between Cow Creek and Toomey	300
1980	Used as part of Lower Imnaha Allotment	885	Used as part of Lower Imnaha Allotment	300 (allotment enlarged)
1990	276	885	236	300
2000	276	885	236	300
2010	231 (allotment enlarged)	784	184 (allotment enlarged)	vacant

Current Condition and Livestock Management of the LIRA area

This section includes discussion about the general plant communities and associations patterns, the current livestock management (generally 2005 to today), and information about past management activities and associated legacy impacts. The current condition is aimed at "painting the picture" for the reader before discussing the effects of the proposed actions and Alternatives. This section will be organized in the following manner for each allotment in the LIRA Area:

- Summary of vegetation within the allotment, and differences between pastures
- Summary of livestock use and behavior in the allotment, and differences between pastures
- Current management grazing rotations in narrative form (Tables are in Range Resource Report, Appendix A)
- Summary of the assessments and monitoring in the allotment
- Conclusion about allotment and pasture conditions

There are general patterns that occur across the LIRA area and are applicable to a degree in all the allotments, the following explanation of those patterns is meant to support the individual allotment discussions. Due to the geography of the project area, the vegetation follows patterns from low to high elevation, and from north to south aspects see figure 4. Within all elevations of the LIRA area vegetation varies from the north to south aspect due to the effects of sun exposure and differences in soil properties. This creates a complex series of vegetation types (referred to as plant communities or associations) that is difficult to clearly analyze because each pasture is very heterogeneous and cannot reasonably be stratified based on plant community for livestock management with solely physical barrier methods such as fencing.

Figure 4. Geography of LIRA relating to changes in plant communities

For this analysis the pastures that are predominately near the Imnaha or Snake Rivers up to bench level will be referred to as the Low Elevation Pastures (generally 1,000- 2,000 feet in elevation). The pastures that are predominately at the bench level will be referred to as the Benches (generally 2,000 to 3,000 feet in elevation), and finally the pastures that are in the higher elevations (3,000 feet or greater in elevation) closest to the headwaters of the drainages will be referred to as the Breaks Pastures. It is important to talk about pastures in these groupings because they have the most similar patterns of vegetation due to elevation and aspect and ultimately livestock grazing effects. The Plant Association Guide (1987) in Appendix M in the project file, and Figure 5 suggest that generally as elevation increases the bluebunch wheatgrass dominated plant associations shift to Idaho fescue dominated plant associations around the mean range of 3,000 – 4,500 feet. There are exceptions to this with the low elevation Idaho Fescue / prairie junegrass association (2,600 feet mean elevation) and bluebunch wheatgrass / Wyeth's buckwheat (4,800 feet mean elevation). Where there is a pasture(s) that

are not consistent with that pattern it is addressed separately or explained. See Figure 5 for example of the landscape positions as they related to the LIRA area.

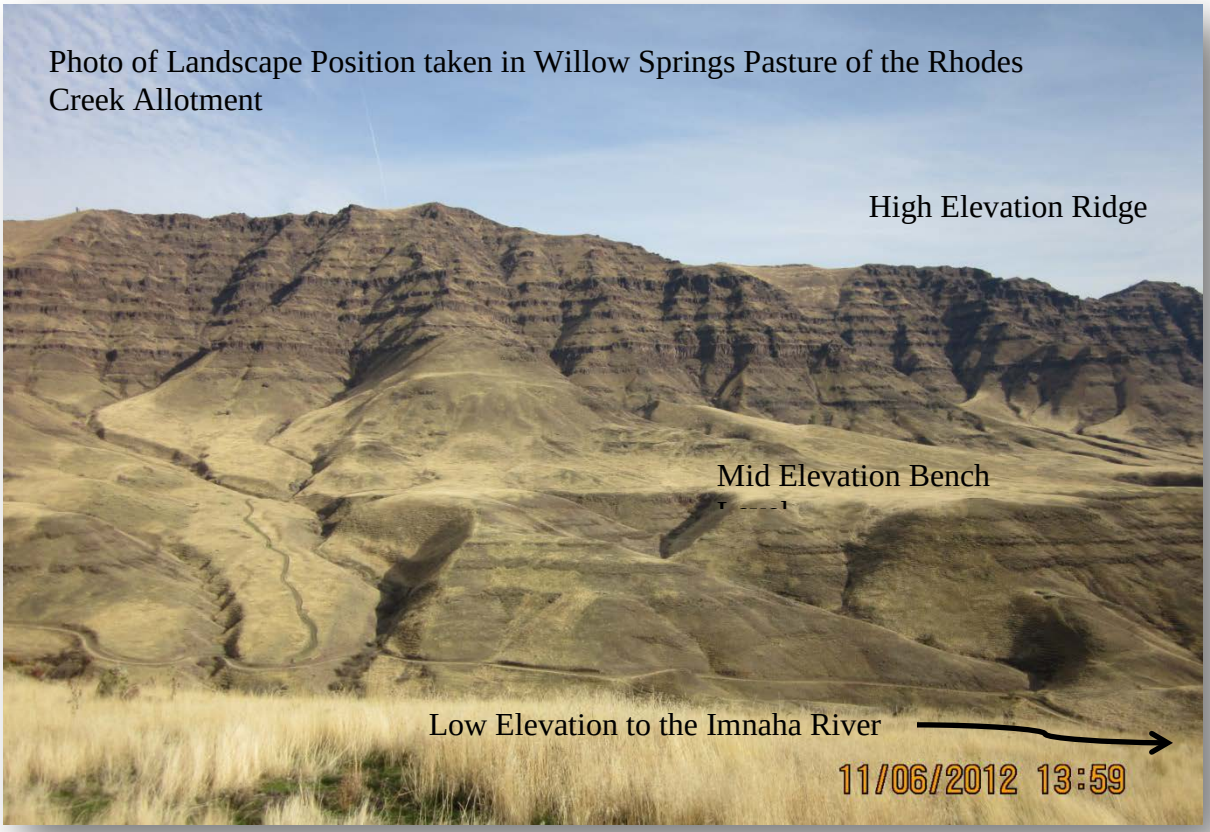


Figure 5. Landscape position example for the LIRA Area for how pastures are described.

The current condition of the vegetation in a lot of sites of the LIRA area varies from the conditions described by plant associations (a grouping of plant communities) in the Plant Association of the Wallowa-Snake Province (Johnson, 1987) description because those conditions are based off of a "reference community". A reference community is what is considered "as good as it gets" for the potential of the plant association for being near PNC.

The current condition of the vegetation of the LIRA area is a product of wide range of past management activities and is in various stages of departure from PNC. However, the Plant Associations of the Wallowa-Snake Province (Johnson, 1987) is still a good reference for what the vegetation in the LIRA area is in general and what sites that have not crossed a threshold potentially could be. Based on the Plant Associations of the Wallowa-Snake Province (Johnson, 1987), past field inspections and monitoring, and a GIS mapping exercise, the majority of the project area is composed of cool season bunchgrasses and the resulting plant

communities. The most dominant species are bluebunch wheatgrass and Idaho fescue. Bluebunch wheatgrass and Idaho fescue can be indicators of later seral status and desired condition and are preferred livestock forage species or "key species". Flatter areas (many less than 10% slope) were historically heavily used areas that were disturbed by past homesteading activities, cultivation, haying and grazing overuse. The disturbed areas have shifted to other plant communities either dominated by warm season grasses such as sand dropseed or red threeawn, or to annual bromes (cheatgrass, field brome, Japanese brome) see Figure 6 in the Lone Pine allotment. There is a data gap in the GIS mapping for the LIRA area and there are areas that have not been specifically mapped, a part of those areas are in generalized categories such as "bluebunch wheatgrass" or "shrub", and others are discussed in a more Plant Association Group or site specific context.

> The introduction of cheatgrass to the canyon lowland region probably occurred between 1905 and 1910. In 1914, in the first range survey of the Imnaha National Forest, cheatgrass was mapped in parts of only 12 sections. Within 25 years it has spread throughout the lowlands, occupying depleted areas…. PNW-GTR-315, June 1995

To summarize, the project area is composed of the following broad vegetation communities in order by approximate percentage of the LIRA allotments:

1. 24%: Low producing plant communities (site characteristics such as high rock component or shallow soils inhibit these areas from producing more than 200 lb of dried forage per acre)
2. 37%: Bluebunch wheatgrass dominant plant community
3. 19%: Idaho fescue dominant plant community
4. 17%: Shrub or forested plant community
5. 3%: Unidentified "grass" communities likely to be associated with degraded bench or canyon bottoms and composed of Kentucky bluegrass, planted species, and/or annual bromes.

For a more detailed percentage of potential plant associations per allotment reference Table 1 in Appendix B, for a more detailed percentage per pastures within the Allotment see Rangeland Resource project record.

Figure 6. Photo of Lone Pine Allotment, Dug Creek Pasture in Dug Basin.

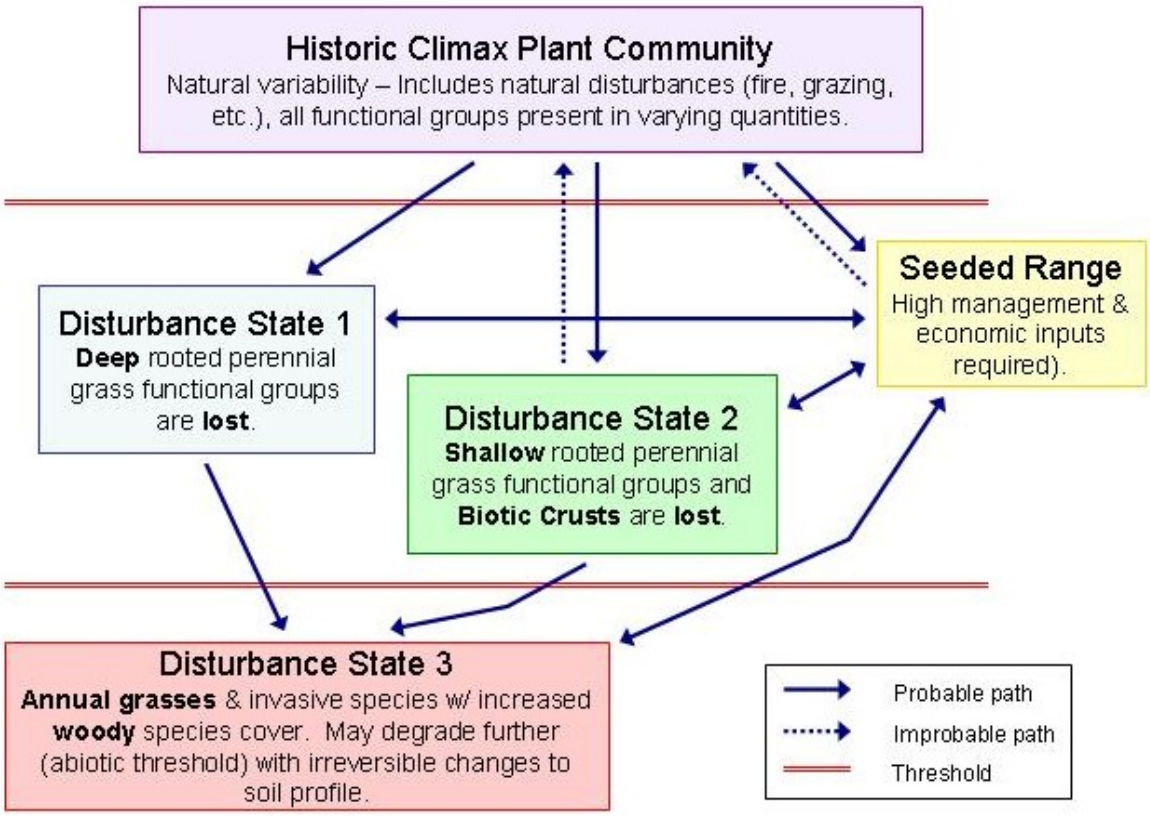
Vegetation in foreground has been altered by historical use (haying/cultivation) and consists of warm season grasses and annual brome species presence, whereas vegetation in the background is on steeper slopes more typical of bunchgrass communities that make up over half of the allotment's vegetation.

The CMP guides managers to consider the recommendations given in the Plant Associations of the Wallowa-Snake Province (Johnson, 1987) herein referred to as the Plant Association Guide. The table in Appendix C in the project file describes the plant associations within the project area and the management recommendations specific to livestock grazing. Implications of the recommendations are discussed in more details in the effects section of this report.

Phenology work by Charlie Johnson in the mid 1970's including several locations within the LIRA area suggests that for bluebunch wheatgrass initiation of growth could be as early as the beginning of February in the low elevations (1,200 feet elevation) to as late as April in the higher

elevations (4,000 feet elevation). This supports Hopkins (1938) work that said that there is a 10 day lag in plant development per 1,000 feet in elevation gain. Johnson's work also suggests that in the low elevations bluebunch wheatgrass may start flowering as early as mid-May, and in the higher elevations as late as the first week in June. Furthermore, the majority of the flowering to maturity stage occurs for all elevations between early June and mid-July. For a table showing Johnson's definition of the stage plant growth and accompanying definition see Appendix E in the project file. It is widely acknowledged that bunchgrass growth and development could vary from year to year.

A crosswalk between plant associations and the Ecological Site Descriptions has been developed for the WWNF, including the LIRA area. The majority of the Ecological Site Descriptions within the LIRA area use the general model for Cool-season Bunchgrass Rangelands that is shown by figure 7. Warm season grasses have not been modeled as well for the project area, it is anticipated that S&T models will be available for use soon. Implications of Ecological Site Interpretations and management recommendations are generally aligned with what Johnson and Simon 1987 recommend, and are discussed in more detail in the effects section of this report. To see a table that lists the ESDs applicable to the LIRA area and the Ecological Site Interpretation recommendations, refer to Table 1 in appendix D in the Rangeland Resource Specialist report.



GENERAL MODEL FOR COOL-SEASON BUNCHGRASS RANGELANDS

Figure 7. State and Transition Model for Cool-season Bunchgrass Rangelands

State and Transition models are meant to be a tool for managers to determine what management changes on the ground would make a measurable difference towards the desired condition for the site. The model also helps to define the sites that have crossed a threshold. Transition thresholds, controlled by abiotic limitations or biotic interactions, limit the ability to direct vegetation development (Whisenant, 1999). Redirecting succession (toward a desired condition or PNV) often requires active management intervention (Whisenant, 1999). Refer to the discussion in the Desired Condition of Chapter 1, for more general discussion.

Across the LIRA area the level of permitted use have been authorized through term grazing permits (FSH 2209.13), which are administered each year by annual instructions and authorized by the payment of grazing fees (FSH 2231.41).

Table 10. The current authorized use within the LIRA analysis area on the Term Grazing Permit.

Allotment	Number of pastures	Livestock Type	Permit Type	Permitted Numbers	Duration	Head Months
Cow Creek	10	Cattle	Term	231	11/1-12/31 2/1-5/15	1,255
Lone Pine	6	Cattle Horse or Mule	Term	300 6	12/1-5/31	1,800 33 horse
Rhodes Creek	17	Cattle Horse	Term	784 500 784 15	11/1-2/15 2/16-4/15 4/16-5/15 11/1-5/15	4,495 97 horse
Toomey	6	Cattle	Term	184	11/1-12/31 2/1-5/15	1,000

Current management requires permittees to achieve proper livestock distribution through herding (livestock social factors) and salting techniques and maintenance of existing water developments and fencing. Stocking levels and season of use are discussed in the description by allotment section below. Stocking of each allotment is described in terms of head-months (HM). A HM is a unit of measure that counts one animal for 30.4 days. A cow-calf pair qualifies as one animal in these calculations if the calf is 6 months of age or less. Refer to Figures 9 thru 14 for the allotments and pastures.

The current management as described is an example of the timing, intensity, and frequency of grazing within the LIRA allotments and can vary from year to year. Current management is described as the average use since 2005-2006 grazing season. The dates and numbers of livestock are used to help the reader understand what that is currently occurring within the project area. The effects section of this report will speak to effects of the timing, intensity, and frequency of grazing rather than specific numbers.

Cow Creek Allotment

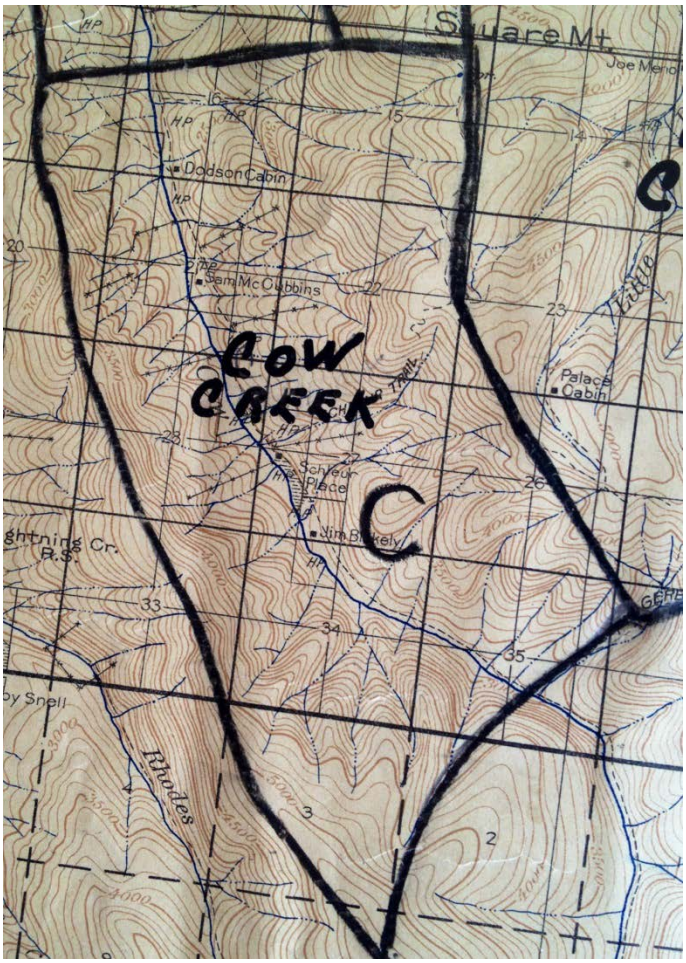
The Cow Creek allotment is currently divided into ten pastures; West Cow Creek, Rowley, Upper Rowley, Fingerboard, Upper Fingerboard, Schleur, Upper Schleur, Salt Gulch and Upper Salt Gulch, and Deer Creek.

The Cow Creek Allotment is a mix of bench and breaks pastures; the pastures are divided east and west pastures by Cow Creek. The elevation increases from north to south towards the headwaters of Cow Creek (see Figure 9). The bench pastures in the Cow Creek are Rowley (and Upper Rowley because the fence between the two is not functional) and West Cow Creek, and are predominately bluebunch wheatgrass plant associations. West Cow Creek, because it is largely north facing, has a higher component of Idaho fescue dominated plant associations regardless of the lower elevation.

Schleur, Salt Gulch, and Fingerboard are pastures that are more similar to breaks pastures in general because they are higher in elevation. However, because they are largely south facing there is larger portion vegetation of bluebunch wheatgrass dominated plant associations. Further up towards Summit Ridge, and thus higher elevation, is Upper Schleur, Upper Salt Gulch, and Upper Fingerboard. The “upper” pastures are mostly Idaho fescue plant association dominated where there isn’t rocky shallow soils. These smaller pastures “in the rims” were created historically to get full utilization of the forage by holding livestock up

> Researchers have concentrated on the physiological factors that influence distribution patterns of cattle on rangelands but have minimized the social factors. Social dominance hierarchies influence grazing distribution and supplement consumption by range cattle. Early experiences in life affect cattle distribution, and herding and selective culling are management tools that could be used to change cattle distribution. Scientific research into the social factors influencing beef cattle distribution will require an intimate knowledge of the pastures and of the animals. Failure to address these relationships will prevent grazing managers from achieving many of their resource objectives. (Sowell, et al. 1999)

higher on the ridge. The fences have not been functional for a prolonged period of time and have functionally served as one pasture during current management. Deer Creek is the only break pasture on the west side of Cow Creek, and is primarily composed of Idaho fescue plant associations dissected by timber stringers. For a detailed breakdown of percentages of potential plant associations by Allotment and pasture see Rangeland Resource project record. Many of the "flat" benches (less than 10% slope) have been degraded to annual brome and warm season grasses such as red threeawn and sand dropseed.



Cow Creek drainage was heavily used during the homesteading period. Rowley Gulch (Rowley pasture) has been extensively used historically as a livestock concentration area and the trailhead over Summit Ridge toward the Snake River. Evidence of rock fences to hold livestock are evidence of this activity. There are also old farm fields near Cow Creek within the Rowley pasture, and it is suspected that there are old farm fields at the bench level as well; however it would take an extensive homestead record search to confirm exactly where cultivation activities may have occurred. The Litch Ranch (Schleur place on Figure 8). Historical map of Cow Creek Allotment to the left) below the Schleur pasture is functional, and was a historical use "hub" with a house, barn, and corrals. In the "flat" part of the Salt Gulch pasture there are old farm fields near Cow Creek, with a network of abandoned ditches as evidence.

Figure 8. Historical map of the Lone Pine Allotment

The Cow Creek Allotment has a mixture of fences and natural barriers to create district pastures or grazing areas. The livestock water from a few narrow places along Cow Creek. Water temperature, thick riparian vegetation, and large substrate focus the water areas and discourage livestock from staying beyond getting a drink. Due to grazing during the cold winter months cattle do not congregate in the riparian area (Masters, et al. 1996) beyond watering because the drainages in the LIRA area tend to act like cold air sinks, and are the areas that get the least sun in the winter due to short day lengths. Results from Keren and Olson (2006) indicate that solar radiation contributes strongly to the thermal balance of a cow during the winter months. In order for the livestock to thermal balance (get warm) they tend to graze where they can find sun in areas away from the colder riparian area. Olson and Wallander (2002) discuss that livestock under long term selecting for performing in winter conditions adjust

physiologically and behaviorally to daily and seasonal weather. This supports observations in the LIRA area that behavior, physiological needs, and preferred forage drive the livestock use the uplands significantly more during winter grazing. Several livestock grazing studies support that this would likely be the opposite if the same area was grazed during the summer months (Gillen, et al, 1984).

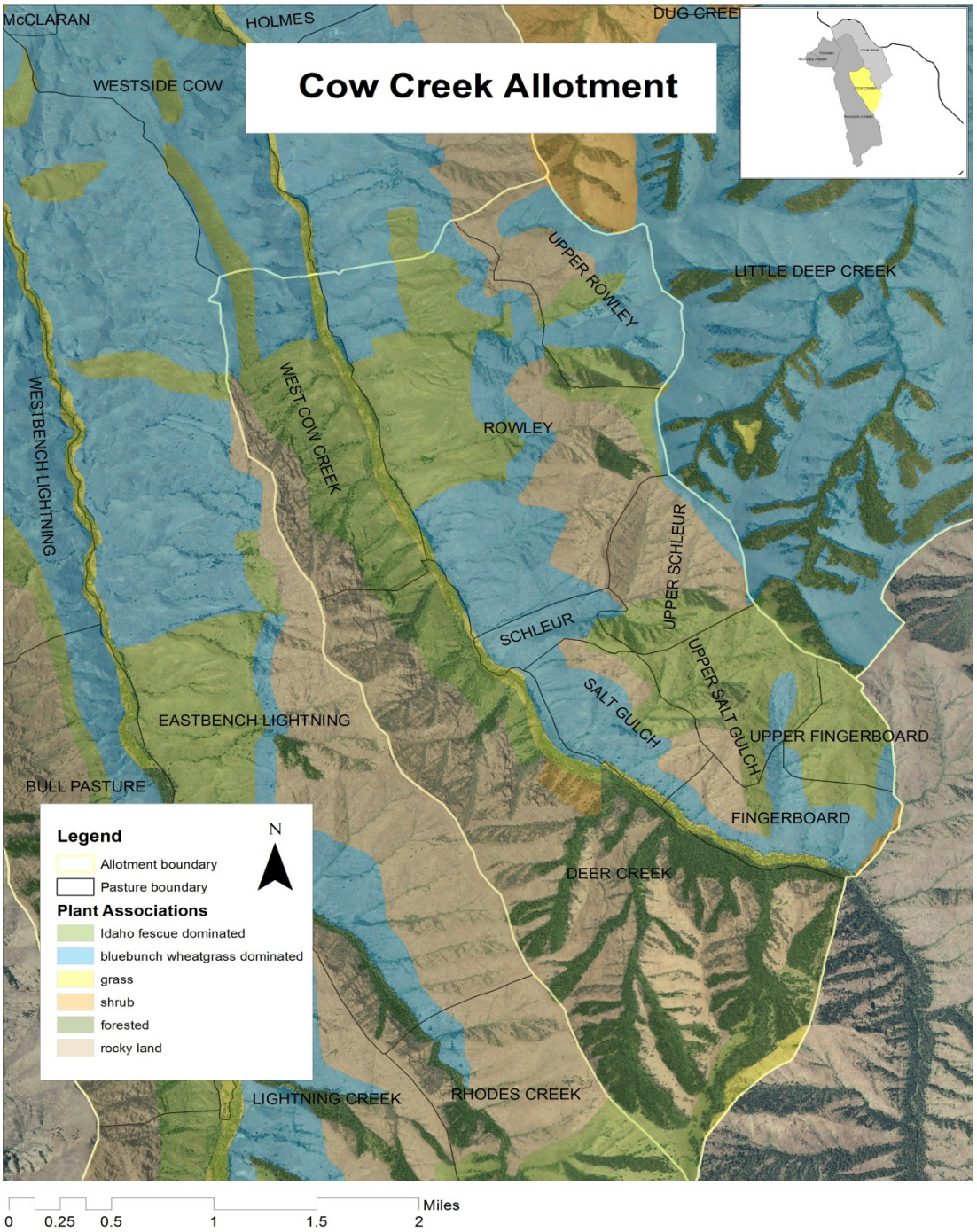


Figure 9. Cow Creek Allotment, Pastures, and Plant Associations

Current management grazing rotations in narrative form (Tables are in Appendix A, project file) A total of 1,255 head months of livestock are authorized on the 5,824 acre Cow Creek Allotment annually between the dates of February 1 through May 15.

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The Cow Creek Allotment is currently managed under an elevationally-determined rotational system within the pastures, and as part of a larger grazing system that includes Rhodes Creek and Toomey allotments, as well as private land. Generally, in the beginning of March the cattle enter the allotment after they have calved and move from the lower to higher elevation during the grazing season until mid-May. Pasture moves are based on resource condition and utilization standards (Forest Plan) in key areas. At the end of the authorized season of use, the livestock are herded back through the lower elevation pastures to exit the allotment, utilizing roads to avoid trailing on steep slopes with soil concerns and riparian areas.

Grazing is managed to maintain desired upland and riparian conditions. Table 1 in the Range Specialist Report Appendix A is an example of the grazing system for the Cow Creek Allotment. Table 24 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Cow Creek Allotment is not be exceeded, although the number of head and dates may vary from pasture to pasture based on anticipated weather, utilization, and/or resource conditions using knowledge based off of the previous grazing season and what is known about these factors prior to the next grazing season. These adjustments are generally made at the AOI meeting; however may be adjusted during the grazing season as more is known about the weather, utilization, and resource conditions.

In mid-February, as the cattle are calving, the livestock start entering the Rowley pasture from the Rhodes Creek Allotment from the East Lightning Bench, Foster, and private land pastures until there is a herd of 300 cow/calf pairs. The cattle graze in Rowley pasture until the end of March. They are then split into three herds; one herd goes to the Upper Schleur, Schleur, Salt Gulch, and Upper Salt Gulch pastures; the second herd goes to Fingerboard; and the third herd goes to Deer Creek for the month of April. A small group from East Lightning Bench and enters West Cow Creek in February and remains there until the beginning of May. Due to the geography of the area, it is shorter distance and safer for the riders that they enter from the Lightning Creek bench and trail the cattle north and east staying at bench level elevation rather than coming up from Cow Creek, see Figure 9. In early May all of the cattle within the allotment are gathered and processed (calves are branded and vaccinated) at the corrals at the Litch place, herded back into Rowley pasture for two weeks, and then herded out of the Cow Creek Allotment to exit the Imnaha canyon by mid-May.

Summary of the assessments and monitoring in the allotment

Table 11. Cow Creek Allotment Interpreting Indicators of Rangeland Health (IIRH or Rangeland Health)

Pasture	**Site #**	**Ecological Site**	**Soil and Site Stability Attribute***	**Hydrologic Function Attribute***	**Biotic Integrity Attribute**	**Soil Stability Test**
Rowley Pasture	7	Loamy North (54)	Moderate departure	Moderate/ Moderate to extreme departure	Moderate to extreme departure	None to slight departure
West Cow Creek	8	Low Elevation North (42)	Sight to moderate departure	Slight to Moderate departure	Moderate departure	None to slight departure
Salt Gulch	9	Shallow South (31)	None to slight departure	Slight departure	Moderate departure	None to slight departure

Table 12. Cow Creek Allotment Soil stability

Allotment	Pasture	Plot #	Year	Stability Value	Rating
Cow Creek	Rowley	Lower Imnaha 1	2012	5.6	Very high stability
Cow Creek	Rowley	Lower Imnaha 2	2012	5.0	High stability

Table 13. Cow Creek Allotment C&T Plot results

Allotment	Pasture	Cluster ID	Year	Forage Condition	Trend*	Soil Condition	Trend
Cow Creek	Rowley	LI 1	2012	Fair (60)	Stable	Good (95)	Stable
			1993	Fair (52)	Upward	Good (95)	Stable
			1964	Poor (31)	Baseline	Good (98)	Baseline
Cow Creek	Rowley	LI 2	2012	Poor (34)	Downward	Good (95)	Stable
			1981	Fair (52)	Downward	Good (100)	Stable
			1964	Good (85)	Baseline	Good (91)	Baseline

Table 13a. Cow Creek Allotment Loop and Cover Frequency results summary

Allotment	Pasture	Cluster ID	Year	Condition	Trend*	State and Transition Phase (2012)
Cow Creek	Rowley	LI 1	2012	Poor	Stable	Phase D*
			1993	--	Up	
			1981	--	Down	
			1964	Poor	Baseline	
Cow Creek	Rowley	LI 2	2012	Good	Up	Phase B*
			1993	--	Up	
			1981	--	Down	
			1964	Good	Baseline	

*For more details regarding specific plant communities trend over time refer to the Rangeland Specialist Report and supporting information in the project file.

Line-point Intercept

For a table of the results of Line Point Intercept plots read refer to the Soils Resource Report in the project file, Appendix D in the project record. Data collected using this protocol was collected as baseline data, therefore there is no trend determination associated with these data.

Conclusion about allotment and pasture conditions

Based on a combination of results from assessment and monitoring, and field inspections all of the pastures within the Cow Creek allotment are generally in satisfactory condition with the exception of a portion of the Rowley pasture. From a vegetation standpoint the IIRH assessment in the Rowley pasture picked up moderate-extreme departure from the expected vegetation on the site, and was supported by both C&T plot, Loop Methods (determines the basal cover direct hits), and Cover Frequency results that had demonstrated a downward trend over time since 1964. However, this downward trend appears to be stabilizing according to the data. This trend, and ultimately the determination the L1 plot site is in Phase D is mainly attributed to the increase in annual species in the north portion of the pasture. There are also soil concerns for the same portion of the Rowley pasture supported by Line-point Intercept data, for more information see Soil Resource section or Soil Resource Report in the project file. This combination of results indicates that all of the pastures within the Cow Creek Allotment are currently in satisfactory condition with the exception of a portion of the Rowley pasture which is currently not in satisfactory condition as described in the Forest Plan or CMP direction.

Rhodes Creek Allotment

The Rhodes Creek Allotment is the largest allotment in the LIRA area, and has the most pastures. The low elevation pastures include Willow Springs, McClaran (private), Foster, Holmes, and Westside Cow (see Map 10). This set of pastures is to the east of the Imnaha River, and north of Lightning Creek, including pastures on either side of Cow Creek near the

confluence with the Imnaha River. These pastures are predominately bluebunch wheatgrass plant association dominant as a result of the lower elevation and south facing slopes. There are pockets of Idaho fescue dominant plant associations within these pastures on north facing slopes. The north facing slope in Westside Cow that faces Cow Creek is the largest exception to the general pattern and is Idaho fescue dominant from the edge of the bench down to the creek, and on the north facing highest elevation portion of the pasture at the very end of Windy Ridge (see Map 12). These pastures are the lowest in elevation (generally) and have the earliest cool-season grass growth and development within the allotment. Many of the "flat" benches (less than 10% slope) have been degraded to annual brome and warm season grasses such as red threeawn and sand dropseed.

The bench pastures include East Bench Lightning, on the east side of Lightning Creek, and West Bench Lightning, Bull, North Roy, South Roy, and Homestead (private) on the west side of Lightning Creek. The vegetation in these pastures shift from bluebunch wheatgrass in the lower elevation (Imnaha River side) to Idaho fescue dominated plant associations up Lightning Creek (see Map 11). In West Lightning Bench and Bull pasture the predominant plant associations are bluebunch wheatgrass dominant with a band of Idaho fescue dominant plant associations at the toe of the slope up to the end of Haas Ridge. In East Lighting Bench pasture the dominant plant associations are bluebunch wheatgrass except for the narrowest portion of the canyon before the confluence of Rhodes Creek and Lightning Creek. North Roy and South Roy are dominated by Idaho fescue plant associations. Homestead (private) is largely in the bottom of the drainage. The bench pastures are the most heterogeneous pastures in terms of cool season grass growth and development because of the increasing elevation gradient and undulating aspects (see Figure 4). For a detailed breakdown of percentages of potential plant associations by pasture see Rangeland Resource project record, file labeled LIRA_pag_020314. Many of the "flat" benches (less than 10% slope) have been degraded to annual brome and warm season grasses such as red threeawn and sand dropseed, this is a prominent pattern in the East and West Bench Lightning pastures.

> This allotment has a colorful history. It is impossible to relate all of the details in the short time and space provided here. Only the highlights are stated here….Range Management Plan for Lower Cow-Tulley C&H Allotment, Arleigh Isley 1966
>
> This Allotment has been grazed by domestic livestock since approximately 1880. Prior to 1906 and the creation of the Forest Service, cattle and horses roamed at will and sheep were herded over the are using any forage left by the cattle and horses.
>
> By 1916 the area (Lower Cow Allotment) was badly overstocked but administration was limited because of the lack of finances, and no adjustments were made in stocking until 1939.

The breaks pastures include Lightning Creek pasture, that includes the confluence of Lightning and Rhodes Creeks, Butcherknife pasture on the east side of Rhodes Creek, Sleepy Breaks pasture that that straddles Rhodes Creek, and Lightning/Hangover that straddles Lighting Creek (see Map 12). The breaks pastures are predominately Idaho fescue plant associations dominant because they are higher in elevation. There are pockets of bluebunch wheatgrass plant associations in the sunnier and drier south facing slopes. As the elevation increases in these pastures so does the occurrence of timber stringers up towards

Summit Ridge. Due to the more rugged and steep topography, the breaks pastures appear to have the least legacy impacts from historical land uses associated with the homesteading era besides heavy grazing. Due to the highest elevations within the project area, the breaks pastures have the most delayed growth in the cool season perennial grasses. The Tulley pasture is also high elevation, however is discussed in the Toomey Allotment discussion because it is on the west side of the Imnaha River.

The Lightning and Rhodes Creek drainage was heavily used during the homesteading period. To support the level of homesteading in both drainages it is suspected that there could be old farm or hay fields at the bench level where it is “flat” and evidence of wagon width roads and trail still exists; however it would take an extensive homestead record search to confirm exactly where any cultivation activities may have occurred. On private land within the drainages that areas that have been cultivated is clearer in some areas continued into the 1980s (McClaran, personal communications 2012). Several stock trails existed throughout the drainage to connect the Imnaha and Snake Rivers. See photos of Historical Maps in the Range Resource Project file of the Rhodes Creek Allotment.

Similar to the Cow Creek Allotment, the Rhodes Creek Allotment has a mixture of fences and natural barriers to create district pastures or grazing areas. In the Willow Springs pasture the livestock water is in the form of springs that have been developed at or above bench level. There are also upland water sources in the Holmes and Foster pastures. Livestock distribution to the south side of Westside Cow would benefit from an additional water development and serve as Alternative from watering out of Cow Creek. For the pastures in the Lightning Creek drainage the livestock water from a few narrow places along Lightning Creek and Rhodes Creek. Air and water temperature, thick riparian vegetation, and large substrate focus the water areas and discourage livestock from staying beyond getting a drink. Due to grazing during the cold winter months cattle do not congregate in the riparian area (Masters, et al. 1996) beyond watering because the drainages in the LIRA area tend to act like cold air sinks, and are the areas that get the least sun in the winter due to short day lengths. Results from Keren and Olson (2006) indicate that solar radiation contributes strongly to the thermal balance of a cow during the winter months. In order for the livestock to thermal balance (get warm) they tend to graze where they can find sun in areas away from the colder riparian area. Olson and Wallander (2002) discuss that livestock under long term selecting for performing in winter conditions adjust physiologically and behaviorally to daily and seasonal weather. This supports observations in the LIRA area that behavior, physiological needs, and preferred forage drive the livestock use the uplands significantly more during winter grazing. Several livestock grazing studies support that this would likely be the opposite if the same area was grazed during the summer months (Gillen, et al, 1984).

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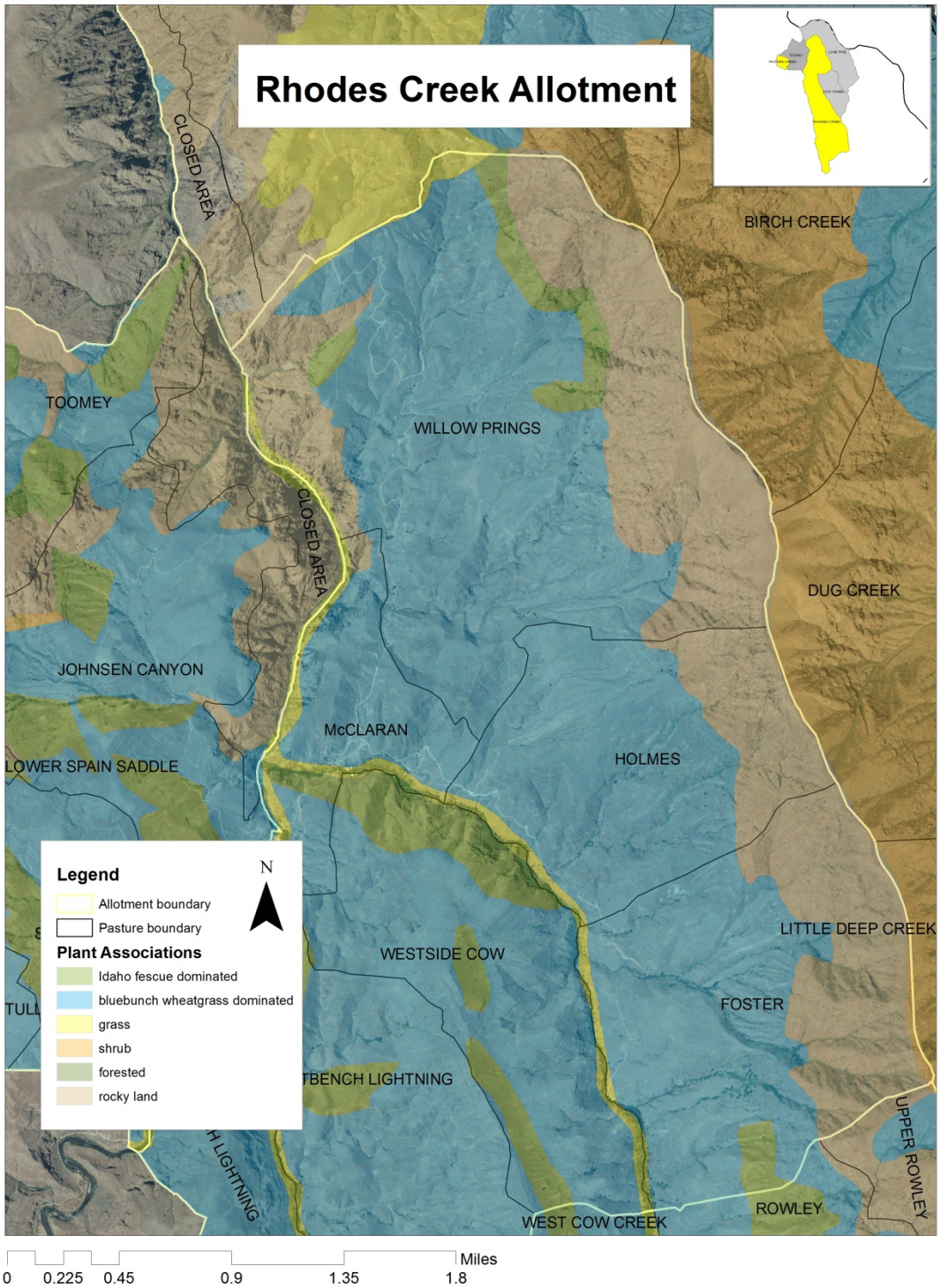

Figure 10. Map 1 of Rhodes Creek Allotment Pastures (Low Elevation) and Plant Associations

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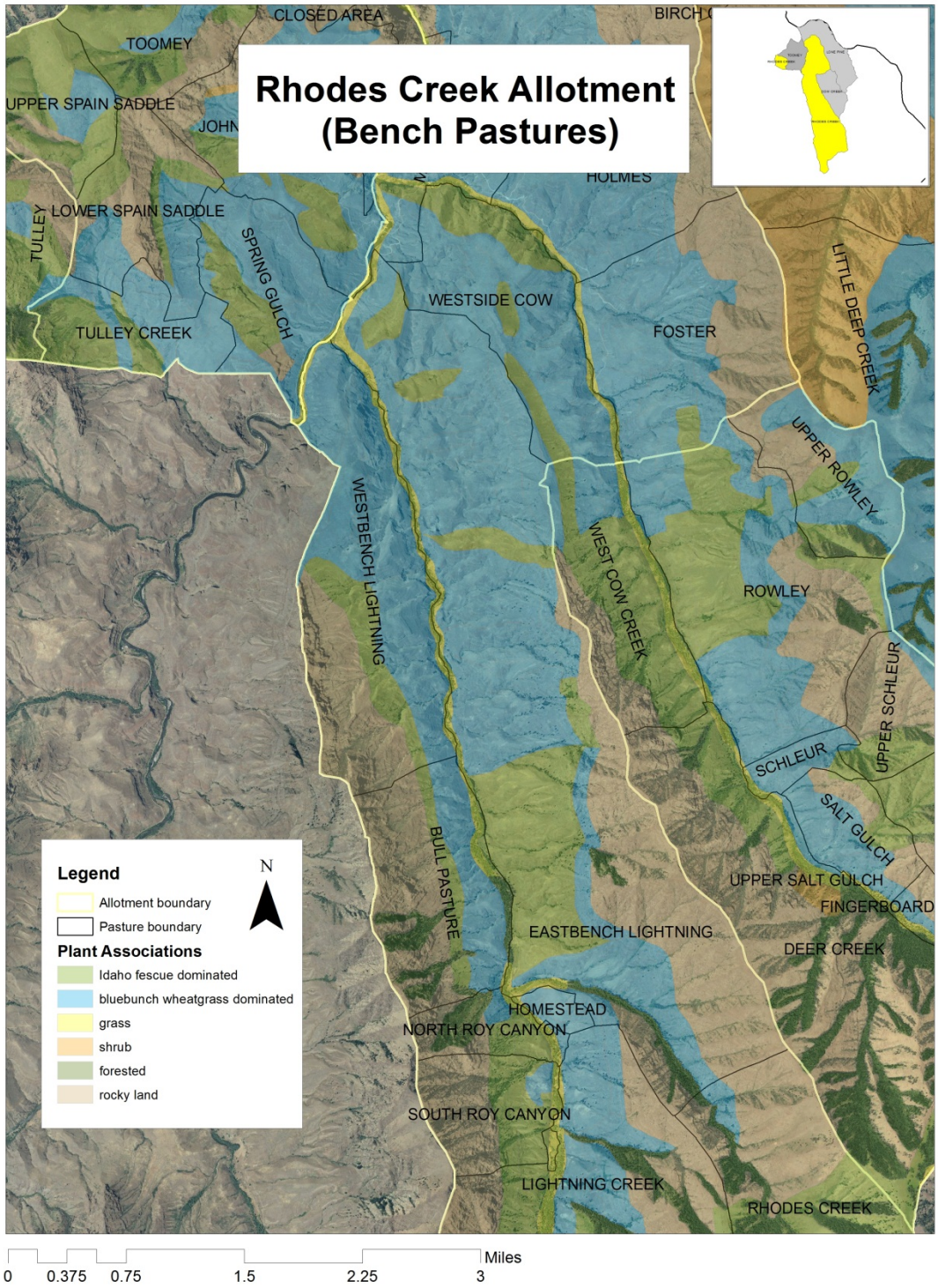

Figure 11. Map 2 of Rhodes Creek Allotment Pastures (Bench) and Plant Associations

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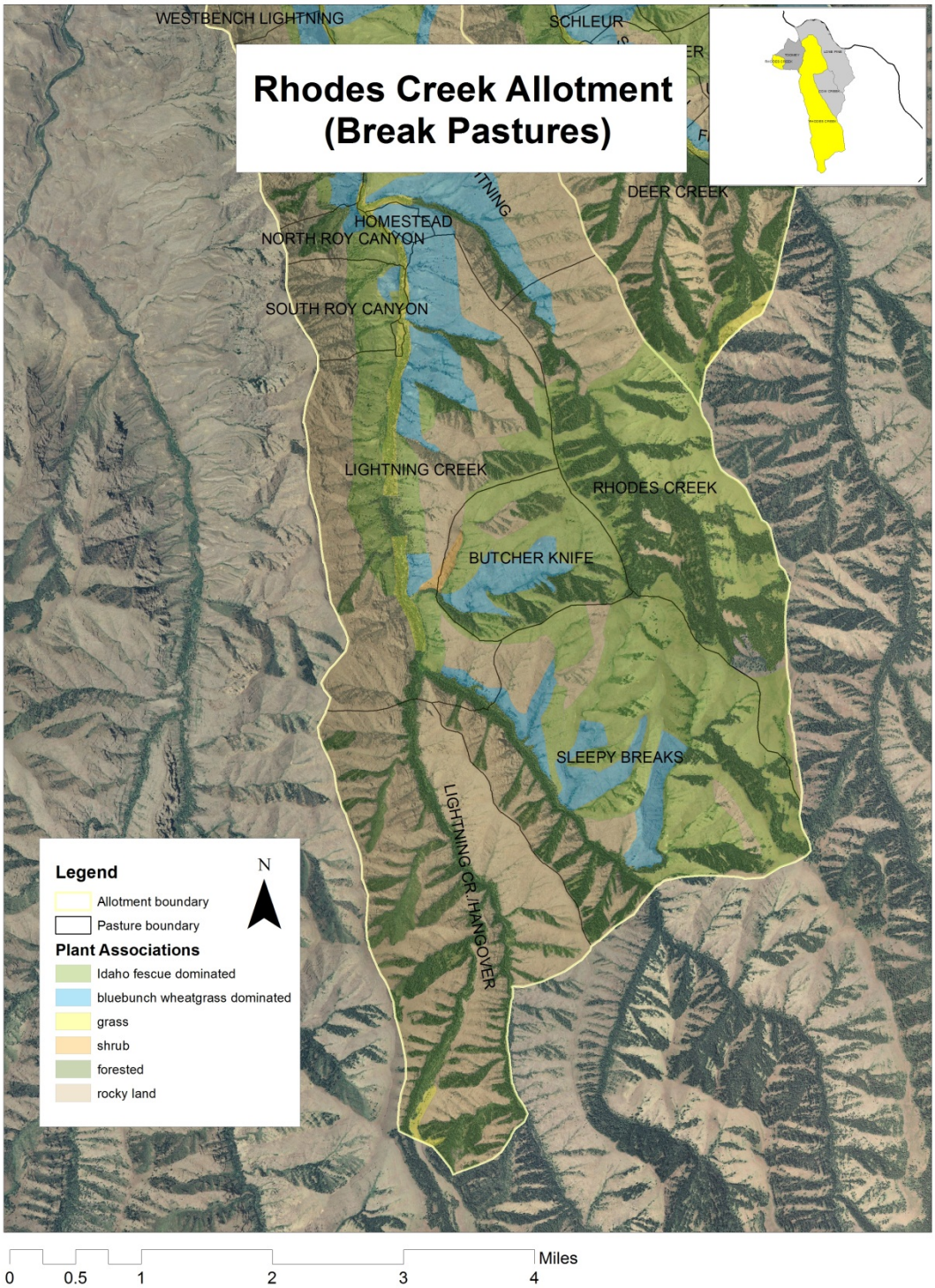

Figure 12. Map 3 of Rhodes Creek Allotment Pastures (Breaks) and Plant Associations

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Current management grazing rotations in narrative form (Tables are in Appendix A of the Rangeland Resource Specialist Report). A total of 4,495 head months of livestock is authorized on the 22,660 acre Rhodes Creek Allotment annually between the dates of November 1 and May 15. The Rhodes Creek Allotment is currently divided into 17 pastures including; Sleepy Breaks, Lightning/Hangover, Butcherknife, Rhodes Creek, North Roy, South Roy, Bull Pasture, East Lightning Bench, West Lightning Bench, Westside Cow, Willow Springs, Holmes, Foster, Homestead pasture, Tulley, and private land pastures (not counted). Please refer to Table 2 in Appendix A for an example of the grazing rotation.

This allotment is currently managed under a rotational system and as part of a larger grazing system which includes Cow Creek and Toomey allotments, as well as private land. A decreased stocking rate has occurred on this allotment as a result of the current permittees acquirement of Cow Creek and Toomey allotments in 2004. The later season of use (March-May) of the Lightning Creek bench pastures has significantly reduced since that time. The pasture use within the allotment is based on the elevation and weather conditions. When the cattle enter the allotment in November they are placed in the higher elevation “breaks” pastures up the Lightning and Rhodes Creek drainages. The cattle move from pasture to pasture during the grazing season, with moves based on resource condition and utilization standards in key areas (refer to PDC section for more explanation). In the higher elevations the cattle may also be moved earlier depending on the weather, as it snows and the forage is no longer readily available, the livestock are moved to lower elevation pastures where the forage is exposed. The cattle are moved into pastures in adjacent allotments (Toomey and Cow Creek Allotments) before and during the calving period which begins in March and a portion of the herd are moved back into the lower elevation pastures in the Rhodes Creek Allotment before exiting the allotment for the grazing season. At the end of the authorized season of use, the livestock are herded utilizing existing trails and roads to avoid trailing through riparian areas before being moved off the allotment. For the Rhodes Creek Allotment this is mainly the Dug Bar Road and the road adjacent to the Lightning and Rhodes Creek drainages.

Grazing is managed to maintain desired upland and riparian conditions. One aspect unique to this project area when compared to allotments grazed in the summer is that it is important to take into consideration short winter day lengths and potentially hazardous weather caused by snow and ice when moving livestock, these factors may lead to longer move times or earlier or delayed move dates between pastures depending on the conditions. Overlapping days in rotation is due to the time it takes to trail cattle from one pasture to another pasture, or another allotment within the project area. The Table 2 in Appendix A in the Rangeland Resource Specialist report displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Rhodes Creek Allotment has not been exceeded, although the number of head and dates may vary from pasture to pasture based on weather, utilization, and/or resource conditions.

In mid-November the cattle are moved from the Chesnimnus Allotment down into the Imnaha Canyon via the Tulley stock driveway, through the Toomey Allotment. About 140 cows and 40 bulls remain in the Toomey Allotment (see Toomey Allotment description and narrative). The rest of the herd continues on to the east and are herded into the high elevation pastures in the Rhodes Creek Allotment, which are located up the Lightning Creek drainage, farthest to the

south. The herd is broken into four herds at this stage in the grazing season for entry into the "breaks" pastures. Approximately 400 go to Sleepy Breaks, 250 go to Lightning Creek, Lightning/Hangover, 80 go to Butcherknife, and 80 go to Rhodes Creek. Up to 40 cattle from those herds that graze in the breaks that the permittee determines a need to watch them more carefully may be placed in the North and South Roy, as well as the Bull pasture during that time where they are more easily accessible in case they need medical attention. The current permittee owns a ranch house up the Lightning Creek drainage which makes it more feasible to tend to the livestock daily. In the beginning of January, the weather effectively drives the cattle back toward the north boundaries of the breaks pastures, towards the lower elevation "bench" pastures.

Between January 5 and 15 the cattle are gathered and sorted according to their Body Condition Score (BCS). The BCS is a numerical system used to suggest the relative fatness or body composition of the cow. Cattle that have a lower BCS are thinner cattle that have higher nutritional needs. These cattle are split off to be put on feed (hay) on private land. On average, about 110 of the cattle would need additional forage for 30-60 days to maintain a desirable BCS. Once the harshest part of winter has passed, these livestock are gradually put back onto the pastures on Rhodes Creek, Cow Creek, or Toomey allotment pastures. The bulls from the Toomey allotment are brought over to the Rhodes Creek Allotment and graze in North Roy, South Roy, and the Bull pasture (approximately 40 head). All cattle that remain on the allotments are redistributed into other portions of the Rhodes Creek Allotment for the remainder of January and February, with the exception of one herd that goes to the Toomey Allotment for approximately three weeks on the way to other Rhodes Creek pastures, and another herd that goes to the Cow Creek Allotment on the bench level (closest pasture to East Lightning Creek Bench in the Rhodes Creek Allotment). Calving season; the pastures closer to the Cow Creek ranch house make checking on the cattle more accessible to the permittee. Once calving has mainly concluded, the cattle (now cow/calf pairs) are redistributed into several groups that are placed in the Cow Creek and Toomey Allotments, with some going back into portions of the Rhodes Creek Allotments. In May the livestock are gathered and staged to exit the Imnaha Canyon around May 15 via the Tulley stock driveway, up to the Chesnimnus Allotment and private land. The main pastures used at this point in the grazing season through the beginning of April are the East and West Bench Lightning, Willow Springs, Holmes, and Foster. February - March is also the main calving season, the pastures closer to the Cow Creek Ranch are used. Once the calving season has mainly concluded the cattle (now cow/calf pairs) are redistributed into several herds which are placed in Cow Creek and Toomey Allotments. Some cattle return to pastures within the Rhodes Creek Allotment. See Table 2 in the Appendices and associated maps for more detailed information and description. In May the livestock are gathered and staged to exit the Imnaha Canyon around May 15th via the Tulley stock driveway en route to Chesnimnus Allotment and private land.

Summary of the assessments and monitoring in the allotment

Table 14. Rhodes Creek Allotment IIRH Assessment

Pasture	**Site #**	**Ecological Site**	**Soil and Site Stability Attribute***	**Hydrologic Function Attribute***	**Biotic Integrity Attribute**	**Soil Stability Test**
Willow Spring	5	Mountain Shallow South (36)	Sight to moderate departure	Sight to moderate departure	Slight to moderate departure	Slight departure
Eastbench Lightening	10	Loamy Shallow South (52)	Sight to Moderate departure	Moderate departure	Moderate departure	None to slight departure
Bull Pasture	11	Loamy Shallow South (52)	Moderate to extreme departure	Moderate to extreme	Moderate departure	Slight departure
Bull Pasture	12	Loamy Bench (50)	Moderate departure	Moderate departure	Moderate to extreme departure	None to slight departure
Eastbench Lightning	13	Loamy South (51)	Slight departure	Slight departure	Moderate/ Moderate to extreme departure	None to slight departure
Rhodes Creek	15	Mountain Very Shallow (27)	Sight departure	Sight departure	Moderate departure	None to slight departure
Sleepy Breaks	16	Shallow South (31)	Moderate to extreme departure	Moderate to extreme departure	Moderate to extreme departure	Moderate departure
Tully	19	Mountain Shallow South (36)	None to slight departure	None to slight departure	Slight to moderate departure	None to slight departure

Table 15. Rhodes Creek Allotment Soil Stability

Allotment	Pasture	Plot #	Year	Stability Value	Rating
Rhodes Creek	Lightning Creek	RC8 / 414	2008	5.3	High Stability
			2012	5.5	Very high stability
			2012	5.5	Very High stability
Rhodes Creek	Willow Springs	Rhodes Creek 4	2008	5.0	High stability
			2012 (burnt2011)	5.8	Very high stability
Rhodes Creek	Eastbench Lightning	Rhodes Creek 5	2008	2.3	Poor stability
			2012	3.7	Fair stability
Rhodes Creek	Holmes	Rhodes Creek 10	2008	5.5	Very high stability
			2012	4.8	Moderate stability
Rhodes Creek	Lightning Creek	RC8 / 414	2008	5.3	High stability
Rhodes Creek	Rhodes Creek	Rhodes Creek 412	2012	4.7	Moderate stability
			2008	5.4	High stability

Table 16. Rhodes Creek Condition and Trend Plots

Allotment	Pasture	Cluster ID	Year	Forage Condition	Trend*	Soil Condition	Trend
Rhodes Creek	Willow Springs	Rhodes Creek 4 /407	2012	Fair (69)	Cannot determine trend	Good (94)	Cannot determine trend
Rhodes Creek	East Lightning Bench	Rhodes Creek 5	2012	Poor (43)	Cannot determine trend	Fair (71)	Cannot determine trend
Rhodes Creek	Lightning Creek	RC8-414	2012	Good (99)	Upward	Good (88)	Stable
			1964	Fair (71)	Baseline	Good (94)	Baseline
Rhodes Creek	Holmes	Rhodes Creek 10 /333	2012	Good (95)	Cannot determine trend	Good (92)	Cannot determine trend
Rhodes Creek	Rhodes Creek	Rhodes Creek 412	2012	Good (92)	Cannot determine trend	Good (91)	Cannot determine trend

Table 16a. Rhodes Creek Loop and Cover Frequency results summary

Allotment	Pasture	Cluster ID	Year	Condition	Trend*	State and Transition Phase (2012) *
Rhodes Creek	Willow Springs	Rhodes Creek 4 /407	2012	Poor	Stable**	Phase C
			2008	--	Stable	
			2002	--	Stable	
			1993	--	Stable	
			1981	--	Stable	
			1964	Poor	Baseline	
Rhodes Creek	East Lightning Bench	Rhodes Creek 5	2012	Poor	Down	Phase C
			1993	--	Stable	
			1981	--	Stable	
			1964	Poor	Baseline	
Rhodes Creek	Lightning Creek	RC8-414	2012	Excellent	Up	Phase A
			2008	Good	Up	
			1993	Good	Up	
			1981	Good	Up	
			1964	Fair	Baseline	
Rhodes Creek	Holmes	Rhodes Creek 10 /333	2012	Fair	Stable	Phase D
			2008	--	Slight down	
			1981	--	Stable	
			1980	Fair	Baseline	
Rhodes Creek	Rhodes Creek	Rhodes Creek 412	2012	Good	Stable	Between Phase A / B
			2008	--	Stable	
			1981	--	Stable	
			1980	Good	Baseline	

*For more details regarding specific plant communities trend over time refer to the Rangeland Specialist Report and supporting information in the project file.
**Burned in Cactus Mountain Fire of 2011. Post fire effects detected in 2012.

Line Point Intercept
For a table of the results of Line Point Intercept plots read refer to the Soils Resource Report in the project file, Appendix D. Data collected using this protocol was collected as baseline data, therefore there is no trend determination associated with these data.

Conclusion about allotment and pasture conditions
Based on a combination of results from assessment and monitoring, and field inspections all of the pastures within the Rhodes Creek allotment are in satisfactory condition with the exception of the East and West Lightning Bench, and Bull Pastures. The assessment and monitoring done for the Bull Pasture is similar to conditions on West Lightning Bench. Although a small

and isolated portion of Sleepy Breaks pasture has resource challenges as indicated by the IIRH assessment, the pasture as a whole is in satisfactory condition. From a vegetation standpoint the IIRH assessment in the East Lightning and Bull pastures picked up moderate to moderate-extreme departure from the expected vegetation on the site. A C&T plot in East Lightning Bench supports the assessment in that it rates the plot as in "poor" condition, a trend for that method cannot be determined because the historical data was lost in the WMO office fire. However trend can be determined with cover data (Loop and Cover-Frequency methods) and do suggest that the trend in the East Lightning bench is downward. Similar conditions exist in the Bull and West Lightning Bench pastures. There are also soil concerns in the Bull, and East and West Bench Lightning pastures, for more information see Soil Resource section or Soil Resource Report in the project file. Line-point intercept information (see Soils Resource section) also affirms assumptions of the present condition within the Bull and Lightning Bench pastures. The combination of results indicates that these pastures are not in satisfactory condition as described in Forest Plan or CMP direction. The remainder of the pastures within the Rhodes Creek allotment are in satisfactory condition.

Toomey Allotment

All of the pastures within the Toomey Allotment are east of the Imnaha River, and increase in elevation from the river level to the top of Cemetery Ridge. Spring Gulch is the only pasture primarily below bench level, and is comprised mostly of blue bunch wheatgrass plant associations with pockets of Idaho fescue dominated north facing slopes. Johnson Canyon is a mix of low elevation and bench landscape position, and resulting mix of plant associations depending on aspect. Tulley Creek, and Lower Spain Saddle pastures are primarily bench pastures, and are also predominately bluebunch wheatgrass plant associations with Idaho fescue inclusions on the north aspects. Toomey, Upper Spain Saddle, and Tulley (Rhodes Creek Allotment) are the higher elevation breaks pastures that are dominated by Idaho fescue plant associations, with bluebunch wheatgrass on the sunnier drier south facing aspects. Many of the "flat" benches (less than 10% slope) have been degraded to annual brome and warm season grasses such as red threeawn and sand dropseed. See Figure 12 of a historical map showing what are likely old farm fields indicated by red at "bench" level.

Similar to the other allotments in the LIRA area, the Toomey Allotment has a mixture of fences and natural barriers to create district pastures or grazing areas. In the Johnsen Canyon pasture the livestock water is in the form of springs that have been developed at or above bench level. There are also upland water sources in the Upper and Lower Spain Saddle pastures. For the Spring Gulch pasture the livestock water from a few narrow places along the Imnaha River on private land. Results from Keren and Olson (2006) indicate that solar radiation contributes strongly to the thermal balance of a cow during the winter months. In order for the livestock to thermal balance (get warm) they tend to graze where they can find sun, which in the Toomey allotment is on south facing aspects. Olson and Wallander (2002) discuss that livestock under long term selecting for performing in winter conditions adjust physiologically and behaviorally to daily and seasonal weather.

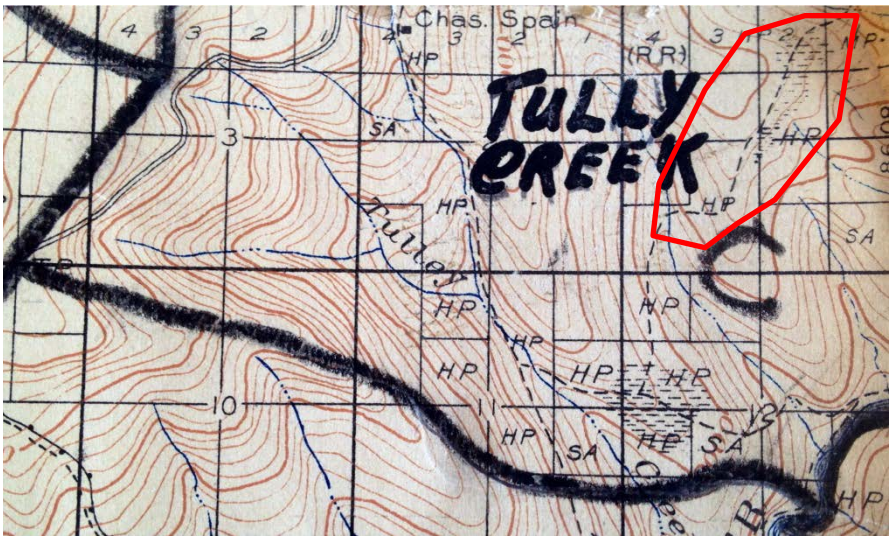

Figure 13a. Historical map of Toomey Allotment

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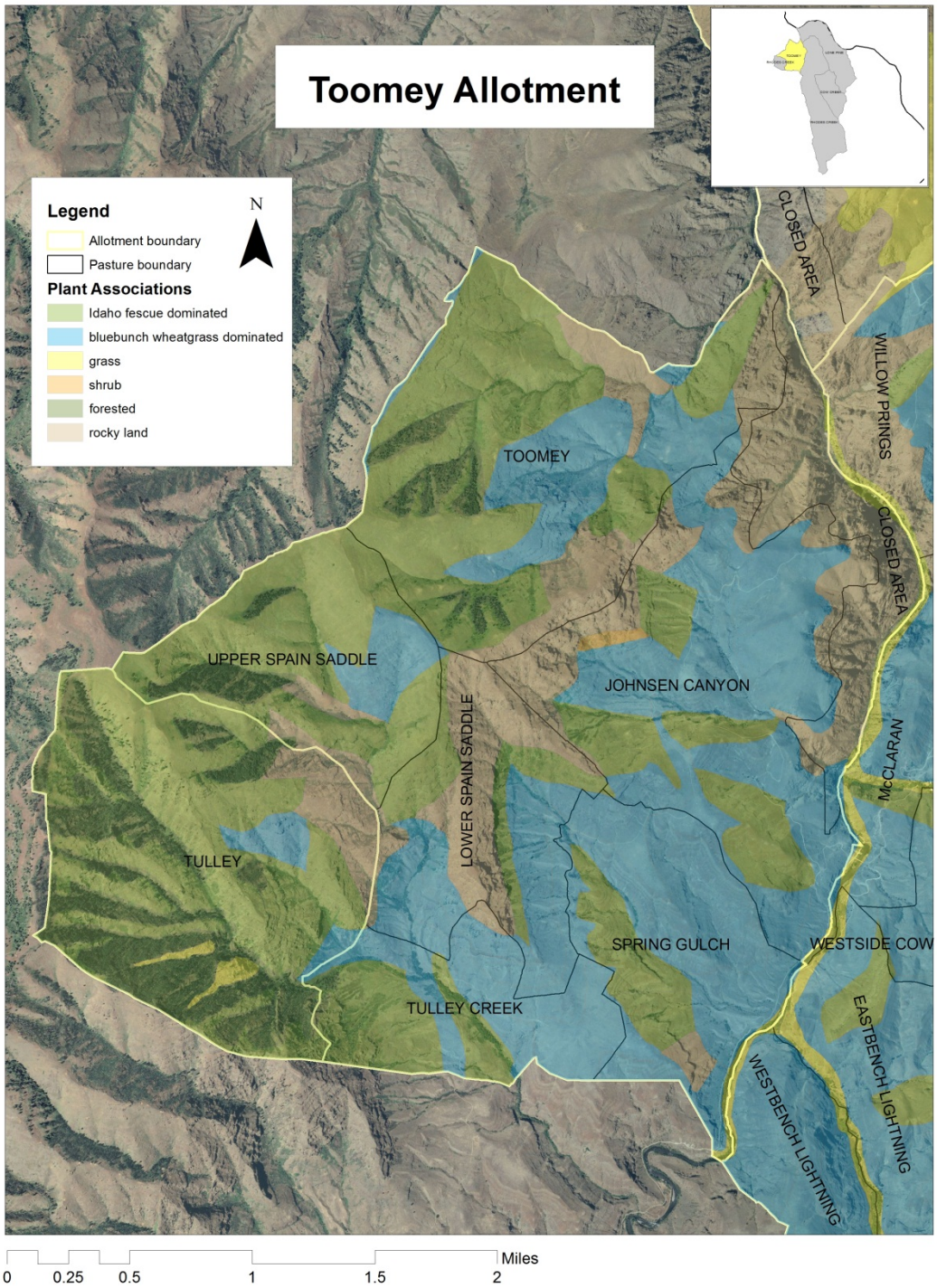

Figure 13. Toomey Allotment, Pastures, and Plant Associations.

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A maximum of 1,000 head months of livestock grazing are authorized in the 4,276 acre Toomey Allotment annually between the dates of November 1 through May 15. The Toomey Allotment is currently divided into six pastures including; Upper Spain Saddle, Lower Spain Saddle, Spring Gulch, Johnsen Canyon, Toomey, Tulley Creek, and private land pastures. This allotment is currently managed under a rotational system and as part of a larger grazing system which includes Cow Creek and Rhodes Creek allotments as well as private land. In the Rangeland Resource Specialist Report, Table 3 in Appendix A is an example of the grazing system for the Toomey Allotment. Table 3 in Appendix A displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Toomey Allotment are not be exceeded, although the number of head and dates may vary from pasture to pasture based on climatic condition, utilization, and/or resource conditions.

Cattle are placed in the Upper and Lower Spain Saddle in December, about 140 cows and 40 bulls. They are moved into the Johnsen Canyon pasture in January, then the cows are taken to private land at the Cow Creek Ranch and the bulls are left on the private land at the Tulley Creek Ranch through December before being moved to the Rhodes Creek Allotment for the rest of the season. A herd from Rhodes Creek comes over to Johnsen Canyon pasture to be staged to move to other Rhodes Creek pastures, about 200 from February 20 to March 10. This also facilitates the cows calving closer to the ranch houses where they can be more closely monitored. The cattle that were taken to the Cow Creek Ranch private land re-enter the allotments in two herds, one herd of 70 reenters into the Willow Springs pasture (Rhodes Creek Allotment) on March 1, and the other herd of 70 enters March 15 into Spring Creek. In early March a herd from the Rhodes Creek Allotment, Holmes pasture, are brought to the Toomey allotment to graze in the Toomey pasture before exiting the allotment in May. The cattle placed in Spring Gulch pasture move one more time into the Tulley Creek pasture until they exit the allotment in May. Cattle from Rhodes Creek Allotment are placed into Upper and Lower Spain Saddle in early April to be staged to exit the allotment around May 15th. There is an area closed to livestock grazing by the Imnaha River, see Figure 13 for location.

Summary of the assessments and monitoring in the allotment

Table 17. Toomey Allotment IIRH Assessment

Pasture	**Site #**	**Ecological Site**	**Soil and Site Stability Attribute***	**Hydrologic Function Attribute***	**Biotic Integrity Attribute**	**Soil Stability Test**
Johnson Canyon	17	Loamy Shallow South (52)	Slight departure	Sight to moderate departure	Moderate departure	None to slight departure
Spring Gulch	18	Shallow Clayey (20)	Moderate/ moderate to extreme departure	Moderate/ moderate to extreme departure	Moderate/ moderate to extreme departure	Slight to moderate departure
Upper Spain Saddle	20	Mountain Shallow South (36)	Sight to moderate departure	Sight to moderate departure	Slight to moderate departure	None to slight departure

Table 18. Toomey Allotment Soil Stability

Allotment	Pasture	Plot #	Year	Stability Value	Rating
Toomey	Lower Spain Saddle	Lower Imnaha 4	2008	4.8	Moderate stability
			2012	5.9	Very high stability
Toomey	Johnsen Canyon	Lower Imnaha 3	2008	5.8	Very high stability
			2012	5.2	High stability

Table 19. Toomey Allotment Condition and Trend Summary

Allotment	Pasture	Cluster ID	Year	Forage Condition	Trend*	Soil Condition	Trend
Toomey	Johnsen Canyon	LI 3	2012	Good(87)	Cannot determine trend	Good (95)	Cannot determine trend
Toomey	Lower Spain Saddle	LI 4	2012	Very poor (22)	Downward	Good (95)	Stable
			1964	Poor (48)	Baseline	Good (97)	Baseline

Table 19a. Toomey Allotment Loop and Cover Frequency results summary

Allotment	Pasture	Cluster ID	Year	Condition	Trend*	State and Transition Phase (2012)
Toomey	Johnsen Canyon	LI 3	2013	Good	Up**	Phase C, improving all readings
			2012	--	Up	
			2008	--	Stable	
			1981	--***	--	
			1964	Good	Baseline	
Toomey	Lower Spain Saddle	LI 4	2012	Poor	Stable	Phase D
			2008	--	Down	
			1993	--	Up	
			1981	--	Down	
			1964	Very poor	Baseline	
Toomey	Upper Spain Saddle	Ecoplot 681	1981	*	*	Phase B
			1982			
			2001			
			2006			
			2008			

*For more details regarding specific plant communities trend over time refer to the Rangeland Specialist Report and supporting documentation in the project file.
**Burned in Cache Creek Fire of 2012. Post fire effects detected in 2013.
***One transect line read for this reading

Line Point Intercept
For a table of the results of Line Point Intercept plots read refer to the Soils Resource Report, Appendix D in the project record. Data collected using this protocol was collected as baseline data, therefore there is no trend determination associated with these data.

Conclusion about allotment and pasture conditions
Based on a combination of results from assessment and monitoring, and field inspections all of the pastures within the Toomey allotment are generally in satisfactory condition with the exception of the Johnsen Canyon, Spring Gulch, and Lower Spain Saddle. From a vegetation standpoint the IIRH assessment in the Johnsen Canyon and Spring Gulch pastures picked up moderate to moderate-extreme departure from the expected vegetation on the sites. This is contrary to a C&T plot read in Johnsen Canyon that found conditions at the plot were good. As with most pastures there are areas within the pasture that are in better condition than others, paired with soils and TES species concerns, the determination is to take the more conservative approach for this pasture which is management as a pasture in in unsatisfactory condition. This is the same scenario for the Spring Gulch pasture. A C&T plot read in Lower Spain Saddle notes that forage condition trend is downward, this assumption is affirmed by what the Loop and Cover Frequency data suggests. This indicates that these pastures (Spring Gulch and Lower Spain Saddle are not in satisfactory condition as described by the LRMP or CMP direction. There are soils and TES species resource concerns in the Johnsen Canyon, Spring Gulch, and

Lower Spain Saddle, for more information see Soil Resource section or Soil Resource Report in the project file as well as the Botanical Resource with Special Status Plants section or Biological Assessment for LIRA in the project record.

Lone Pine Allotment

The predominately low elevation pastures in the Lone Pine Allotment are the Big Canyon, Hospital Area, Birch Creek, and lower half of Dug Creek pastures. Although the Big Canyon pasture begins at the Snake River level, it goes up in elevation to the top of Cactus Mountain. The Big Canyon pasture is divided by low and high elevation by a drift fence along the Dug Bar road. The Big Canyon pasture is primarily dominated by bluebunch wheatgrass communities, at the higher elevation points there are bands of Idaho fescue dominated plant associations. The Hospital Area is along the Snake River on a degraded bench, primarily composed of warm season perennial grasses such as Sand dropseed and red threeawn and annual species. In areas of steeper slopes and less historical impact there is bluebunch wheatgrass. The Birch Creek pasture is largely bluebunch wheatgrass plant associations in the lower elevations and as the elevation increases towards Summit ridge the vegetation shifts to a shrub and Idaho fescue mix. The Dug Creek pasture follows the same basic vegetation pattern as the Birch Creek pasture. However the Dug Creek pasture has more area of bench land, and in some areas like Dug Basin, evidence of past historical land uses such as haying and cultivation are visible in the vegetation and infrastructure to get to the field such as old roads (see Figure 6. Dug Basin and Figure 3. Historical Map). The highest elevation pasture, or breaks pasture is Little Deep Creek pasture. In the lower part of the pasture closer to the Snake River the dominant plant association is more aligned with that of bluebunch wheatgrass. The map (Figure 14) doesn't show adequately the increase in Idaho fescue dominated plant associations in the higher elevations between the timber stringers on the north side of Summit Ridge.

Similar to the other LIRA allotments, the Lone Pine Allotment has a mixture of fences and natural barriers to create district pastures or grazing areas. Livestock are not allowed to water out of the Imnaha or Snake River to decrease interactions with recreationalists (many of these areas are depicted as "closed areas" on Figure 14). Cattle have been known to access the Snake River in the Hospital Area and at Robinson Gulch; diligent herding has in the past prevented a continuation of that situation. In the Big Canyon pasture the livestock water is in the form of springs that have been developed at or above bench level. There are also upland water sources in the Birch Creek, Dug Creek, and Little Deep Creek pastures at bench level or higher. In the Birch Creek, Dug Creek and Little Deep Creek livestock can also water out of creeks. The air and water temperature, thick riparian vegetation, and in some places Himalayan blackberry focus the water areas and discourage livestock from staying beyond getting a drink. Due to grazing during the cold winter months cattle do not congregate in the riparian area (Masters, et al. 1996) beyond watering because the drainages in the LIRA area tend to act like cold air sinks, and are the areas that get the least sun in the winter due to short day lengths. Results from Keren and Olson (2006) indicate that solar radiation contributes strongly to the thermal balance of a cow during the winter months. In order for the livestock to thermal balance (get warm) they tend to graze where they can find sun in areas away from the colder riparian area. Olson and Wallander (2002) discuss that livestock under long term selecting for

performing in winter conditions adjust physiologically and behaviorally to daily and seasonal weather. This supports observations in the LIRA area that behavior, physiological needs, and preferred forage drive the livestock use the uplands significantly more during winter grazing. Several livestock grazing studies support that this would likely be the opposite if the same area was grazed during the summer months (Gillen, et al, 1984).

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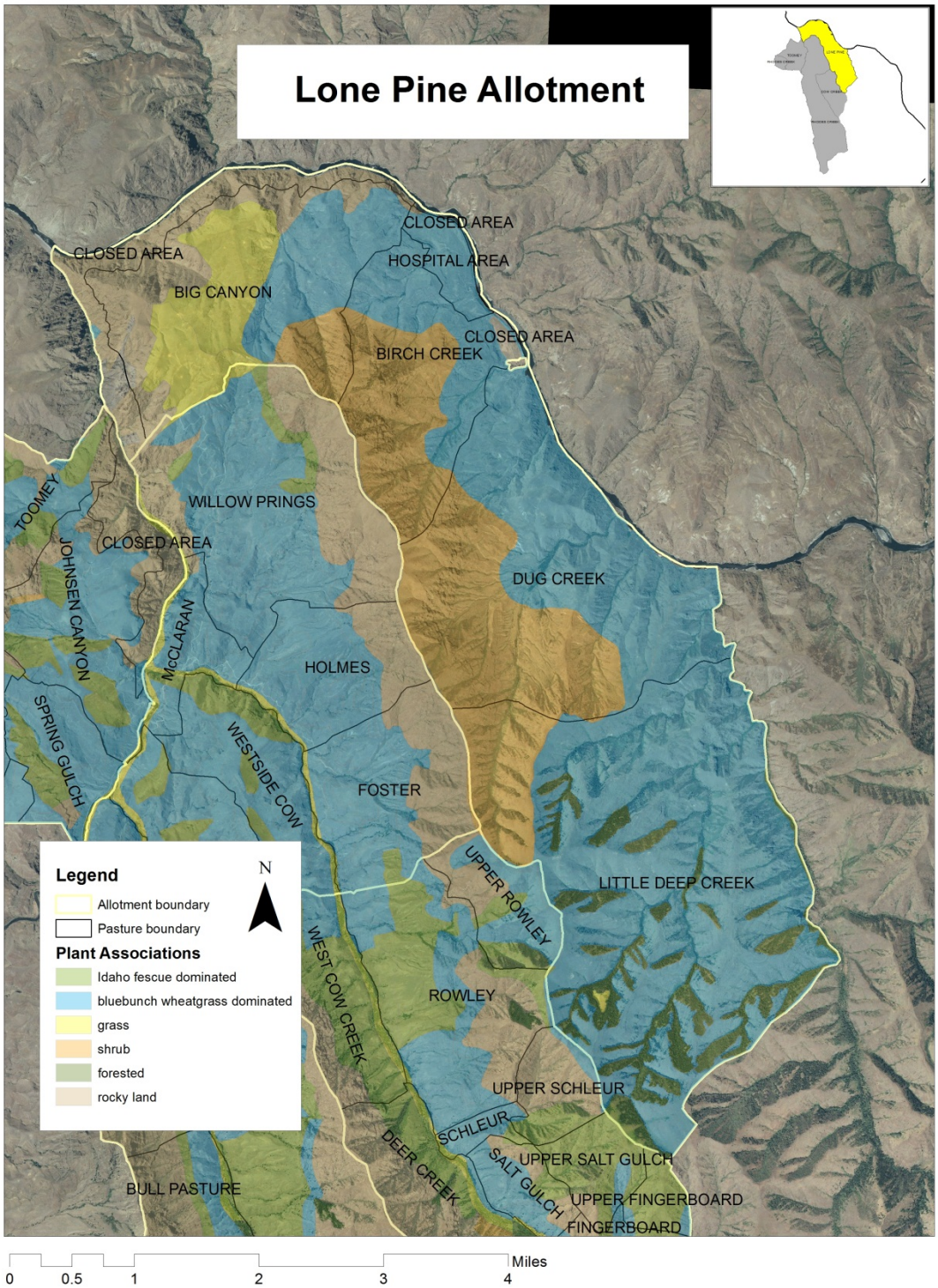

Figure 14. Lone Pine Allotment, Pastures and Plant Associations

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Current management grazing rotations in narrative form (Tables are in Appendix A). Current Management is based off when the allotment was last grazed under a Term Grazing Permit. The permit was cancelled due to non-compliance of the last Term Grazing Permit permittee, not for resource concerns reasons. A total of 1,833 head months of livestock grazing were authorized in the 11,138 acre Lone Pine Allotment between the dates of December 1 and May 31, annually. The Lone Pine Allotment is currently divided into six pastures; Big Canyon, Birch Creek, Dug Creek, Little Deep Creek and the Hospital Area. A horse pasture is also adjacent to the Dug Bar facilities. The rotation is only within the Lone Pine Allotment. The livestock have rotated through the pastures in this allotment in a loop from north to south, then back east to west. Refer to Table 4 for an example of the grazing rotation.

Grazing is managed to maintain desired upland and riparian conditions. In the Rangeland Resource Specialist Report Table 4 in Appendix A provides an example of the grazing system for the Lone Pine Allotment and Table 6 displays the maximum number of livestock and time within the pastures for the grazing season. The total HM authorized for the Lone Pine Allotment is not to be exceeded, although the number of head and dates may vary from pasture to pasture, based on climatic condition, utilization, and/or resource conditions.

The livestock enter the Lone Pine Allotment via the Dug Bar road the first of December; the cattle spend the first month in the Big Canyon pasture, and are rotated through the pastures working towards the east. The Birch Creek pasture is grazed for the first two weeks of January, and then the Dug Creek pasture for the second two weeks of January on the way to Little Deep Creek. The largest pasture, Little Deep Creek, is grazed for 45 days during February thru mid-March. The cattle calve primarily in the Little Deep Creek pasture. Mid-march the livestock (now cow/calf pairs) are herded back towards the west, spending two weeks in the Dug Creek pasture, and two weeks in Birch Creek. Finally the cattle spend two weeks in Big Canyon before exiting the allotment on May 31. The Hayfield is closed to livestock grazing. The Horse pasture is available to horses for the grazing season from December 1 – May 31, it is also available as a holding facility for working livestock in the adjacent corrals and loading area. The Hospital pasture is available for sick or injured animals that need to be in a smaller pasture in order to receive proper care, and will not be used for a feeding ground or for more than 10% of the herd at one time. Due to the absence of livestock accessible private land accessible to livestock within the allotment boundary, and the remote location with steep, narrow roads to access the Dug Bar facility in inclement weather, weed free hay may be stored at the Dug Bar Facility to feed the livestock in case of emergency. It is up to the permittee to decide whether or not to store hay at Dug Bar, and an approved contingency plan including the amount and the time the hay is to be stored and where it could be fed must be agreed to by the Area Manager prior to the grazing season.

Summary of the assessments and monitoring in the allotment

Table 20. Lone Pine IIRH Assessment

Pasture	**Site #**	**Ecological Site**	**Soil and Site Stability Attribute***	**Hydrologic Function Attribute***	**Biotic Integrity Attribute**	**Soil Stability Test**
Little Deep Creek	1	Clayey (16)	None to slight departure	None to slight departure	Slight to moderate departure	None to slight departure from expected
Dug Creek	2	**South facing slope:** Loamy Shallow South (52). **North facing slope:** ecological site was not able to be determined for this site.	**South facing slope:** Slight to moderate departure **North facing slope:** Slight to moderate departure	**South facing slope:** Slight to moderate departure **North facing slope:** Moderate departure	**South facing slope:** Moderate departure **North facing slope:** Moderate to extreme departure	**South facing slope:** None to slight dept from expected **North facing slope:** None to slight departure from expected
Birch Creek	3	Loamy Bench (50)	None to slight departure	Slight departure	Slight to moderate departure	None to slight departure from expected
Big Canyon	4	Loamy Shallow South (52)	Sight to Moderate departure	Slight to Moderate departure	Moderate Departure	Slight to Moderate Departure

Table 21. Lone Pine Allotment Soil Stability

Allotment	Pasture	Plot #	Year	Stability Value	Rating
Lone Pine	Big Canyon	Lone Pine 14	2008	5.8	Very High stability
			2012	5.5	Very High stability
Lone Pine	Little Deep Creek	Cow Creek / 392	2008	4.6	Moderate stability
			2012	4.6	Moderate stability
Lone Pine	Dug Creek	Lone Pine 3	2012	5.0	High stability

Table 22. Lone Pine Condition and Trend Plot Summary

Allotment	Pasture	Cluster ID	Year	Forage Condition	Trend*	Soil Condition	Trend
Lone Pine	Dug Creek	Lone Pine 3	2012	Good (95)	Cannot determine trend	Good (90)	Cannot determine trend
Lone Pine	Big Canyon	LP 14 8003	2012	Good (88)	Stable	Good (79)	Stable
			1965	Good (88)	Stable	Good (89)	Stable
			1956	Good (91)	Baseline	Good (86)	Baseline
Lone Pine	Little Deep Creek	Cow Creek 392	2012	Good (99)	Cannot determine trend	Good (99)	Cannot determine trend

Table 22a. Lone Pine Condition and Trend Plot Summary

Allotment	Pasture	Cluster ID	Year	Condition	Trend*	State and Transition Phase (2012)
Lone Pine	Little Deep Creek	Cow Creek 392	2012	Good	Up	Phase B
			1982	Fair	Baseline	

Line Point Intercept

For a table of the results of Line Point Intercept plots read refer to the Soils Resource section of this DEIS and Soils Resource Report, Appendix D in the project record. Data collected using this protocol was collected as baseline data, therefore there is no trend determination associated with these data.

Conclusion about allotment and pasture conditions

Based on a combination of results from assessment and monitoring, and field inspections all of the pastures within the Lone Pine allotment are in satisfactory condition. The IIRH assessment done in the Dug Creek pasture noted moderate to moderate-extreme departure from the expected conditions from a vegetation standpoint. The C&T in the Dug Creek Pasture was contrary to the IIRH assessment. These inconsistencies indicate that the IIRH assessment and C & T did not represent the whole pasture consistently. While important, the finding from the IIRH assessment does not solely constitute the pasture being determined to be in unsatisfactory condition. The remainder of the pastures in Lone Pine is in satisfactory condition, see C&T plot summary. Not all C&T plots can be used to determine trend due to loss of historical data in the 2010 WMO Office Fire. However, for Plot 392 there is data to determine trend, data was affirmed in the Loop Method and Cover Frequency data for the Little Deep Creek Pasture was in good condition and upward trend. There are soil concerns in the Dug Creek pasture, for more information see Soil Resource section or Soil Resource Report in the project file.

Table 23. Pastures not in Satisfactory Condition as described in the CMP and Forest Plan

Allotment	Pasture	Why	Site Specific Change to work toward compliance
Cow Creek	Rowley	Downward range condition (vegetation)	Utilization % reduced to 35% during the late spring season
Rhodes Creek	East Lighting Bench	Downward range condition (soils)	Utilization % reduced to 35% during the late spring season
Rhodes Creek	West Lighting Bench	Downward range condition (soils)	Utilization % reduced to 35% during the late spring season
Toomey	Johnson Canyon		Utilization % reduced to 35% during the late spring season
Toomey	Spring Gulch	Downward range condition (soils)	Utilization % reduced to 35% during the late spring season
Toomey	Lower Spain	Downward range condition (soils)	Utilization % reduced to 35% during the late spring season

Environmental Consequences

The issues generated during the internal and public scoping process are summarized below from Chapter 1 of the LIRA DEIS. The effects analysis for the rangeland resources within the LIRA are focused on these issues, and will include other information as guiding documents require.

Significant Issue 1 – Spalding's Catchfly

Figure 15. Spalding's catchfly within the project area in an altered / degraded site next to an old farm field (annual grass species dominate the site).

There is uncertainty about the extent of the effect of cattle grazing in the LIRA project on Spalding's catchfly or catchfly habitat.

- Livestock trailing or grazing through a Spalding's catchfly site when soils are moist could shear the plants below the root crown and cause plant or seedling damage or death. Damage to Spalding's catchfly by livestock eating the plants is not major concern because the cattle have exited the allotments when Spalding's catchfly is most vulnerable to grazing.
- The known Spalding's catchfly sites exist on north facing slopes, and in areas that have received high amounts of grazing pressure over the last century. The rate of habitat recovery given the current grazing levels is unknown, and could prolong the improvement of Spalding's catchfly habitat. Many of the north facing slopes are

degraded, containing invasive annual grasses. Competition from annual grasses reduces the quality of Spalding's catchfly habitat and impedes seedling establishment.

Significant Issue 2 – Deep soils on steep north facing slopes

There is uncertainty about the degree of impact on deep soils on steep north-facing slopes due to hoof shear action by cattle grazing in the LIRA project area.

Under past and current management, moist soils on steep north facing slopes are at risk of displacement under the weight of cattle. As a result, soil exposure caused by displacement is evident in localized areas. This creates bare soil subject to non-native annual vegetation to invasion and spread. Soil displacement by hoof shear may also shear the native plant roots out of the ground. Exposed bare soil can also be more prone to erosion impacts such as accelerated surface erosion. Over time, this condition could decrease the overall soil productivity as well as the seral stage of the vegetation communities that exist in these areas.

Soil compaction caused by animal trailing may negatively affect long term soil productivity and range condition.

Other issues that were identified the public and/or the IDT (Interdisciplinary Team) during the course of scoping and preliminary analysis of the project area would also be analyzed but were not considered Alternative drivers include:

- Rangeland vegetation and soil condition: This is commonly a matter of dispute during environmental analysis of livestock grazing on NFS lands and will be addressed in Chapter 3.
- Biological soil crusts: There is some controversy and uncertainty of livestock impacts to biological soil crusts as identified in the CMP, and the relevance of these impacts on overall rangeland health.

Resource Concerns were also identified by the public and IDT and will be analyzed by Alternative in Chapter 3.

- Noxious weeds: Livestock grazing can present risk for weed invasion through the spread of seeds or creation of open spaces for weeds to establish. In Chapter 2 and 3 the mitigation measures and most reasonable methods for preventing and treating weeds are discussed.
- Recreation / Livestock Interaction: Concerns have been expressed regarding effects of seeing cattle, or signs of cattle (manure) on the quality of the recreation experience along trails in the Hells Canyon National Recreation Area and within or adjacent to campsites along the Snake River.

Alternative A – No-action Alternative

Under this Alternative, grazing would not be reauthorized and the current permit holders would be notified that their term grazing permits would be cancelled after two years, pursuant to Forest Service Handbook (FHS) 2209.13 part 16.24, and Code of Federal Regulations (CFR) 36 CFR 222.4(4)(1). The FSH and CFR regulations indicate that a two-year notification is required prior to cancelling a permit, except in emergency situations. Alternative A would close four allotments, eliminating livestock grazing from 43,897 acres of National Forest System lands. Permits would not be issued for any of the four affected allotments unless a subsequent NEPA analysis and decision to restock the allotments was made. For more information about Alternative A, refer to Chapter 2 of the LIRA DEIS.

Direct and Indirect Effects of No Action:

Under this Alternative, domestic livestock effects on Spalding's catchfly plants or habitat would not occur. Domestic livestock effects on deep soils on north facing slopes would not occur. In some areas plant reproductive rate and vigor, and resulting ground cover would change towards the desired condition at natural rates. Upland areas identified in mid to late seral stage would likely continue to move towards a later seral stage and potentially towards the Potential Natural Community (PNC). However, areas that have departed the PNC as a result of historical uses, resulting in warm season grass and annual or non-native species dominance, would persist. Departed communities that have crossed a threshold have a modified climax plant association even with the removal of domestic livestock use. Under this Alternative these departed (transitioned) areas would not likely return to a pre-disturbance community without significant and expensive restoration.

Alternative A would reduce the risk of invasive plant introduction and spread as a result of domestic livestock grazing, but could not reduce the risks due to large-scale wildfire, recreation, wildlife, and other activities. Areas of soil compaction caused by past homesteading activities, cultivation, and grazing overuse would remain. There may be a long term reduction in soil compaction caused by livestock on steep slopes, around water areas, and salting grounds. Wildlife impact to vegetation would remain the same and potentially increase. Impacts to biological crusts from livestock grazing would not occur. Interactions between livestock and recreational users would not occur.

There would be no cumulative effects due to livestock grazing because there would be no proposed activities.

Compliance with the HCNRA CMP and Forest Plan

This Alternative does not meet and is not consistent Forest Plan (as amended by the CMP) direction to make available forage production above that needed for maintenance or improvement of the basic resources to wildlife (within Management Objective levels), to permitted domestic livestock under standards and guidelines that will assure continued

maintenance or improvement of the resource. This Alternative would not maintain ranching as a traditional and valid use of lands within the HCNRA (CMP).

Actions Common to All Alternatives

The following actions are common to all action Alternatives because they would formalize changes in pasture boundaries that is already occurring on the ground, work to improve site specific conditions that have been a concern, identify and assign areas and timing of livestock concentration.

Cow Creek Allotment

- Remove the fences between the Schleur, Upper Schleur, Fingerboard, Upper Fingerboard, Salt Gulch and Upper Salt Gulch, and combine pastures into one pasture and referred to as Fingerboard (note: six of the pastures within the Cow Creek Allotment are a legacy of when the original ranch was homesteaded and intensely grazed by sheep and are no longer practical grazing units for cattle).
- The fence between Upper Rowley and Rowley pastures would be removed and the pastures combined into one pasture and referred to as Rowley (note: the Upper Rowley pasture was used by sheep herders to keep the sheep in the rims of Summit Ridge. The allotment is no longer grazed by sheep, therefore the fence is no longer necessary)

Rhodes Creek Allotment

- Install a gate constructed with traditional materials at the head of the designated recreation trail #1713 also known as the Eureka Bar Trail, at the first rim location from the trailhead to keep livestock from accessing the trail and the closed area. The gate would be located on private land at T3N, R49E, Section 6.
- Construct a water development consisting of a spring box, trough, and less than 300 feet of pipeline in the Westside Cow pasture of the Rhodes Creek Allotment, located in T3N, R50E, Section 17 NE. The purpose for this development is to increase livestock use on the southern end of the pasture.
- Rotate use between the North Roy, South Roy, Bull pastures.
- Incorporate the Tulley pasture of the Rhodes Creek Allotment into the Toomey Allotment where it is a more logical management unit given both its location and geography (note: the Tully pasture is the only “island” pasture in the Rhodes Creek Allotment west of the Imnaha River, see Map 1). This would result in a gain of 1,014 acres to the Toomey Allotment coming from the Rhodes Creek Allotment.

Toomey Allotment

- Continue to use the Tulley stock driveway as the main ingress/egress route for cattle between the Chesnimnus area and the Cow Creek, Rhodes Creek, and Toomey Allotments.
- Reconstruct the fence between Upper and Lower Spain Saddle pastures to prevent drift of livestock, ensuring use only during specified grazing times.
- Redevelop Tips Trough; however the design of the redevelopment varies depending on the Alternative. Under Alternatives B, D, and E the redevelopment

would be at the spring source and would serve one pasture. Under Alternative C it would be a more complex water system serving multiple pastures, see more specifics described in Alt C below.

Lone Pine Allotment (Currently Vacant)

- Restrict use of Dug Bar Facility for concentrated livestock management (ie. branding, vaccinating) annually from March 20th -April 10th during the high traffic recreation use to reduce potential conflicts between livestock and recreational users, and permittees and recreational users.
- Grazing use by the Nez Perce Tribe would reduce the head months available to a Term Grazing Permittee and would be decided on annually at the annual operating meeting. Prior to permitting livestock to graze through a Term Grazing Permit, the potential permittee must be willing to accept that the level of stocking could be reduced or vary from year to year contingent on Nez Perce Tribal grazing. The Lone Pine allotment would be analyzed for a maximum of 1,833 head months (33 head month are for horses) from December 1 to May 31.

Project Design Criteria, Mitigations, and Monitoring Common to All Alternatives

Refer to Chapter 2 of the LIRA DEIS for a complete list of the PDCs, mitigations, and monitoring common to all Alternatives.

Effects of Climate Change Common to all Allotments and all Alternatives

Livestock may impact climate change however; there is very little scientific data on the impacts of climate change within the ecosystems present on the Wallowa-Whitman National Forest. Therefore, it is difficult to address how livestock grazing would affect climate change conditions. Our current management protocols allow the Forest Service and the Range Specialists to alter grazing management if a trend change in resource conditions is observed. Furthermore, annual and long term monitoring protocols are in place to identify when vegetation dynamics and rangeland conditions need management changes. According to Brown et al. (2010), methane gas is considered a greenhouse gas, and has increased within the atmosphere as a result of ruminant animals, the burning of natural gas, and emissions from landfills. Approximately 18 percent of agriculturally emitted greenhouse gasses are from grazed lands, and is not representative of carbon stored within the soils and forests (USDA 2008a). Some studies have found limited to large reductions in soil carbon and increases in carbon dioxide flux with grazing (Haferkamp and Macneil 2004 and Welker et al. 2004). Studies involving modeling and remotely sensed data indicate that proper grazing on rangelands can improve ecosystem production as measured by soil carbon storage (Li, et al. 2007, Steinfeld and Wassenaar 2007, Reeder et al. 2001, Schuman et al. 2002). Additional studies similarly conclude that certain levels of grazing may even increase carbon sequestration (Hellquist et al. 2007, Derner et al. 2005 and 2006, LeCain et al. 2002, Ganjegunte et al 2002, Manley et al. 2005, Reeder et al. 2001, Schuman et al. 2002). Given the above information, it can be assumed that there is variability in carbon storage and landscape carbon storage response to grazing pending land type and local conditions (Derner et al. 2006 and Henderson et al. 2005). However, literature research consistently suggested that management practices which maintain or move plant

associations to satisfactory rangeland conditions appear to be consistent with maintaining soil organic pool, and therefore soil carbon sinks (Henderson et al. 2005, Brown and Thrope 2008, and Sharrow 2008).

Beschta et al. (2013) suggested that grazing on public lands (by livestock, feral herbivores such as ‘‘wild’’ horses and burros, and native ungulates) should be greatly reduced or eliminated as a means of improving the capacity of native vegetation communities to cope with climate change. The notion that eliminating grazing will provide a solution to problems created by climate change is disputed for three primary points: (1) grazing is a complex ecological process and a single recommendation (e.g. eliminate grazing) is unlikely to be universally correct, (2) there are legacy effects of livestock grazing from the homestead period that are separate from current day impacts, and (3) climate change is likely to increase the risk of large wildfires and grazing is one of the few available tools for landscape-level fuel reduction (Svecjar et al. 2013).

Alternative B – Current Management

Alternative B, this Alternative is authorizing livestock (cattle) and an incidental level of horse grazing within the LIRA allotments (Table 24). The level of permitted use would be similar to past levels that have been authorized through term grazing permits (FSH 2231.11 and 2231.13), which are administered each year by annual instructions and authorized by the payment of grazing fees (FSH 2231.41). A detailed description of current management can be found in the current management portion of this report, or in Chapter 2 of the LIRA DEIS. Everything in current management is proposed to continue in Alternatives C, D, and E with additional actions to address issues (see Chapter 1 of the LIRA DEIS, Issues) unless otherwise explained.

Table 24. The Current Authorized Use within the LIRA Area

Allotment	Number of pastures	Livestock Type	Permit Type	Permitted Numbers	Duration	Head Months
Cow Creek	10	Cattle	Term	231	11/1-12/31 2/1-5/15	1,255
Lone Pine	6	Cattle Horse or Mule	Term	300 6	12/1-5/31	1,800 33 horse
Rhodes Creek	17	Cattle Horse	Term	784 500 784 15	11/1-2/15 2/16-4/15 4/16-5/15 11/1-5/15	4,495 97 horse
Toomey	6	Cattle	Term	184	11/1-12/31 2/1-5/15	1,000

This Alternative requires permittees to achieve proper livestock distribution through herding and salting techniques and maintenance of existing water developments and fencing. Stocking levels and season of use are discussed in the description by allotment section below.

This Alternative encourages the responsible management of livestock within the project area by allowing existing levels of grazing. These levels of grazing would continue only where permittees are responsive and preemptive in their management of resources, and continue to meet the terms and condition of their permits. It further resolves or penalizes poor performance by allowing the modification of allowable use or management activities when monitoring indicates that site specific objectives are not being met or that trends are moving away from the desired condition.

Direct and Indirect Effects of Proposed Grazing Activities

This Alternative addresses the significant issues that were identified for the LIRA project. Adjusting management allows flexibility for adjustments in stocking rates to utilize available forage while meeting the requirements for upland vegetative health. This Alternative specifically addresses each significant issue as follows:

Significant Issue 1 – Spalding's catchfly

Livestock can cause direct effects to Spalding's catchfly plants by trailing or grazing through a site when soils are moist and could shear the plants below the root crown and cause plant or seedling damage or death. There is uncertainty about how much there is direct interaction between livestock hooves and Spalding's catchfly on an annual basis when soils are moist, and would be directly correlated to weather that occurs while the livestock are in the pasture with Spalding's catchfly present. Damage to Spalding's catchfly by livestock eating the plants is not substantial direct effect because the cattle have exited the allotments when Spalding's catchfly is most vulnerable to grazing. The direct effect is only an issue in pastures that have Spalding's catchfly plants, which include the pasture in Table 25:

> Livestock behavior is very malleable, and grazing patterns can be changed substantially through management. Ongoing research suggests that grazing patterns of livestock can be manipulated sufficiently to resolve most, if not all, resource concerns with grazing. Managers have the potential to manipulate abiotic and biotic characteristics of their pastures and/or change the animals and their behavior so that habitat conditions are favorable for the livestock and so that land use objectives can be met at the same time. (Bailey, 2005)

Table 25. Spalding's catchfly occurrences within the LIRA area

Spalding's catchfly occurrences within LIRA area

Allotment	Pasture
Cow Creek	None
Rhodes Creek	North Roy
	South Roy
	Bull Pasture
	East Bench Lightning
	West Bench Lightning
Toomey	Spring Gulch
	Lower Spain Saddle
	Johnsen Canyon
Lone Pine	Big Canyon

Direct effects to Spalding's catchfly can be decreased as proposed through active management by the permittee by herding or encouraging livestock to not concentrate, trail, or graze where there are known Spalding's catchfly sites by discouraging livestock to overlap use where the plants are. Direct effects can also be reduced by maintaining flexibility in the grazing intensity, grazing rotation, or adjusting grazing entry and exit dates in pastures where Spalding's catchfly and livestock overlap when the soil is most likely to be moist during the spring months (March – April). Direct effects can be measured through permit compliance monitoring.

The indirect effect to Spalding's catchfly due to grazing is the effect to the Spalding's Catchfly habitat. The majority of known Spalding's catchfly habitat exists on north facing slopes, and in areas that have received high amounts of grazing pressure over the last century which have altered the native vegetation communities. The intensity of the grazing historically (particularly during the 1890-1945 time period) reduced the vigor and reproduction of the cool season bunchgrasses, paired with livestock induced soil disturbance on steep slopes lent an opportunity for invasive annual grasses that were introduced during the same time period. Indirect effects to Spalding's catchfly habitat as a result of grazing can be measured through monitoring range condition, both vegetation and soils.The evidence of such extensive past use is in the form of terraces (step-like features on steep slopes) is visible in Figures 17, 18, and 19. Literature confirms that terraces, also called terrecettes or "tracks" occur worldwide including areas of Europe, Africa, and Australasia.

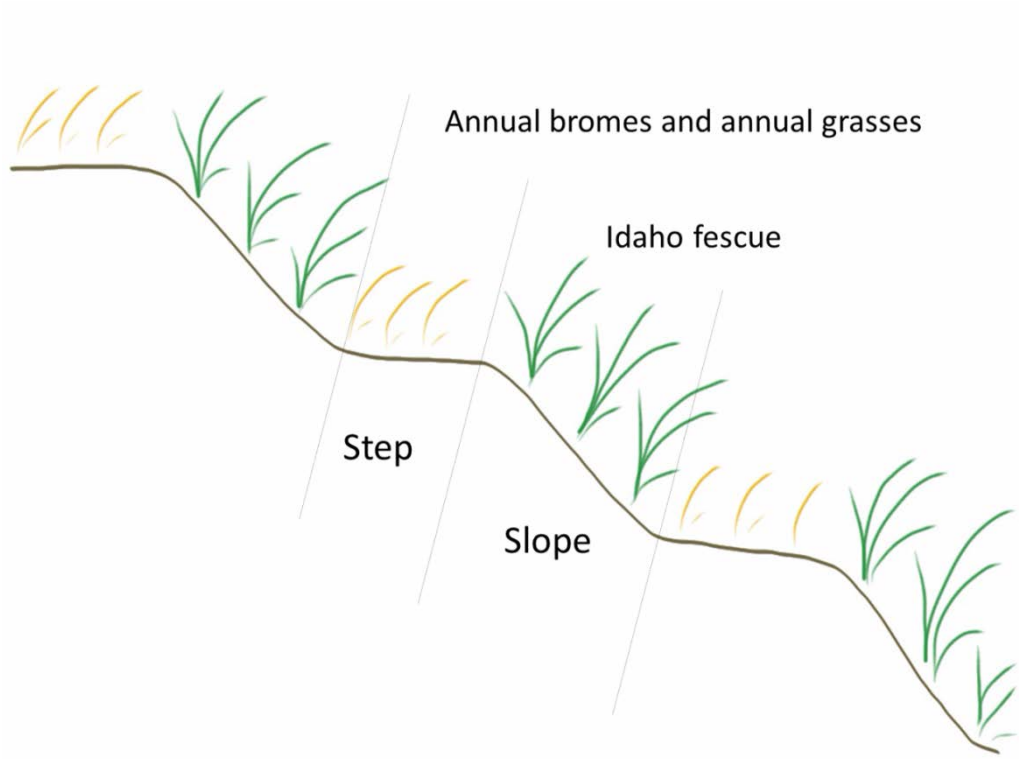

Figure 16. Diagram of terraces within LIRA Area (provided by WWNF Ecology Program)

The origination of terraces from either livestock use or geological processes is widely debated in the American based literature going back to 1922 by Odum, 1962 (Rhahm) and more recently (Vincent and Clark, 1980) and (Bielecki and Mueller 2002) amongst others. Photo evidence within the Imnaha canyon going back to 1925 suggest that terraces have been on the landscape within the LIRA area for at least the last century. Currently, terraces in the LIRA area are still utilized by livestock as trails on an annual basis to ingress or egress to less steep grazing areas, trail to water, or to thermobalance (get warm during cold winter temperatures) (Keren and Olson, 2006).

Over the past century the intensity of terrace use has decreased significantly with the decrease in livestock grazing timing, intensity, and frequency throughout the entire Imnaha canyon. Even so, there areas of the north facing slopes continue to be degraded, and contain invasive annual grasses. Competition from annual grasses reduces the quality of Spalding's catchfly habitat and impedes seedling establishment. A change in the timing or intensity of grazing in the pastures that contain Spalding's catchfly could decrease the potential occurrence of soil disturbance and decrease the current levels of indirect effects to vegetation. Decreased impacts to soils and vegetation could allow these sites to move in an upward trend with the assumption that the annuals present on the site would not further out-compete the native vegetation, including Spalding's catchfly.

Figure 17. Photo from 1925 of the Cemetery Ridge Area within the LIRA project area, terraces are visible in the foreground.

Figure 18. Cherry Creek Allotment terraces visible in mid-ground

The photo taken (Figure 18) in a north facing slope in the recently burnt August 2012. The Cherry Creek allotment has been closed to grazing for over 20 years. The Toomey Allotment is the background (ridge).

Figure 19. Rhodes Creek Allotment terraces visible mid-ground of photo taken in a north facing slope in the Rhodes Creek Allotment, Willow Spring pasture, which is currently grazed. This site was also near the historical Cactus Mountain stock driveway referred to in the history of the project area.

Livestock grazing could have an indirect effect on Spalding's catchfly by grazing annual grass species early in their growth cycle, thus reducing vigor and ability for annual grass to seed. On range with a mix of perennials and annual bromes, Swanson and others (1987) concluded that dormant-period grazing in late summer, fall, winter, and even early spring if ended while sufficient soil moisture remains to allow the perennial plants to grow, should favor the perennial species (Vallentine and Stevens, undated). Studies suggest that livestock grazing can control annual grass species (particularly cheatgrass) when grazed early in the annual grass species life cycle, but before perennial grasses begin active growth. Cheatgrass is very palatable to livestock in the spring, but becomes unattractive when the seed heads develop (Hull and Pechanec 1947; Klemmedson and Smith 1964; Vallentine 1989). This creates a narrow window of opportunity to use livestock as a control tool for annual bromes. Mechanical defoliation within a week after flowering was found by Finnerty and Klingman (1961) to be effective in preventing seed formation by annual bromes. Laude (1957) found in working with soft brome (Bromus mollis) that removing the terminal buds prevented leaf elongation and seed production. Launchbaugh (1976) suggests that cattle grazing be used on warm season native grass

seedings during seed germination, seedling emergence, and initial plant development for weed suppression as well as utilizing the weeds for forage. These are all species present within the LIRA area. Studies suggest that if this technique were to be effectively applied to enhance establishment of perennials on cheatgrass sites a high degree of grazing control and intensity would be required to prevent damage to the perennial plant seedlings, and this may be a major limitation under practical management situations. Although using livestock as a tool to reduce annual species and reduce indirect effects to Spalding's catchfly is possible and is likely happening in within the LIRA area to an unknown extent, a high degree of grazing control to control annual grass species is not likely to be feasible on a larger scale across the project area. Using livestock grazing intensively to reduce annual grasses may be in direct conflict with soils and Significant Issue 2, deep soils on north facing slopes.

Furthermore, the CMP directs managers to take into considerations management recommendations from the Plant Associations of the Wallowa-Snake Province (Johnson, 1987) to promote desirable cool-season perennial grasses and reduce both direct and indirect impacts to vegetation and overall range condition by livestock grazing. Indirectly this should improve habitat for Spalding's catchfly. The grazing rotations within the LIRA area generally follow these recommendations by:

- Utilizing forage in the highest elevation pastures while cool-season perennial grasses dormant(November – February), and the soil most likely to be frozen
- Rotate through pastures between growth initiation of cool-season perennial grasses and prior to critical flowering and seed-set period by moving through pastures from lower elevation to higher elevation (higher elevation areas have delayed cool season perennial grass development)
- Removing livestock before critical flowering and seed-set period (mid-May thru July depending on elevation)
- Distributing livestock throughout the pastures to reduce livestock concentration areas

Upland plots have been identified in unsatisfactory condition as a result of legacy impacts or in combination with current management. The exact time or reason the plots were degraded into unsatisfactory condition is not known due to the complexity of the LIRA area and long land use history, but is likely before 1950. However based off of ecology studies done in the LIRA area and supporting research, it is probable that a change in livestock management would have a positive effect in some of these unsatisfactory areas and reduce indirect impacts to Spalding's catchfly habitat. Future monitoring would support or not support this assumption. In accordance with Forest Plan direction, allowable use would be reduced to 35% for this Alternative on the plots that have not crossed a threshold and can demonstrate the ability to recover for the late spring period. The reduction in allowable use is intended to help improve the condition on these sites by reducing the intensity of livestock use, thus increasing vegetative reproductive capacity, plant vigor, and competitive advantage of desirable cool season perennial grass species. Adaptive management proposed for Alternative B identifies objectives and desired condition for these plots, and specific management responses to indicators identified through long-term monitoring (see action common to all action Alternatives). The allowable use level of 35% should improve the condition of the unsatisfactory plots, but it is likely to occur at a slower rate than under the no grazing, deferred or rest-rotation Alternatives (Alternatives A, C, and D respectively). When these areas have improved to satisfactory

condition the allowable use would be increased. In areas that have crossed a vegetative threshold, changing the timing or intensity of grazing would not move the area towards the desired condition. Active restoration of the sites that have crossed a threshold would likely be necessary to obtain compliance with the CMP and Forest Plan, and could include costly practices such as tillage, seeding, irrigation, fencing, chemical pre and post treatments, and other activities depending on the site and those activities are outside the scope of the LIRA DEIS. If areas that have been identified as areas that have crossed a threshold in this analysis have been misidentified and demonstrate the ability to recover over time (for example have a notable increase in desirable cool-season grasses) management of these sites would be reconsidered to promote potential recovery towards the PNC.

Many of the proposed activities common to all Alternatives would not have a direct or indirect impact to Spalding's catchfly because;

- The proposed activities common to all Alternatives that remove fencing in the Cow Creek Allotment will not have a direct or indirect impact to Spalding's catchfly because there are no plants in or near the area the fence would be removed.
- Installing a gate at the head of the #1713 trail along the Imnaha River in the Rhodes Creek Allotment would not impact Spalding's catchfly because there are no plants or habitat nearby.
- Incorporating the Tulley pasture of the Rhodes Creek Allotment into the Toomey allotment would not have impacts to Spalding's catchfly because it is administrative change and would not change the livestock management of the Tulley pasture.
- Use at the Dug Bar facility for concentrated livestock management would not have direct or indirect effects to Spalding's catchfly because there are no known plants or habitat at the Dug Bar facility or within the adjacent pastures.

The following proposed actions could have direct or indirect effect to Spalding's Catchfly;

- In the Toomey Allotment the continued use of the Tulley stock driveway for ingress/egress to the Imnaha canyon would be an immeasurable impact to Spalding's catchfly; there are no known plants that directly overlap with the driveway. The Spalding's catchfly habitat is nearby within the same pasture, but the activity of trailing livestock on the stock driveway would not measurably overlap with Spalding's catchfly habitat that is not already disturbed by an existing trail or road.
- Constructing a water development in the Westside Cow pasture in the Rhodes Creek Allotment would not directly impact Spalding's catchfly because there are no known plants within the pasture. Increased livestock distribution to the southern portion as a result of a new water development would decrease grazing pressure on small pockets of potential habitat in the northern portion of the pasture. There would be an immeasurable effect from additional livestock trailing to the southern portion of the pasture as a result of the water development.
- Rotating use between the North, South Roy, and Bull pastures in the Rhodes Creek Allotment would reduce impacts to Spalding's catchfly by reducing the potential for hoof shear or trampling impacts. Rest would allow the Spalding's catchfly habitat to be more resilient to trampling impacts and allow more time (than one growing season) to recover from them. Future monitoring would determine if this management strategy is effective.

- Reconstructing the fence between Upper and Lower Spain Saddle pastures would reduce potential direct impacts to Spalding's catchfly by livestock by preventing livestock from using the Lower Spain Saddle outside specific grazing times. Lower Spain Saddle does contain Spalding's catchfly plants. Both pastures have Spalding's catchfly habitat, reconstructing the fence would have an indirect effect of promoting the vegetation within both pastures by being able to more finely control the timing, intensity, and frequency of grazing within those pastures and managing livestock to promote vegetation towards the desired condition.
- Redeveloping the Tips Trough in the Toomey Allotment would not have a direct impact to Spalding's catchfly plants because the water development does not overlap. However there could be indirect impacts from trailing from other portions of the pasture through Spalding's catchfly habitat to the water development.

Significant Issue 2 – Deep soils on steep north facing slopes

There is uncertainty about the continued degree of impact on deep soils on steep north-facing slopes due to hoof shear action by cattle grazing in the LIRA project area. Under past management, grazing livestock while soils were moist on steep north facing slopes caused direct effects of soil displacement and compaction in localized areas (see terrace discussion in Significant Issue 1 – Spalding's catchfly). Displacement caused by livestock still occurs in limited areas within the LIRA area. Exposed bare soil can become more prone to raindrop impacts that may cause accelerated surface erosion. Over time if the presence of bare soil continues without a chance for recovery (by being covered with vegetation) it is likely to contribute to an indirect effect of decreased overall soil productivity as well as an earlier seral stage of the vegetation communities.

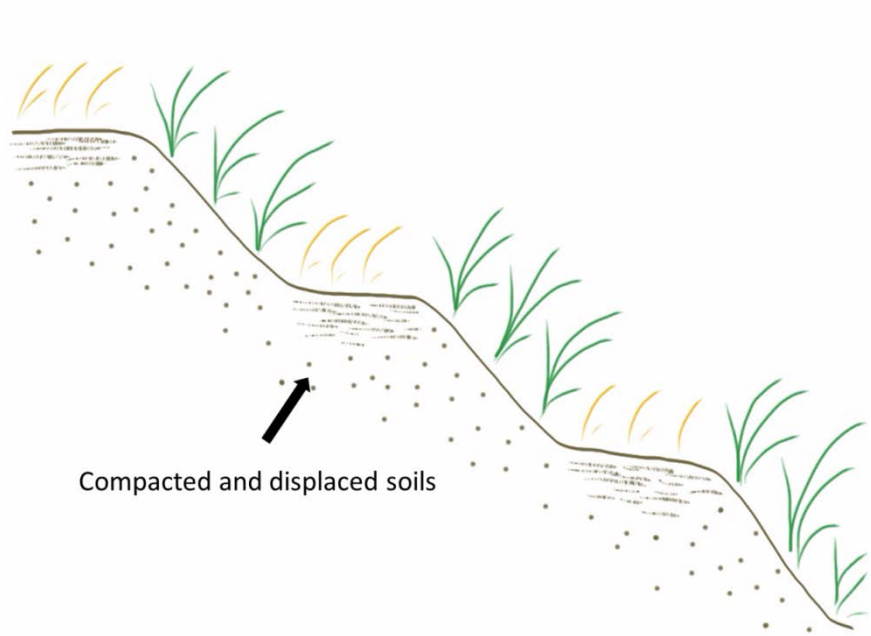

Figure 20. Diagram of Terraces within LIRA Area #2 (WWNF Ecology Program)

The direct effect of livestock management under Alternative B is potential continued displacement and compaction of deep soils on north facing slopes caused by livestock trailing. Although the origin of terraces is debated (see discussion of terraces in Significant Issue -1), the current management authorizes livestock to trail through steep slopes on terraces and potentially cause or prolong the recovery of soil displacement or compaction depending on the soil moisture. The indirect effect is the impact to the plant community over time when bare soil is exposed and at risk of annual grass invasion or continuation of annual grass presence, and resulting competition for resources with desirable cool season perennial grass species. For a figure of the pattern of compacted and displaced soils see Figure 20, and Photos 17, 18, and 19. The CMP and Forest Plan direct that soil productivity would be maintained if the livestock impact to soils (defined as Detrimental Soil Conditions or DSCs) is less than 20% of the grazed area. See the Soils Resource Report for more detailed, soil specific information. Further monitoring would support that assumption or provide data for adjustment in livestock management.

In accordance with Forest Plan direction, allowable use would be reduced to 35% utilization during the late spring period and continue the 20% detrimental soil condition standard for the whole grazing season for this Alternative. The direct effect of the reduction in allowable use is intended decrease to soil impacts and to help improve the condition on these sites by reducing the intensity of livestock use. Thus the indirect effect would be increasing vegetative reproductive capacity, plant vigor, and competitive advantage of desirable cool season perennial grass species which would benefit deep soils in steep north facing slopes over the long term by creating more soil stability by increasing soil holding by perennial grass species roots. Adaptive management proposed for Alternative B identifies objectives and desired condition for these plots, and specific management responses to indicators identified through long-term monitoring. The allowable use level of 35% during the late spring period should improve the condition of the unsatisfactory plots, but it is likely to occur at a slower rate than under the no grazing, deferred or rest-rotation Alternatives (Alternatives A, C, and D respectively). For areas that have crossed a vegetative threshold changing the timing or intensity of grazing would not move the area towards the desired condition; therefore the focus is shifted towards not exceeding Detrimental Soil Condition standards by livestock use to ensure sites are not continuing to degrade. Active restoration on sites that have crossed a threshold would accelerate improvement necessary to obtain compliance with the CMP and Forest Plan, and could include costly practices such as tillage, seeding, irrigation, fencing, chemical pre and post treatments, and other activities depending on the site and those activities are outside the scope of the LIRA DEIS.

Many of the proposed activities common to all Alternatives would not have a direct or indirect impact to deep soils on steep north facing slopes because;

- Installing a gate at the head of the #1713 trail along the Imnaha River in the Rhodes Creek Allotment would not impact soils because it would be an existing disturbed site on level terrain.

- Incorporating the Tulley pasture of the Rhodes Creek Allotment into the Toomey allotment would not have impacts to soils because it is administrative change and would not change the livestock management of the Tulley pasture.
- Use at the Dug Bar facility for concentrated livestock management would not have direct or indirect soils because the areas are not on steep north facing aspects and are already compacted as part of the corral system.

The following proposed actions could have direct or indirect effect to deep soils on steep north facing slopes;

- The proposed activities common to all Alternatives that remove fencing in the Cow Creek Allotment will not have a have a direct impact by reducing livestock trailing along fence lines, the indirect effect would be potential improvement of compaction caused by historical fence line trailing.
- In the Toomey Allotment the continued use of the Tulley stock driveway for ingress/egress to the Imnaha canyon would be an immeasurable impact to the deep soils on steep north slopes in the driveway area; the current use is significantly less than historical use.
- Constructing a water development in the Westside Cow pasture in the Rhodes Creek Allotment would not directly affect deep soils on steep north facing slopes because the water development would not overlap with the steep ground. Increased livestock distribution to the southern portion as a result of a new water development would decrease grazing pressure on small pockets of deep soils on steep north facing slopes in the northern portion of the pasture. There would be a direct effect to deep soils on steep north facing aspects from additional livestock trailing to the southern portion of the pasture as a result of the water development.
- Rotating use between the North, South Roy, and Bull pastures in the Rhodes Creek Allotment would reduce impacts to deep soils on steep north facing slopes by reducing the potential for hoof shear or trampling impacts. Rest would allow the soil to be more resilient to trampling impacts and allow more time to recover from them. Future monitoring would determine if this management strategy is effective.
- Reconstructing the fence between Upper and Lower Spain Saddle pastures would have immeasurable impacts to deep soils on steep north facing slopes because it would be reconstructing an existing structure where impacts have already happened.
- Redeveloping the Tips Trough in the Toomey Allotment would not have a direct impact to deep soils on steep north facing slopes because the trough location would not overlap with a steep north aspect. However there could be indirect impacts from trailing through steep north facing aspects of the pasture to the water development.

Direct and indirect effects of livestock grazing under Alternative B, current management, to biological crusts within the LIRA area are discussed within the biological crust section of the Soils Resource Report (see Soils Resource Report in the project record). Direct and indirect effects of livestock grazing under Alternative B, current management, to invasive species (noxious weeds) are discussed in the Noxious Weeds Report (see Noxious Weeds Report in the project record). Direct and indirect effects of livestock grazing under Alternative B, current management, to recreationalists is discussed in the Recreation Resource Report (see Recreation Resource Report in the project record).

Direct and Indirect Effects of Forest Service Mitigation, Monitoring (Alternative B)

Mitigation measures address potential impacts by avoiding adverse impacts, minimizing adverse impacts by limiting activities, or rectifying adverse impacts through rehabilitation. Mitigation measures would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the Annual Operating Instructions to provide for further protection of resources.

All Allotments:

- To minimize direct and indirect effects to the soil and vegetation resources the Tulley stock driveway would continue to be the main ingress/egress route for cattle between the Chesnimnus area and the Cow Creek, Rhodes Creek, and Toomey Allotments rather than spreading the impact out over a larger area.
- To avoid direct and indirect effects to Spalding's catchfly, the adaptive management steps as described would aim to change livestock management in pastures with the plant to protect the plants, their habitat, and the soil resource particularly in deep soils on steep north facing slopes.
    - The direct and indirect effects of increased riding and herding of livestock would be to distribute livestock in other areas of the pastures that do not have Spalding's catchfly plants and are not as prone to hoof shear.
    - Reduction in the season of use or number of livestock in the pasture where the issue is would reduce the interaction between livestock and the Spalding's catchfly and it's habitat and therefore the reduce the risk of direct and indirect effects of livestock grazing to Spalding's catchfly
    - Long term monitoring on or adjacent to the areas of concerns would be conducted to determine long term trend and determine if the adaptive management triggers are appropriate in reducing the direct and indirect impacts to Spalding's catchfly and its habitat. The direct and indirect impact from the monitoring would be the action taken depending on the monitoring outcomes.
    - If the long term effectiveness monitoring demonstrates that the desired condition has been reached the permittee may be authorized during the AOI meeting to increase the number or livestock or extend the season of use with approval from the Area Ranger within the effected pastures, the direct and indirect effects may be additional overlap in time and space between livestock and Spalding's catchfly and its habitat.

Rhodes Creek Allotment

- Direct and indirect effects to the heritage site in the Willow Springs pasture are discussed in the Heritage Resources report.

Lone Pine Allotment

- The Lone Pine Allotment mitigations are tied to recreation trails and high use area, a discussion direct and indirect impacts can be found in the Recreation Resource Report.
- Discussion of Lone Pine Allotment mitigation direct and indirect effects related to heritage resources can be found in the Heritage Resources report.

The direct and indirect effect of monitoring are tied to the action or actions that could be implemented as a result of the monitoring outcomes which are described above and throughout the discussion of effects. The effects could be short term (1-3 years) or long term (5-10 years or longer).

Cumulative Effects of Proposed Grazing Activities (Alternative B, Current Management)

Cumulative Effects Analysis

Under this Alternative, livestock would be authorized to graze the four allotments in the LIRA area and the allotment boundaries serve as the spatial boundary for this cumulative effect analysis. The LIRA area is bounded by NFS land. Private land within the LIRA area is managed similarly to the lands within the project boundary. The timeframe for this cumulative effects analysis is for the next 20 years; beyond that timeframe it would be speculative. Where improvement is possible, rangeland condition in the analysis area as whole is on an upward trend as depicted by the data collected and described in the existing condition. In general the upward trend in rangeland condition has occurred with the presence of livestock grazing. Areas where the CMP and Forest Plan standards are not being met are addressed through development of site specific management objectives that will allow for the improvement of the resource condition.

The main activities within the project area are grazing and recreation based. The overall upward trend within the LIRA area would continue when considering the overlapping effects of permitted grazing, tribal grazing, potential noxious weed treatments, and recreational use. There are no vegetation management projects (thinning, harvest, prescribed burning) being discussed or planned for the foreseeable future.

Tribal grazing by the Nez Perce Tribe has been occurring in the Lone Pine Allotment since the 2012 grazing season. Tribal grazing is not a permitted activity, the Nez Perce Tribe has elected to exercise their tribal grazing rights and do not require a permit to do so. To date the season of use of tribal grazing has coincided with what permitted grazing would be under all the action Alternatives. The amount of permitted grazing to occur within the LIRA area would be contingent on the amount of tribal grazing occurring. The combined use of tribal and permitted grazing should not exceed the amount analyzed for under any of the action Alternatives. The tribal and permitted grazing would overlap in time and space, but the effects should not be additive to what is being analyzed. Timing, intensity, or frequency of tribal grazing beyond what

is being analyzed for permitted grazing concerned is speculative. The Nez Perce Tribe is responsible for ensuring that resource damaged caused by tribal grazing does not occur.

Noxious weed treatments may be planned for sites not currently approved for treatment depending on the outcome of the re-analysis Wallowa-Whitman Noxious Weed Treatment EIS (2010) that may allow clearance for chemical treatment. Noxious weed treatments within the LIRA area may require a review process where treated areas are assessed by the noxious weed program manager and range management specialist to determine if the area may need a season's rest from grazing. This could be accomplished by temporary fencing, resting the pasture, or herding livestock.

Recreational use would continue at current levels or may increase with improvement to the Indian Crossing interpretive infrastructure at Dug Bar and potentially more visitation to the Chinese Massacre Site. Cumulative effects to recreation are discussed in the Recreation Resources report. Although grazing and recreation may on a limited basis overlap in time in space the effects from each activity is likely to be immeasurably additive because livestock grazing in those and adjacent to those areas is very low.

Compliance with the HCNRA CMP and Forest Plan

This Alternative does meet and is consistent Forest Plan (as amended by the CMP) direction to make available forage production above that needed for maintenance or improvement of the basic resources to wildlife (within Management Objective levels), to permitted domestic livestock under standards and guidelines that will assure continued maintenance or improvement of the resource. This Alternative also works towards maintaining ranching as a traditional and valid use of lands within the HCNRA (CMP).

Alternative C – Proposed Action, Site Specific Changes and Adaptive Management in the Toomey Allotment

Current management (Alternative B) and the Proposed Actions common to all action Alternatives is the same for the Cow Creek, Rhodes Creek, and Lone Pine Allotment in Alternative C. Refer to effects analysis for current management for those allotments.

Alternative C represents the Proposed Action. The Proposed Action is similar to Current Management in Cow Creek, Rhodes Creek, and Lone Pine allotments, with several site-specific changes to management in the Toomey Allotment. Wambolt (1973) indicated that no single grazing system is best under all conditions; therefore, each must be tested to determine which conditions it is best suited for (Willard and Herman 1977). Adaptive management under alternative C is the test proposed to determine which strategy would best work toward the desired condition for the Toomey Allotment. These changes include creation of an additional pasture and adaptive management driven grazing rotation plan, as well as reconstruction and addition of water improvements. This Alternative was driven by the significant issues and other analysis issues identified by the public and interdisciplinary team. The following Proposed Actions would change current management on the Toomey Allotment:

- A new pasture, Big Pine pasture, would be created from a portion of the Lower Spain Saddle Pasture as a way to control livestock use near an occurrence of Spalding's catchfly. Refer to Maps in Chapter 2.
- Tips Springs (also known as Vance Draw Spring or # 16045906) would be re-developed to incorporate both the Spring Gulch pasture and the Big Pine pasture of the Toomey Allotment.
- The grazing schedule for this allotment would be adjusted so that pastures with known Spalding's catchfly sites or areas with deep soils on steep north facing slopes would be grazed to reduce soil disturbance and ensure that the standards, guidelines, goals and objectives of the guiding documents are met. This schedule would include:
    - Upper Spain Saddle pasture would be used in a two-year rotation where one year the pasture would be used only as a driveway, and the following year as a spring pasture and driveway.
    - Big Pine pasture would be used in a two-year rotation where one year the pasture would be rested and the following year used as a pasture. The season of use during the grazing year would be decided at the annual operating meeting.
- Research about Spalding's catchfly is limited to date. As a result management strategies proposed are aimed at improving vegetation and soil condition serves as a proxy for maintaining viable Spalding's catchfly habitat. These same management strategies would respond to the other significant issue of deep soils on steep north facing slopes with the intention of reducing soil disturbance by livestock. If after initial monitoring, or after long term trend monitoring, it is found that the standards, guidelines, goals and objectives are not met for Johnsen Canyon and Toomey pastures, than the following grazing schedule would occur within that pasture:
    - Toomey pasture would be used in a two-year rotation where one year the pasture would be rested, and the following year used as a pasture. The season of use during the grazing year would be decided at the annual operating meeting. Monitoring of this pasture would include utilization standards and line-point intercept at key areas to ensure compliance.
    - Johnsen Canyon would be used in a two-year deferred rotation grazing schedule where one year the pasture would be grazed in the fall (November 1 – December 31) and the following year the pasture grazed in the spring, (February 15 - May 15). Spring grazing would only be for a two month time frame within the dates allocated. Monitoring of this pasture would include utilization protocols and line-point intercept to ensure soil compliance.
    - For the Johnsen Canyon pasture, if it is found that the sites with known catchfly or steep deep soil north-facing slopes are not recovering at the expected rate of 70% of the natural rate of recovery, or meeting soil alteration standards within three years of implementation of the schedule described above, then the deferred rotational schedule of this pasture would change where the pasture would be grazed in the fall one year (November 1 – December 31), and in the spring the following year (January 15 through March 15).
    - After three grazing seasons of implementation the above deferred rotation schedule, if it is found that the sites with known catchfly or steep, deep soil north-facing slopes are still not recovering at the expected rate 70% of the natural rate of recovery, or meeting soil alteration standards, then a rest rotational schedule of use would occur where the pasture would be grazed in the fall one year (November 1 – December 31), in the spring the following year (January 15 through March 15), and rested the third year.

Direct and Indirect Effects of Proposed Grazing Activities (Alternative C)

This Alternative addresses the significant issues that were identified for the LIRA project. Adaptive management allows flexibility for adjustments in stocking rates to utilize available forage while meeting the requirements for upland vegetative health. This Alternative specifically addresses each significant issue as follows:

Measurement Indicator 1 – Spalding's Catchfly

The actions presented in Alternative C are aimed at reducing both the direct and indirect effects to Spalding's catchfly and its habitat. Initially the creation of a new pasture, Big Pine pasture, would reduce the direct impacts to Spalding's catchfly by being able to more finely control livestock use in the specific area where there are known Spalding's catchfly plants. Indirectly, a pasture would create the ability for the permittee to more finely control livestock use and would allow more flexibility for managing the timing and intensity of livestock use in that particular area which over time could decrease impacts and therefore increase range condition (both vegetation and soils) in the long term. Implementing a rest –rotation with the Big Pine pasture would decrease the direct effect to Spalding's catchfly plants by reducing the direct interaction when soils are moist between and livestock grazing and the plants every other year. Resting the Big Pine pasture would allow for maximum growth, reproduction, and vigor of desirable vegetation on the rest years and would be more resilient to grazing and hoof shear during the graze year, indirectly benefitting the Spalding catchfly habitat. Reconfiguring Tip's spring would provide the water infrastructure to ensure the success of the new pasture. The direct effect of reconfiguring Tip's spring would be soil disturbance at the new trough location, the indirect effect would be better distribution through both pastures and less concentration on sensitive areas near Spalding's catchfly habitat.

If monitoring shows that improvement is not being made in Johnsen Canyon or the Toomey Pasture in regards to Spalding's catchfly habitat, then the adaptive management steps described would be implemented. The adaptive management steps focus around the use of rest-rotation and deferment schedules to reduce direct (physical contact between cattle hooves and Spalding catchfly plants when soils are moist) and indirect effects (promote both vegetation and soil range conditions). Rest rotation and deferment allow the desirable bunchgrasses to go through a whole growth cycle without the pressure of livestock grazing. The direct effect would be that the desirable bunchgrass species would not be grazed. The plants would have maximum growth, reproduction, and vigor given the resources available that growing season. The indirect effect would be potentially stronger bunchgrasses to not only hold the soil in place, but maintain desired Spalding's catchfly habitat. Rest rotation and deferment also reduce grazing use pressure to soils when they may be moist. The direct effect is that cattle would not be in the pasture to cause potential soil disturbance, the indirect effect is that the vegetation on those soils would not be disturbed and could help to maintain the vegetative integrity of the site.

The indirect effect to other pastures in the Toomey Allotment that are not rested or deferred is additional pressure from livestock grazing to allow for rest or deferment in other pastures.

There may be increased direct or indirect effects to the vegetation and soil resources in the non-rest or deferred pastures that could slow improvement towards the desired conditions.

Measurement Indicator 2 – Deep soils in steep north facing slopes

The actions presented in Alternative C are aimed at reducing both the direct and indirect effects to deep soils in steep north facing slopes. Initially the creation of a new pasture, Big Pine pasture, would reduce the direct impacts to deep soils in steep north facing slopes by being able to more finely control livestock use on the deep soils. Indirectly, a pasture would create the ability for the permittee to more finely control livestock use and would allow more flexibility for managing the timing and intensity of livestock use in that particular area depending on the soil conditions. Over time the ability to either keep livestock out of the pasture when soils are moist, or use the pasture when soils are dry could decrease impacts and therefore increase range condition (both soils and vegetation) in the long term. Implementing a rest –rotation with the Big Pine pasture would decrease the direct effect to deep soils in steep north facing slopes by reducing the potential direct interaction between livestock and soils when they are grazing the pasture every other year. Soil disturbance that could occur during the graze year would have an opportunity to recover during the rest year. Resting the Big Pine pasture would allow for maximum growth, reproduction, and vigor of desirable vegetation on the rest years and would be more resilient to grazing and hoof shear during the graze year, indirectly benefitting the deep soils in steep north facing slopes. Reconfiguring Tip's spring would provide the water infrastructure to ensure the success of the new pasture. The direct effect of reconfiguring Tip's spring would be soil disturbance at the new trough location, the indirect effect would be better distribution through both pastures and less concentration on sensitive areas with deep soils in steep north facing slopes.

If monitoring shows that improvement is not being made in Johnsen Canyon or the Toomey Pasture in regards to deep soils on steep north facing slopes, then the adaptive management steps described would be implemented. The adaptive management steps focus around the use of rest-rotation and deferment schedules to reduce direct (physical contact between cattle hooves and deep soils when they are moist) and indirect effects (promote both vegetation and soil range conditions). Rest rotation and deferment allow a change to timing and intensity of grazing to avoid use when deep soils are likely to be moist, or allows for recovery of disturbances caused on a graze year by following with a rest year. Indirectly, rest-rotation and deferment allow the desirable bunchgrasses to go through a whole growth cycle without the pressure of livestock grazing. The direct effect would be that the desirable bunchgrass species would not be grazed and the plants would have maximum growth, reproduction, and vigor given the resources available that growing season. The indirect effect would be potentially stronger bunchgrasses to hold the soil in place and maintain ground cover.

The indirect effect to other pastures in the Toomey Allotment that are not rested or deferred is additional pressure from livestock grazing to allow for rest or deferment in other pastures. There may be increased direct or indirect effects to the soil and vegetative resources in the non-rest or deferred pastures that could slow down improvement towards the desired conditions.

Direct and Indirect Effects of Forest Service Mitigation, Monitoring and PDCs (Alternative C)

Mitigation measures address potential impacts by avoiding adverse impacts, minimizing adverse impacts by limiting activities, or rectifying adverse impacts through rehabilitation. Mitigation measures would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the Annual Operating Instructions to provide for further protection of resources. PDCs, mitigation, and monitoring are consistent amongst action alternatives, see direct and indirect effects for Alternative B for more explanation of the direct and indirect effects across all action alternatives.

The direct and indirect effect of monitoring are tied to the action or actions that could be implemented as a result of the monitoring outcomes which are described above and throughout the discussion of effects. The effects could be short term (1-3 years) or long term (5-10 years or longer). There is additive monitoring for Alternative C to support adaptive management strategies.

For Alternative C, there would be additional monitoring specific to the Toomey Allotment (see description above) to determine if adaptive management steps are necessary to work towards the desired condition, and to determine if the adaptive management steps are appropriate or effective to work towards the desired condition. An adaptive management framework that incorporates and evaluates both experiential and experimental knowledge can most effectively facilitate the learning required to create management strategies that fit specific social and ecological settings and that accommodate the inherent uncertainties of rangeland ecosystems (Briske et. al, 2011). The direct effect of the monitoring would be to interpret the results to determine if the management activities are working, the indirect effect would be the change to management activities that cause an improvement towards the desired condition.

Cumulative Effects of Proposed Grazing Activities (Alternative C)

The cumulative effects of proposed grazing activities under Alternative C are the same as for Alternative B. There are no proposed or foreseeable activities that overlap in space or time with the proposed activities in Alternative C that would suggest that cumulative effects would differ between the two alternatives.

Compliance with the HCNRA CMP and Forest Plan

This Alternative does meet and is consistent Forest Plan (as amended by the CMP) direction to make available forage production above that needed for maintenance or improvement of the basic resources to wildlife (within Management Objective levels), to permitted domestic livestock under standards and guidelines that will assure continued maintenance or improvement of the resource. This Alternative also works towards maintaining ranching as a traditional and valid use of lands within the HCNRA (CMP).

Alternative D – Incorporate Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment Grazing Rotation

Alternative D represents the greatest change from current management across the project area. Alternative D would incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations. This Alternative provides additional opportunities for rest and deferment of pastures within all four allotments. The reduction in use would be realized by the rest periods scheduled for each allotment. This Alternative was driven by the assumption that rest would reduce direct and indirect livestock impact to Spalding's catchfly and at the same time reduce cumulative soil disturbance by livestock when soils are not dry or frozen. A further assumption is that the vegetation in the pastures that are rested could have improved range condition over time by the desirable perennial vegetation being allowed to complete its life cycle without grazing pressure. The actions to change current management on the four LIRA allotments are as follows:

- This Alternative would allow for rest from grazing 1 year in every 3 years for the entire Toomey Allotment.
- This Alternative would allow for rest from grazing 1 year in every 3 years in the Rowley pasture in the Cow Creek Allotment.
- This Alternative would allow for rest from grazing 1 year in every 3 years in the East and West Lightning Bench pastures in the Rhodes Creek Allotment
- This Alternative would allow for rest from grazing 1 year in every 3 years in the entire Lone Pine Allotment.
- The grazing rotation in the Lone Pine and Cow Creek allotments would be changed, allowing for deferment between spring and winter grazing 2 in 3 years (meaning use in winter one year, use in the spring the next year).

Alternative C also incorporates the CMP Grazing Goal-3 of "evaluate periodic rest and deferred grazing systems during AMP process".

Direct and Indirect Effects of Proposed Grazing Activities (Alternative D)

Measurement Indicator 1 – Spalding's catchfly

The actions presented in Alternative C in combination with actions proposed for all action alternatives are aimed at reducing both the direct and indirect effects to Spalding's catchfly and its habitat in all the pastures where Spalding's catchfly occurrences are present. See Table 25, which is repeated below.

Spalding's catchfly occurrences within LIRA area	
Allotment	Pasture
Cow Creek	None
Rhodes Creek	North Roy
	South Roy
	Bull Pasture
	East Bench Lightning
	West Bench Lightning
Toomey	Spring Gulch
	Lower Spain Saddle
	Johnsen Canyon
Lone Pine	Big Canyon

Initially the reduction of head months that would be authorized in the Lone Pine Allotment in Alternative B, C, and E respectively, paired with incorporating the Lone Pine allotment into the grazing rotation would reduce the intensity of grazing across all the allotments in the LIRA area. The reduction in grazing intensity would reduce the risk of direct interaction between livestock and Spalding's catchfly plants where they are present and soils are moist, and the indirect effect to Spalding's catchfly habitat would be potentially accelerating range condition improvement by reducing grazing pressure on desirable bunchgrasses.

Incorporating complete grazing rest years (1 in 3) for all the pastures in the Toomey Allotment, Lightning Bench pastures, and the entire Lone Pine allotment would decrease the direct effect to Spalding's catchfly plants by reducing the direct interaction when soils are moist between and livestock grazing and the plants every third year. Rest would allow for maximum growth, reproduction, and vigor of desirable vegetation on the rest years and would be more resilient to grazing and hoof shear during the graze year, indirectly benefitting the Spalding catchfly habitat. A combination rest and deferred grazing rotations in the Lone Pine would provide two out of three years where the livestock grazing is occurring during the dormancy of desirable bunchgrass species. In the Cow Creek Allotment deferment would allow for grazing during the dormancy of desirable bunchgrass species one in three years. Grazing desirable bunchgrass (primarily bluebunch wheatgrass and Idaho fescue in the LIRA area) during dormancy allows the closest to a "rest" response and allows the grasses to have a full growing period free from grazing intensity.

Measurement Indicator 2 – Deep soils on steep north facing slopes

The actions presented in Alternative D are aimed at reducing both the direct and indirect effects to deep soils in steep north facing slopes. Reducing grazing use across the LIRA area would reduce the direct impacts to deep soils in steep north facing slopes by being reducing the number of cattle and hooves that could potentially displace soil on deep soils on steep north facing slopes. Indirectly, reducing grazing intensity would reduce use of desirable bunchgrass species and hold vigor for such species at a higher level.

Incorporating complete grazing rest years (1 in 3) for all the pastures in the Toomey Allotment, Lightning Bench pastures, and the entire Lone Pine allotment would decrease the direct effect to deep soils on steep north facing slopes by reducing the direct interaction between livestock and deep soils if they are moist every third year. Rest would allow for maximum growth, reproduction, and vigor of desirable vegetation on the rest years and would be more resilient to grazing and hoof shear during the graze year, indirectly benefitting the deep soils on steep north facing slopes. Ratliff and Reppert, 1974, found results that suggested that rest-rotation grazing has some advantages for the vigor of Idaho fescue over continuous grazing. They found that rest-rotation grazing disturbs the relationship between grazing use and precipitation, which may be an important factor on continuously grazed allotments; and, therefore, may hold Idaho fescue vigor at a higher level than can continuous grazing. This matters because Idaho fescue is the main bunchgrass species on many of the deep soils in steep north facing slopes. A combination rest and deferred grazing rotations in the Lone Pine would provide two out of three years where the livestock grazing is occurring during the period where soils are most likely dry or frozen. In the Cow Creek Allotment deferment would allow for grazing during the period when the soils are most likely to be dry or froze one in three years. Grazing desirable bunchgrass (primarily bluebunch wheatgrass and Idaho fescue in the LIRA area) during dormancy allows the closest to a “rest” response and allows the grasses to have a full growing period free from grazing intensity and would have a positive indirect effect to soils by increased vegetation cover and soil stability.

Direct and Indirect Effects of Forest Service Mitigation, Monitoring and PDCs (Alternative D)

Mitigation measures address potential impacts by avoiding adverse impacts, minimizing adverse impacts by limiting activities, or rectifying adverse impacts through rehabilitation. Mitigation measures would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the Annual Operating Instructions to provide for further protection of resources. PDCs, mitigation, and monitoring are consistent amongst action alternatives, see direct and indirect effects for Alternative B for more explanation of the direct and indirect effects across all action alternatives.

The direct and indirect effect of monitoring are tied to the action or actions that could be implemented as a result of the monitoring outcomes which are described above and throughout the discussion of effects. The effects could be short term (1-3 years) or long term (5-10 years or longer).

Cumulative Effects of Proposed Grazing Activities (Alternative D)

The cumulative effects of proposed grazing activities under Alternative D are the same as for Alternative B and C. There are no proposed or foreseeable activities that overlap in space or time with the proposed activities in Alternative B or C that would suggest that cumulative effects would differ between the three alternatives. Cumulative effects would be immeasurably reduced during the rest years in each allotment. The cumulative effects between recreation and grazing within the Lone Pine Allotment would be reduced 1 in every 3 years because livestock and

recreationalists would not overlap, however it is likely immeasurable over the long term (10 years or more).

Compliance with the HCNRA CMP and Forest Plan

This Alternative does meet and is consistent Forest Plan (as amended by the CMP) direction to make available forage production above that needed for maintenance or improvement of the basic resources to wildlife (within Management Objective levels), to permitted domestic livestock under standards and guidelines that will assure continued maintenance or improvement of the resource. This Alternative also works towards maintaining ranching as a traditional and valid use of lands within the HCNRA (CMP).

Alternative E – Forage Reserve in Lone Pine Allotment

The Lone Pine Allotment would be utilized as a Forage Reserve through a Temporary Grazing Permit (R6/PNW FSH 2209.13) for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. This Alternative was driven by the Area Manager, the public, permittees, and multiple congressional inquiries regarding available forage due to losses from wildland fires in adjacent areas from 2006-2012. This Alternative is also driven by the IDT to potentially provide rest to adjacent allotments in the Imnaha River Canyon, or summer grazed allotments with resource concerns. Under Alternative E the same management proposed in Alternative C would apply to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Direct and Indirect Effects of Proposed Grazing Activities (Alternative E)

The direct and indirect effects of Alternative E for the Cow Creek, Rhodes Creek, and Toomey Allotments would be the same as for Alternative B (Current Management). The only proposed change from current management would be for the Lone Pine Allotment. The livestock management for the Lone Pine Allotment would be consistent with current management except there would be a rest year for the Lone Pine allotment if there is a demand to use it consecutive years as a forage reserve.

Measurement Indicator 1 – Spalding's Catchfly

See direct and indirect effects discussion for Current Management for effects specific to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Utilizing the Lone Pine Allotment as Forage Reserve would only have direct and indirect effects to the Spalding's catchfly and it's habitat in the Canyon Pasture unless it is found in other places in the allotment in the future. The effects would be similar to those discussed in Alternative B, Current Management, except there would be a rest year for the Lone Pine allotment in every three years. The rest year would eliminate direct effects to Spalding's catchfly during the no graze year, and reduce indirect effects to Spalding's catchfly habitat by allowing desirable perennial bunchgrasses (especially Idaho fescue) to have additional growth, reproduction, and vigor free from livestock grazing pressure.

The nature of a Forage Reserve is that qualified permittees can be approved to utilize it, and would likely vary from year to year. Inconsistent permittees and livestock may have difficulty in being able to successfully utilize the Lone Pine Allotment due to not having time to "learn" the country and how to best graze it given the complexity of the allotment. The direct effect could be livestock not distributed throughout the pastures adequately, the indirect effect could be to isolated areas that could get overused and impact the vegetation in a negative way as a result of poor distribution. It is possible these direct and indirect effects could overlap with Spalding's catchfly and its habitat in time and space in the Big Canyon pasture.

Direct and indirect effects from this alternative may be the opportunity for other pastures and allotments with Spalding's catchfly to be rested from livestock grazing while the Lone Pine forage reserve is being utilized and improve its habitat. A key component to the Forage Reserve concept is that permittees could provide resource benefit to the allotment they have a Term Grazing Permit for by using Lone Pine allotment instead.

Measurement Indicator 2 – Deep soils on steep north facing slopes

See direct and indirect effects discussion for Current Management for effects specific to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Utilizing the Lone Pine Allotment as Forage Reserve would have direct and indirect effects to deep soils on steep north facing slopes. The effects would be similar to those discussed in Alternative B, Current Management, except there would be a rest year for the Lone Pine allotment in every three years. The rest year would eliminate direct effects to the deep soils on steep north facing slopes on the no graze year, and reduce indirect effects to deep soils by allowing desirable perennial bunchgrasses to have additional growth, reproduction, and vigor free from livestock grazing pressure that would make soils more resilient to disturbance during the graze year.

The nature of a Forage Reserve is that qualified permittees can be approved to utilize it, and would likely vary from year to year. Inconsistent permittees and livestock may have difficulty in being able to successfully utilize the Lone Pine Allotment due to not having time to "learn" the country and how to best graze it given the complexity of the allotment. The direct effect could be livestock not distributed throughout the pastures adequately, the indirect effect could be to isolated areas that could get overused and impact the vegetation in a negative way as a result of poor distribution. It is possible these direct and indirect effects could overlap with deep soils on steep north facing slopes.

Direct and indirect effects from this alternative may be the opportunity for other pastures and allotments with concerns about soil disturbance to be rested from livestock grazing while the Lone Pine forage reserve is being utilized and improve soil condition. A key component to the Forage Reserve concept is that permittees could provide resource benefit to the allotment they have a Term Grazing Permit for by using Lone Pine allotment instead.

Direct and Indirect Effects of Forest Service Mitigation, Monitoring and PDCs (Alternative E)

Mitigation measures address potential impacts by avoiding adverse impacts, minimizing adverse impacts by limiting activities, or rectifying adverse impacts through rehabilitation. Mitigation measures would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the Annual Operating Instructions to provide for further protection of resources. PDCs, mitigation, and monitoring are consistent amongst action alternatives, see direct and indirect effects for Alternative B for more explanation of the direct and indirect effects across all action alternatives.

The direct and indirect effect of monitoring are tied to the action or actions that could be implemented as a result of the monitoring outcomes which are described above and throughout the discussion of effects. The effects could be short term (1-3 years) or long term (5-10 years or longer).

Compliance with the HCNRA CMP and Forest Plan

This Alternative does meet and is consistent Forest Plan (as amended by the CMP) direction to make available forage production above that needed for maintenance or improvement of the basic resources to wildlife (within Management Objective levels), to permitted domestic livestock under standards and guidelines that will assure continued maintenance or improvement of the resource. This Alternative also works towards maintaining ranching as a traditional and valid use of lands within the HCNRA (CMP).

Botanical Resources and Special Status Plants

Introduction

This section will start by addressing Region 6 Sensitive Species listed plants, and then follow with Threatened and Endangered Species plants.

Effects on species of concern within the project area are documented in a Biological Evaluation (located in the project record), which evaluated the following species:

1) the Pacific Northwest Region Regional Forester's Sensitive Species list (**December 9, 2011** - http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy) for plant species known or with potential to occur on the Wallowa-Whitman National Forest;
2) threatened endangered or candidate species as indicated by the US Department of Interior Fish and Wildlife Service, Oregon Fish and Wildlife Office website (http://www.fws.gov/oregonfwo/Species/Lists/RequestList.asp) updated **January 7, 2014**. This link references the list of threatened, endangered and candidate species that may occur in selected Oregon counties through the U.S. Fish and Wildlife Services' Information, Planning, and Conservation (IPaC) system.

Table B-1. Forest Service Region 6 Sensitive Plants Documented (D) or with potential (p) to occur in the Lower Imnaha Rangeland Analysis Project Area, and for which surveys were designed to detect.

Common Name	**General Habitat affiliation**	**Project area status**
	Nonvascular plants	
Narrow mushroom-headed liverwort	Damp soil and rocks of shaded Creek banks and seepages; splash of Creeks and cascades; often under willow; may be calciphilous; on soil with little organic material, often on ledges on cliffs or in crevices in rocky areas from low elevations to the subalpine zone	p
Candle snuffer moss	Soil on ledges and in crevices on cliffs, reported from both igneous and siliceous substrates - various elevations	p
Banded cord-moss	Occurring as individual plants or forming small sods on seasonally wet, exposed soil in seeps or along intermittent streams. It is usually hidden among grasses, other mosses, and litter, and periodically on humid or damp earth of terraces of exposed rock outcrops &; may be found on recently disturbed soil & occasionally present on thin soil overlying limestone; found below 3,000 feet, often w/Pseudotsuga menziesi,or Quercus garryana	p
Bent-stem moss	Occurs on the cut or broken ends or lower sides of large (usually over 15 inches in diameter in Oregon and Washington), decay class three, four and five rotted logs or stumps (usually on bare wood), and occasionally on peaty banks in moist coniferous forests from sea level -subalpine elevations	p
	Vascular plants	
Geyer's onion	Moist, open slopes, meadows, or stream banks or sumer-dry grasslands at low to mid elevation	D
Hells canyon rockcress	Steep Rocky Soil and Rock outcrops at mid to high elevation	p
Green spleenwort	Limestone and other basic rocks - all elevations	p
Prairie moonwort	open prairie-like areas, glaciated terrain, & well-drained soils in non-forested habitats or at the margins of shrub-lands and forests	p
Crenulate moonwort	Moist woodlands, meadows, & grassy-roadsides	p
Moonwort	cosmopolitan in its habitats from open (to lightly wooded) meadows as well as scree slopes, mesic woodlands on moist well-drained soils w/neutral pH	p
Green-band mariposa-lily	Mid-elevation grasslands & meadows & under parkland-like P-pine stands	D
Broad-fruit mariposa-lily	Low to mid elevation grasslands	p
Cordilleran sedge	Dry forests and riparian woods (some timed w/aspen), very often at the edges of ninebark and snowberry stands to rocky slopes with much duff	D

Common Name	General Habitat affiliation	Project area status
Retrorse sedge	Floodplane forests and wet meadows, mesic shrub thickets, sedge meadows, bogs, swamps, marshes, and edges of streams, lakes shores, and rivers from lowlands through foothills	p
Fee's lip-fern	Limestone substrate & rock formations	D
Steller's rockbrake	Sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats	p
A cyperus	low elevation sandy substrates & grassy slopes up to 250 feet from shoreline, Celtis zone on first terrace above high water mark, rocky shoreline, and edge of riparian zone along dry Creek bed tributaries	p
Short seeded waterwort	Low to mid elevation wetland and riparian habitats - ponds & oxbows	p
White cushion erigeron	In dry grasslands and shallow soiled plateaus and ridges / ridge shoulders and rocky slopes at mid elevations	D
Engelmann's daisy	In dry grasslands and shallow soiled plateaus and ridges / ridge shoulders and rocky slopes at mid elevations	D
Membrane-leaved monkeyflower	on steep moist soil and seeps and seeping cracks in basalt and limestone in low elevation canyons	D
Macfarlane's four o'clock	Low elevation grasslands or shrublands	p
Dwarf phacelia	Small seasonally moist openings in dry gravely bunchgrass hillsides at middle elevations as well as edges of forb dominated meadows, edge of alder, aspen & false hellebore stands	D
Rough pyrrocoma	Mesic canyon grasslands (ID fescue) with deep soil and transition zones between grasslands & P-pine communities	p
Columbia cress	Stream banks, ditches, margins of lakes and ponds, meadows, roadsides, gravel bars, wet fields	p
Lowland toothcup	Moist sites, drying edges of ponds, springs and streams	p
Bartonberry	low elevation protected canyon sides, forming thickets along streams	p
Spalding’s catchfly	Mixed prairie and mesic canyon grasslands (ID fescue) with deep soil and ponderosa pine forests in swales and on dry hillsides	D
Arrow-leaf thelypody	Vernally moist alkaline areas, hillside seeps, stream-beds, at lower to intermediate elevations in juniper-sagebrush communities & steep basalt canyon drainages which are wet for part of the year	p
American globeflower	Montane to alpine moist sunny wet meadows, (+/- acidic) seeps, bogs, and riparian openings in mixed conifer stands with a gentle flow of water running through it, often accompanied by alders	p

Affected Environment/Environmental Consequences

Existing Condition, Forest Service Region 6 Sensitive Species

The Pre-field and project review determined that there were 7 Forest Service Region 6 Sensitive Species listed plant species to be evaluated in the analysis of the LIRA project.

Geyer's onion

This species is found on moist meadows, moist river banks, and rock outcrops in the lowland, steppe and montane zones. In the Imnaha river canyon this plant is found scattered along the small ledges in the canyon walls, and steep slopes falling into the Imnaha River between the Cow creek bridge and the mouth of the Imnaha. This is the only population known on the Wallowa-Whitman National Forest.

Great Planes flatsedge

This species is found along the Snake River, and reported from sand or fine gravel along shore, grassy slopes up to 250 feet from shoreline, *Celtis* zone on first terrace above high water mark, rocky shoreline, and edge of riparian zone along dry creek bed tributary.

White cushion fleabane

These species are found on open moist to dry grassy meadows, sometimes bordered by scattered mixed conifer forest and frequently on shallow, dry, rocky slopes dominated by bluebunch wheatgrass. It is often but not exclusively found on west-facing slopes at various elevations.

Davis' fleabane and Snake River daisy or white cushion fleabane are very similar to each other. Both species are small, perennial daisies, which have solitary white-rayed flower heads. The main way to distinguish the two species is by the orientation and lengths of the hairs on the stem of the plants (Nesom, 2004). Both the Snake River daisy and Davis' fleabane are regional endemic species. The Snake River daisy is found in northeastern Oregon, southeastern Washington, and into southwestern Idaho. Davis' fleabane is also found in northeastern Oregon, and into southwestern Idaho. Both are found in the LIRA project area on virtually identical habitat. The botanists working in the area have struggled with distinguishing these species ever since they were originally included on the Region Six sensitive plant list. Based on these findings and the professional experience of the area botanist working with these plants, this analysis will treat them as one species under the name of white cushion fleabane.

Thinsepal monkey flower

This species grows on wet spots of soil on cliff shelves and in moist cracks in basalt and calcareous influenced cliffs, often alongside ferns and bryophytes. When found along small streams, they are usually above the high water line. This species is found only in the Imnaha and Snake River canyons but has been reported from Montana.

Slender lipfern

This species is found most often on rocky (usually dry) formations especially limestone cliffs or calcareous influenced cliffs and ledges of basalt or sandstone.

Cordilleran sedge

Cordilleran sedge is a recently described species of the North American Rocky Mountain range. The cordilleran sedge is infrequently found in mountainous terrain from Utah and Wyoming through Idaho, Oregon, Washington and up into British Colombia and Alberta (CWG 2008, USDA PLANTS 2012, FNA eFlora 2012 Hurd et al. 1998). Cordilleran sedge is small tufted sedge that grows largely in upland plant communities. It resembles a bunch-grass in appearance, in that it is densely ceaspitose, deep dull-green and usually grows about 6”-14” tall (the Carex Working Group (CWG, 2008). It flowers during spring, and in this part of Hells Canyon if would bloom from late April through early June and fruits would develop from about June through July.

The cordilleran sedge is a shallow-rooted species of mid elevations found in a suit of habitats from rocky slopes with organic layers and leaf litter to mixed conifer forests with a notable Douglas fir component and well developed shrub understory (CWG 2008). It also can be found in open grassy hills, and in Hells Canyon it is often observed at the edge of these grassy slopes where they transition into ninebark shrub stringers or along the edges of timbered stringers. This species is quite palatable and easily pulled up when grazed by livestock.

Dwarf phacelia

Dwarf phacelia is very small and cryptic species in the water-leaf family. This dwarf annual forb usually only gets 5 cm tall and rarely grows up to 10cm tall. Correspondingly it has one to few small light blue flowers. The first discovery in Oregon of the species was by Morton Peck in 1934. He found a population near Buckhorn Springs, on the edge of the Imnaha River Canyon in the Hells Canyon National Recreation Area (Moseley 1995). Botanists for the Wallowa-Whitman National Forest have tried to relocate this population without success – a common theme with this species (Moseley 1995). Dwarf phacelia seed bank biology is completely unknown and it is not unusual for small rare annual species to blink in and out of detectability across a landscape.

Little is known about its response to grazing or fire or how it migrates around the landscape. Likewise, the habitat parameters for this species are not well understood due to the relatively low number of known occurrences being scattered far and wide across the west from Nevada, Idaho, Washington and the Wallowa Mountains (USDA PLANTS 2012, FNA eFlora 2012, Moseley 1995, Hitchcock and Cronquist 1973). In Hells Canyon National Recreation Area it is found in low angle bunchgrass slopes or small-forb dominated openings in hardwood or conifer stands. The dwarf phacelia is almost always found in small patches with a limited number of individuals. The habitats are almost always gently sloping.

Existing Condition, ESA listed Plants

The Pre-field and project review determined that there were 3 USFWS listed plant species of concern to be evaluated in the analysis of the LIRA project.

Whitebark Pine – Candidate for listing

Habitat for whitebark pine is not present in the LIRA Project area. Terrain within the LIRA project area only reaches an elevation of just under 5,500 feet. This is well below the known range of whitebark pine at this latitude. Also, habitat for this species was not detected during botanical inventories for this project. Therefore it is concluded that this species does not occur within the LIRA area, and will not be discussed further.

MacFarlane's Four O'Clock – Listed Threatened

MacFarlane's four-o'clock occurs in steep river canyon grassland habitats that are characterized by regionally warm and dry conditions. In these habitats less than 12 inches of precipitation occurs, mostly as rain during winter and spring. In the Imnaha canyon, MacFarlane's four o'clock grows among very arid bunchgrass communities, and rarely, spiny greenbush communities below 3000 feet. Thirteen populations of MacFarlane's four-o'clock are currently known. Three of these populations are found in the Snake River Canyon area (Idaho County, Idaho and Wallowa County, Oregon), seven in the Salmon River area (Idaho County, Idaho), and two in the Imnaha River area (Wallowa County, Oregon).

Suitable habitat for this species does occur in the LIRA project area. The nearest occurrence of this species is just four miles south of the LIRA project area. However extensive inventory work over the last 20 years has not located any populations with in the LIRA project area boundary. This species is well known to the permittee, local weed management crews, and the local botanical community. The project area is a vast landscape with quite a bit of suitable habitat and so it is possible that there are very small patches of this species residing unknown with in the LIRA project area. However, it is considered highly unlikely, given that the best of the potential habitat has been thoroughly inventoried with negative results. Therefore it is concluded that this species does not occur within the LIRA area and will not be discussed further.

Spalding's catchfly (Silene spaldingii) – Listed Threatened

Suitable habitat for this species does occur in the LIRA project area. This species is found predominantly in the Pacific Northwest bunchgrass grasslands and sagebrush-steppe, and occasionally in open-canopy pine stands. In Oregon, Spalding's catchfly grows in deep-soiled, grassland communities dominated by Idaho fescue with prairie junegrass subdominant (USDI 2005). In the canyon environments, the Idaho fescue communities (pure or mixed with Bluebunch wheatgrass) are nearly all relegated to steeper slopes with a northern component to the aspect. Virtually all of the deeper soiled ground found on the benches and areas of less steep terrain have been converted to unsuitable habitat during homesteading times (farm fields, holding pastures, corrals and gathering places)(USDI 2014b – from online USFWS species fact sheet)

For the purposes of conservation, recovery, and delisting, the USFWS determined in the Recovery Plan for Spalding's catchfly (2007) population distribution and size goals for each of the 5 physiographic regions where this species is found. The LIRA project area falls within the Canyon Grasslands region. Of the populations found within the Canyon Grasslands region, five have been selected (meet criteria) as Key Conservation Areas (KSAs), with a goal of seven needed for meeting delisting criteria. Seventy small patches, totaling close to 1128 individual plants of Spalding's catchfly are now known within the LIRA area. Work is ongoing to assign them to a population / element occurrence as defined by the USFWS (USDI 2007). Based on recovery plan criteria, the Spalding's catchfly found in the LIRA project area will likely represent 3 element occurrences. It is also highly likely that these populations will constitute a 6th KSA. Table B-2 below displays the location of Spalding's catchfly relative to LIRA allotments/pastures.

Environmental Consequences

The Evolving Baseline Condition: Unlike many proposed actions the Forest Service analyses, range management is not a new activity, nor an action applied after many years of rest, applied one time, or over a few years as for example, a timber sale contract. Understanding lasting but evolving historical effects and anticipating changing or new effects under a new management plan can be quite challenging. The challenge is compounded relative to TES plants because usually there is little to no research, knowledge, or data on the effects of grazing on very uncommon species. In LIRA there has been domestic livestock grazing to some degree for at least the last two centuries and new range management actions would be applied annually for at least the next 10 years. The existing condition is a condition resulting from a varying history of grazing and changes in grazing animals. Thus, the analysis of effects is partly an assessment of the effects historic, recently past, and present grazing and partly an analysis of the effects of grazing differently under new permitted sideboards as put forth by the alternatives. Even current management has evolved since 2004. Traditionally any problems discovered during field-work were addressed with adjustments through the Annual Operating Instructions (AOI). All grazing impacts are not just from historical actions, although all historical conditions influence all future effects. There are new potential effects with each adjustment, even within each season and with repetition over time. (See chapter one for a discussion of the grazing and social history now reflected in the current condition).

Because livestock grazing has been and is ongoing it can be easy to assume that rare plant species must be evolving with or at least tolerating grazing. However, there are many factors influencing rarity; grazing impacts may contribute to some species rarity and not others.

It is not known how many TES plant individuals and how much habitat may have been lost to human related activities during the last 150 to 200 years. Early collection records don't often report abundance, and many rare species were seldom documented or collected. Often land conversions within a plant's historical range took place before botanical surveys had been done. Without documentation of historical reference conditions, it is difficult to know the extent or number of some rare plant species or if there are more or less now. Instead, we assume that the loss (from homesteading for example) and alteration of large portions of suitable habitat have translated to a decline in some population numbers. Habitat degradation may relate to the limited existence of some plant species. Habitat affiliations and response to disturbance regimes are two of the most prominent factors relating to plant distribution. Therefore life-form and habitat often become the most useful aspects with which to gauge potential impacts.

Without good historical population number estimates for comparison from the time prior to the initiation of livestock use, it is difficult to assess trends over time. Instead shorter term, more evident losses such as loss of reproductive structures, individuals, and habitat degradation are used to infer an impact to TES plants from livestock grazing and trampling.

Effects to Forest Service, Region 6 Sensitive Plant Species

Table B-2. Summary Table of Alternatives and Determinations by Plant Species and Alternative

Alternatives	Determination	Risk	Rationale
Alt B Current Mgt.		some risk	
White Cushion Fleabane	**MIIH	Low	Low potential for impacts from herbivory because of time of year and plant is considered poor forage. Low potential for trampling because of location on the landscape. Some, but low potential for Cumulative effects, mostly from habitat conditions and noxious weeds.
Cordilleran Sedge	MIIH	Moderate	Moderate potential for impacts from herbivory because plant is highly palatable but less so during the proposed seasons of use. Some potential for trampling because of location on the landscape, soft soils and shallow root system. Some, but low potential for Cumulative effects, mostly from livestock-wildfire interactions and noxious weeds.
Dwarf Phacelia	MIIH	Moderate	Low potential for impacts from herbivory because of time of year and plant is very short. Moderate potential for trampling because of location on the landscape and habitat is moist and thus more vulnerable to soil displacement. Some, but low potential for Cumulative effects, mostly from habitat conditions and noxious weeds.
Thinsepal Monkeyflower	***NI	None	Habitat Not Accessible to Livestock
Geyer's Onion	NI	None	Habitat Not Accessible to Livestock
Slender Lipfern	NI	None	Habitat Not Accessible to Livestock
Great Planes Flatsedge	NI	None	Habitat Not Accessible to Livestock
Alt C Prop. Action	Same as for Alt B all species	Some Risk	Similar management impacts to Sensitive plant species as found in Alternative B.
Alt D Rest and Rotation	Same determination as for Atl B for all species	Least Risk of all Alternatives	Still a risk of trampling and habitat impacts to White Cushion Fleabane, Cordilleran Sedge, and Dwarf Phacelia but this alternative provides a substantial reduction in risk by reducing livestock numbers and utilizing both rest and deferment rotational grazing. This reduces the amount of Impact to this resource over time and allows for more recovery between grazing seasons.
Alt E Forage Reserve	Same as for Alt B for all species	Slightly less risk than Alt. B	Similar management impacts to Sensitive plant species as found in Alternative B.
Alt A No Grazing	No Impact to any Sensitive plants	None	Management Activity Removed

** May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species (MIIH): Activities or actions that have effects that are immeasurable, minor or are consistent with Conservation Strategies would receive this conclusion. For populations that are small - or vulnerable - each individual may be important for short and long term viability.

***No Impact (NI): A determination of "No Impact" for sensitive species occurs when a project or activity will have no environmental effects on habitat, individuals, a population or a species.

The four species for which there would be no predicted effects are not discussed further in the DEIS. See the Biological Assessment in the project record for additional information.

Effects Common to All Alternatives, including the No-Action Alternative for Forest Service Region 6 Sensitive Plant Species for plants with a May Impact Determination

Three sensitive plant species are found among grassland habitat in the Imnaha Canyon and have potential to be impacted by livestock management actions. The 3 species discussed in this situation are:

1) **White Cushion Fleabane**, including Davis' White Cushion Fleabane
2) **Cordilleran sedge**
3) **Dwarf Phacelia**

These three species are expected to experience similar threats from gazing, just in different ways or degrees. All the action alternatives propose grazing in all of the pastures, but at differing times, levels, and under different grazing strategies, so each alternative would have some similar kinds of effects but in some instances they may differ in their probability of impacting TES plant species.

This discussion intends to focus on two of the most tangible kinds of effects to TES plants from livestock management; herbivory and trampling actions. All action alternatives propose livestock grazing (with timing and number differences) so the differences in direct effects would be noted only in the season, degree, extent, location, or duration of the potential effect, or how well the project design components are able to mitigate undesirable effects. Indirect effects resulting from alterations to habitat conditions will be discussed where site specific information is available and relevant. Cumulative effects to these TES plants will generally be the same across all the action alternatives but differ by alternative in location, degree, extent, or duration to which they potentially add to the direct and indirect effects. There are no timber management or prescribed fire actions within LIRA to consider and very few roads. Cumulative effects are most likely to come about from recreation activities and impacts resulting from wildfire events, wildlife or the spread of noxious weeds.

Direct and Indirect Effects of No Action Alternative (No Grazing)

White cushion fleabane

This alternative would have No Impact to White cushion fleabane. This species is not known to be palatable to cattle and observations of herbivory are at most incidental. However it tends to

grow on habitat and in locations that are occasionally desirable for fence locations, salting locations, and where livestock travel. Removal of livestock would eliminate these threats, although the degree of potential benefit would be very modest. It would also reduce the threat to habitat conditions from ground disturbance and associated results from livestock grazing.

Cordilleran sedge

This alternative would have No Impact to cordilleran sedge. This species is known to be palatable to cattle but grazing during the current permitted season of use likely only threatens this species in May, as the plant would be dormant before that. Eliminating this use could have a small and incalculable beneficial effect of reducing the potential for any impacts from herbivory. This is a shallow rooted species that grows in soft soil in grasslands and shrublands and often in draws, so eliminating any potential for it to be pulled up while being munched on, or eliminating trampling disturbance that could damage cordilleran sedge plants could have a small and incalculable beneficial effect. Cordilleran sedge does not tend to grow in areas desirable for fence locations, salting locations, or fire suppression line construction locations, so eliminating grazing would have little influence over the continuation of these actions to impact cordilleran sedge.

Dwarf phacelia

This alternative would have No Impact to dwarf phacelia. Although only one site is known along the very western edge of the Toomey allotment, it is probable that more sites exist undetected within the LIRA area. This species resides in moist microsites within grasslands and shrub or timber stand edges. These are sites attractive to livestock in late spring because of the green plant growth supported by the mesic nature of the sites. There may be less benefit from eliminating grazing as currently permitted as it is mostly winter grazing when this plant is dormant and the habitat is frozen or less moist. Some benefit maybe assumed from the component of the grazing schedule that utilizes pastures in April and May.

Direct, Indirect, and Cumulative Effects Common to All Action Alternatives (B, C, D, and E):

White Cushion Fleabane

There are 60 white cushion fleabane occurrences known from across the Wallowa-Whitman National Forest, including 8 occurrences found within the LIRA area. More occurrences are found in allotments directly to the south of the LIRA area.

Little is known about the palatability of this species to livestock. An internet search suggests that Erigeron plants vary considerably in their palatability to different animals. Sheep often eat plants not consumed by cattle or wildlife. Horses and mules fall some place in-between. A very similar erigeron (in stature and habitat affiliation), the cutleaf daisy, is said to be of poor forage value and may increase under some grazing regimes (Craighead 1991). White cushion fleabane may be responding similarly but there is insufficient historical data and monitoring results to determine this. Observations on the Wallowa Valley Ranger District suggests that White cushion fleabane is not selected for forage by cattle and that consumption by cattle is incidental at most, occurring only as the animals forage on the bunchgrass growing around it. In

the LIRA project area this species is typically found in the middle to upper elevation areas. Here it is actively growing from around April through June and has set seed by the end of July. The plants are typically completely dormant from October through March. When the white cushion fleabane is in winter dormancy incidental grazing of dormant structures would have very little effect on the plants lifestyle as the plants have withdrawn much of the compounds they can reuse the next season. At this point grazing (or fire) only affects the volume of thatch available for soil building and other functions. Grazing from April through July could have some negative effects. Through this period white cushion fleabane would be initiating growth for the new season, and a loss of tissue would be more costly to the individual plants as structures (leaves, stems, flowers) removed results in a loss of carbohydrate reserves used to build the structures and a loss of any photosynthetic returns. Still, given its presumed low level of palatability it is not anticipated that incidental grazing impacts to white cushion fleabane would lead to very little plant mortality, and if it did, it would only be a few individuals and not the whole occurrence. Only where animals are repeatedly concentrated could one anticipate lethal levels of plant consumption. At this time of year the influences from trampling would be more likely to play a role in occurrence sustainability.

Trampling is a slightly greater threat to white cushion fleabane because of where it is usually located on the landscape. It tends to grow among bunchgrass stands that cattle seek as forage species. Occasional trampling from general foraging behavior is not usually lethal. However white cushion fleabane can be found along or near ridgelines that are preferred travel ways for livestock and wildlife. Fence-lines are also commonly put in these areas, potentially concentrating trampling effects. In these instances, the trampling impacts tend to occur as trailing impacts where livestock create trails through habitat. Trail creation is lethal to plants along the path. But once established these trails tend to be re-used each season and not change much without some physical change diverting the animals into creating a new trail. Thus new concentrated trampling impacts every season would be unlikely or infrequent. Generally it is expected that not more than a few individuals would be impacted from trampling in any given grazing season.

Water developments and salt (or other supplement) placement concentrates livestock use. White cushion fleabane is generally not located in terrain where water developments are feasible. However desirable locations for salt grounds include ridges, knolls, or gentle slopes (Holecheck 2001). By design, future salt placement would be implemented in a way that would draw livestock away from white cushion fleabane occurrences, thus reducing the potential for trampling impacts. The exact distance that salt should be separated from white cushion fleabane or any TES plant site, so that concentrated impacts are eliminated is not known and varies by the local topography. A guideline distance of ¼ mile is prescribed as a general rule of thumb. This distance is arrived at by extrapolating percent utilization levels of rangeland plants found around both watering sources and salt sources as reported by Holecheck (2001). He surmised from available literature that one could expect up to 50% utilization of available forage up to ½ mile from a water source and slightly less utilization from a half mile from a salting source. Thus it is proposed that keeping salt ¼ mile from TES plant sites would serve to protect these locations from detrimental levels of trailing and herbivory.

Cumulative impacts to white cushion fleabane and its habitat within the LIRA project area are assumed to occur only from recreational activities, wildfire events, wildfire suppression actions, wildlife use, and the presence of and treatment of noxious weed patches.

Recreation Actions

Without a recreation feature (trail or campground) that would concentrate recreational use it is assumed that impacts from recreational activities (foot travel from hikers/pack animals, hunting activities, camping etc.) would be very dispersed and infrequent.

Wildfire and Wildfire Suppression incidents

Little is known or published on the effects of fire on white cushion fleabane. Experience and observations on the district indicate that wildfire has very little effect on this species. Generally, during wildfire events in the grasslands that contain white cushion fleabane the fires travel through its habitat quickly, burning only some of the aerial stems and leaves but not killing the plants. The greatest loss to the plant is in the destruction of some of that year's seed. Most of the time, the plants are observed to vigorously sprout back the following season.

Wildlife

Little is known on the effects of wildlife use of white cushion fleabane plants or habitat. Wildlife generally causes different and less extensive patterns of trailing impacts than cattle. Wildlife preference for white cushion fleabane as a forage species has not been observed to be measurably different from that discussed for cattle.

Noxious Weeds

Through policy and procedure, noxious weed treatments are coordinated with TES plant managers to avoid unintended impacts to TES plant occurrences. Other than medusa-head, most of the noxious weeds in this project area are forb species. When noxious weed treatments are successful, TES plants benefit from the reduction in competition for resources from noxious weeds. When noxious weed treatments cannot be completed TES species like white cushion fleabane face strong competitive threats and potentially localized extirpation if the weeds take over their entire suitable habitat. Noxious weed species can displace grass species but usually displace the native forb species growing between the bunchgrasses first. Even under the best of treatment plans, it is expected that over time some individuals of white cushion fleabane would be impacted by the spread of noxious weeds.

Effects from climate change

The effects of climate change are speculative, but it has the potential to affect rare plants, including white cushion fleabane. Researchers speculate that a warming climate will alter precipitation patterns, with some regions becoming drier and others wetter. Within the Pacific Northwest, a recent model predicts warmer and wetter winters in 80 years. Being stationary, plants must migrate through dispersal, colonization and recruitment strategies, a relatively slow process compared to mobile organisms. Some researchers believe that plant species will not be able to migrate at a pace dictated by a warming climate, which would isolate and eventually doom some species, unless new adaptations arise to cope with a changing environment.

Direct , Indirect and Cumulative Effects Specific to Alternatives B to White Cushion Fleabane

Direct, Indirect, and Cumulative effects have all been identified as small or immeasurable but there is no way to quantify how many individuals might be eliminated. Forest Service Policy and Forest Plan guidance to protect sensitive plants when planning future activities would also help minimize the potential for sustained adverse effects to sensitive plants from federal actions. Thus without a better system of quantifying these impacts it is difficult to identify enough effects to rise to the level of certain adverse effects to the viability of the species as it exists in the project area or on the Wallowa-Whitman National Forest. Only a small number of individuals are expected to be impacted. It is professional judgment that the number of white cushion fleabane impacted would be small enough to not adversely impact the populations within the LIRA project area.

Therefore this analysis concludes that Alternative B of the LIRA project May Impact Individuals Or Habitat of White Cushion Fleabane, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.

Direct and Indirect Effects Specific to Alternatives C on White Cushion Fleabane

Alternative C – The Proposed Action

White cushion fleabane has not been found in the Toomey allotment so changes to this allotment's grazing scheme would not change the potential effects to this species from that discussed in alternative B. The effects summary, conclusions and determinations for this species would be the same as that for alternative B.

Alternative C would have the same affect to white cushion fleabane**,** therefore it is concluded that **Alternative C of the LIRA project May Impact Individuals Or Habitat of white cushion fleabane, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.**

Direct and Indirect Effects Specific to Alternatives D on White Cushion Fleabane

The rest rotation of the entire Lone Pine allotment would inherently decrease the potential effects to white cushion fleabane in this allotment simply by reducing the frequency over time that those occurrences would encounter the presence of livestock. However the degree of reduction would be difficult to measure. The potential for impacts would be lower than current management and alternative C, but would not be eliminated. The same would be true for white cushion fleabane in the Rowley pasture of the Cow Creek allotment. The summary of effects to white cushion fleabane would be virtually the same as with Alternative B in the other pastures where occurrences reside.

The risk of impacts to white cushion fleabane is clearly but immeasurably reduced in this alternative by grazing near the occurrences less frequently but the potential for some impacts has not been eliminated. **Therefore this analysis concludes that Alternative D of the LIRA project May Impact Individuals Or Habitat of White Cushion Fleabane, But Will Not Likely**

Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.

Direct and Indirect Effects Specific to Alternatives E on White Cushion Fleabane

The effects to White Cushion Fleabane in Alternative E are virtually the same as that stated for Alternative B and C. There might be a very slight difference in effects to the White Cushion Fleabane in the Deep Creek pasture of the Lone Pine allotment because this and all Lone Pine pastures would be grazed 3 out of every 5 years, rather than every year. The reduced frequency of use in the Lone Pine allotment would inherently decrease the potential effects (discussed in detail above) to White Cushion Fleabane in this allotment simply by reducing the frequency over time that those occurrences would encounter the presence of livestock. However the degree of reduction would be difficult to measure. The potential for impacts would be lower than current management and alternative C, but would not be eliminated. Effects to White Cushion Fleabane would be virtually the same as with Alternative C and B in the other pastures where occurrences reside.

A couple factors limit any potential benefit of reducing the frequency of Lone Pine use. Livestock that are new to an area and lack the knowledge of where to find forage, water, and salt, often express different and unpredictable trailing and foraging behavior compared to that expected of a herd whose cows have experience in the area. Meeting standards will be more difficult and at a greater risk of failure. Predicting how this might change effects to sensitive plants from what has been discussed is difficult. This scenario can also be compounded by the potential situation where more than one permittee is trying to use the same allotment at the same time. Once there is added complexity to the management environment, there is added risk that management will not go as planned. However none of these concerns are measurable.

Over all there is no way to measure the difference in this alternative compared to Alternative C with respect to white cushion fleabane. Thus the analysis, conclusions, and summary would be the same as that stated for Alternative C. **Therefore this analysis concludes that Alternative E of the LIRA project May Impact Individuals Or Habitat of white cushion fleabane, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.**

Common Direct Indirect and Cumulative Effects from Grazing Activities (Alternatives B, C, D, and E) on Cordilleran sedge

The cordilleran sedge is small bunchgrass-like tufted sedge found in grasslands and the ecotone between grasslands and shrub stands or timber stands. Its leaves are quite palatable and it is shallow rooted. There are 62 cordilleran sedge occurrences known from across the Wallowa-Whitman National Forest, including 3 occurrences found within the LIRA area. More occurrences are found in allotments to the south of the LIRA area.

As with the majority of sensitive plant species, conclusive information as to their growth habits and response to, or tolerance of, various land management influences such as grazing, is largely unknown. Due to a lack of historical reference conditions for this species, it is not possible to determine whether past grazing has negatively impacted populations of cordilleran

sedge in this analysis area. Grazing impacts could occur if the timing of grazing was during late spring or early fall. Cordilleran sedge is known to be palatable to livestock, and because of its shallow root system is prone to being displaced during foraging by cattle (CWG 2008). Spring and fall are when moisture is abundant and the plant is most palatable. Moist soils at those times of year also make it easier to uproot the plant during foraging actions. In certain settings the cordilleran sedge can avoid herbivory by being interspersed among little openings in a surrounding shrub or conifer overstory that can impede livestock access to the plant to some degree. But here, it also has to compete more with the overstory vegetation for resources. In some cases, livestock force their way into these thickets in search of thermal cover thereby trampling some plants. Over the winter months, the Cordilleran sedge is likely to be less desirable to foraging cattle than the adjacent bunchgrass grasslands because the grass is a more desirable forage species and contain more residual material from the previous season's growth.

Cordilleran sedge is at most risk from trampling when livestock congregate in draws in search of water, forage or thermal cover. Salting locations are chosen to avoid moist areas, so *cordilleran sedge* in timbered draws would face little threat from that activity. The standard protective buffer (as discussed above) of salting away from known Sensitive plant locations would also provide some additional protection.

Cumulative impacts to cordilleran sedge and its habitat within the LIRA project area are assumed to occur only from recreational activities, wildfire, wildfire suppression actions, wildlife use, and the presence of and treatment of noxious weed patches.

Recreation Actions

Generally there are very few recreational impacts to cordilleran sedge, especially to the kinds of recreation activities found within the LIRA project area. Very few roads exist within the LIRA area. Cordilleran sedge has not been found near existing roads in the project are. Trails are the major transportation and recreation feature of the upland terrain within the LIRA area. Trails in the vicinity of cordilleran sedge can lead to impacts to individuals adjacent to the trail from humans or animals traveling outside the trail tread. Trails traversing through small draws and through shrub stands such as ninebark would pose the most risk of tramping and herbivory to undiscovered cordilleran sedge plants. Horses and mules tend to eat anything along the way when enlisted as packstock and they often stray off the existing tread when the trail is wet. Trail-side impacts to cordilleran sedge in LIRA have not been noted at this time. Without a recreation feature (trail or campground) that would concentrate recreational use it is assumed that impacts from recreational activities (foot travel for hunting, camping etc.) would be very dispersed and infrequent.

Wildfire and Wildfire Suppression incidents

Residing in Hells Canyon this species would have evolved under a regime of periodic fire events across this landscape. Still, this species response to fire is not completely understood and most of our understanding comes from observations associated with wildfire events and not experiments. Where fire passes through one of the cordilleran sedge sites it would likely consume the above ground leafy vegetation, and it could also consume that season's seed production. The principal investigator for Environmental Consultants, Duncan Thomas, Ph.D.

often (2009 contract report) finds occurrences underneath forest canopy and along the transition between grasslands and forest. In subsequent conversations with the Carex Working Group and the Forest Service, Thomas observed that following a fire cordilleran sedge can regenerate in the light soil throughout a draw. The plants thrive for a few years but gradually decline as they are crowded out by other plants, including elk sedge and low shrubs, thereby decreasing available light and increasing competition for water & nutrients. Thomas believes that the species regenerates well after fire, and then declines in vigor as mature forest/shrub vegetation establishes. The population persists longest along the forest-grassland ecotone where it is more accessible to livestock. Where areas of livestock management overlap grazing management it seems to confound these observations.

Wildlife

Little is known on the effects of wildlife use of cordilleran sedge plants or habitat. Wildlife generally causes different and less extensive patterns of trailing impacts than cattle. Wildlife preference for cordilleran sedge as a forage species has not been observed to be measurably different from that discussed for cattle. Elk numbers within the LIRA area are estimated to exceed that desired for the management unit but the effects of these numbers on cordilleran sedge are undetermined.

Noxious Weeds

Through policy and procedure, noxious weed treatments are coordinated with TES plant managers to avoid unintended impacts to TES plant occurrences. Other than medusa-head, most of the noxious weeds we deal with in this project area are forb species. When noxious weed treatments are successful, TES plants benefit from the reduction in competition for resources from noxious weeds. When noxious weed treatments cannot be completed TES species like cordilleran sedge face strong competitive threats and potentially localized extirpation if the weeds take over their entire suitable habitat. Noxious weed species can displace grass species but usually displace the native forb species growing between the bunchgrasses first. Little is known of the competitive ability cordilleran sedge has to resist invasion from non-native vegetation. Even under the best of treatment plans, it is expected that over time some individuals of cordilleran sedge would be impacted by the spread of noxious weeds or other undesirable invasive species.

Effects from climate change

The effects of climate change are speculative, but it has the potential to affect rare plants, including Spalding's catch-fly. Researchers speculate that a warming climate will alter precipitation patterns, with some regions becoming drier and others wetter. Within the Pacific Northwest, a recent model predicts warmer and wetter winters in 80 years. Being stationary, plants must migrate through dispersal, colonization and recruitment strategies, a relatively slow process compared to mobile organisms. Some researchers believe that plant species will not be able to migrate at a pace dictated by a warming climate, which would isolate and eventually doom some species, unless new adaptations arise to cope with a changing environment.

Direct Indirect and Cumulative Effects Specific to Alternatives B on Cordilleran sedge

The effects of livestock herbivory on cordilleran sedge is expected to impact some individuals as the plant is palatable to livestock and wildlife and several of the pastures where it resides would be used late enough in the season to intersect its early growth period when it is highly palatable and vulnerable to tissue loss. The potential for this to occur is often mitigated somewhat by the thickness of the surrounding vegetation. However this protection can be greatly diminished by wildfire as that would open up the shrub stands, and may stimulate additional cordilleran sedge reproduction. There is also a slight risk that cordilleran sedge could incur some level of trampling impacts because of their location adjacent to travel and foraging corridors. Given the conditions of the occurrences and the actions proposed in Alternative B, it is concluded that any impacts from trampling would most likely be incidental. Habitat conditions within this allotment for this species seem to be mixed but none were noted to be critically degraded. Cumulative impact from other ongoing activities within the allotment area was also found to have a potential to impact cordilleran sedge at levels that were probably incidental.

Direct, Indirect, and Cumulative effects have all been identified as small, infrequent or incidental. Although the long-term outlook for cordilleran sedge habitat from the effects of fire or the spread of noxious weeds is concerning, it is currently incalculable. Forest Service Policy and Forest Plan guidance to protect sensitive plants when planning future activities would also help minimize the potential for sustained adverse effects to sensitive plants from federal actions. Thus without a better system of quantifying these impacts it is difficult to identify enough effects to rise to the level of certain adverse effects to the viability of the species as it exists in the project area or on the Wallowa-Whitman National Forest. Only a small number of individuals are expected to be impacted.

Therefore this analysis concludes that Alternative B of the LIRA project May Impact Individuals Or Habitat of Cordilleran sedge, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.

Direct and Indirect Effects Specific to Alternatives C on Cordilleran sedge

Alternative C differs little from alternative B in respect to the Sensitive plant resource (see discussion above under White Cushion Fleabane).

In the Toomey allotment, cordilleran sedge has only been found in the Tully Creek pasture, so changes to this allotment's grazing scheme would not change the potential effects to this species from that discussed in alternative B. The effects conclusions and determinations for this species would be the same as that for alternative B.

Alternative C would have the same affect to cordilleran sedge as alternative B**,** therefore it is concluded that **Alternative C of the LIRA project May Impact Individuals Or Habitat of Cordilleran sedge, But Will Not Likely Contribute To A Trend Towards Federal Listing or Cause A Loss Of Viability To The Population Or Species.**

Direct and Indirect Effects Specific to Alternatives D on Cordilleran sedge

Cordilleran sedge has been found in the Cow Creek, Rhodes Creek and Toomey allotments. In the Cow Creek allotment the cordilleran sedge occurrence is located in the Rowley pasture. In the Rhodes Creek allotment the cordilleran sedge occurrence is located in the East lightning

bench pasture. In the Toomey allotment the cordilleran sedge occurrence is located in Tully Creek pasture.

This alternative has the potential to greatly reduce the risk of Impacts to all of the known cordilleran sedge occurrences compared to alternative B, because every pasture where it is found is included in a rest rotational schedule under this alternative. The rest rotation in these allotments would inherently decrease the potential effects (discussed in detail above) to cordilleran sedge simply by reducing the frequency over time that those occurrences would encounter the presence of livestock. However the degree of reduction would be difficult to measure. The potential for impacts would be lower than current management (Alternative B) and alternative C, but would not be eliminated. The effects summary and conclusions would be similar but less than that stated for Alternative B

The risk of impacts to cordilleran sedge is clearly but immeasurably reduced in this alternative by grazing near the occurrences less frequently but the potential for some impacts has not been entirely eliminated. **Therefore this analysis concludes that Alternative D of the LIRA project May Impact Individuals or Habitat of cordilleran sedge, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause A Loss of Viability To The Population or Species.**

Direct, Indirect, and Cumulative Effects Specific to Alternatives E on Cordilleran sedge

The difference in this alternative is expressed in how the Lone Pine allotment would be used. The other allotments would be used the same as in Alternative B. No cordilleran sedge has been recorded in the Lone Pine allotment; therefore any difference in this alternative compared to Alternative C is immeasurable. Thus the analysis and conclusions would be the same as that stated for Alternative C.

Therefore this analysis concludes that Alternative E of the LIRA project May Impact Individuals or Habitat of Cordilleran sedge, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause a Loss of Viability To The Population or Species.

Common Direct , Indirect, and Cumulative Effects from Grazing Activities (Alternatives B,C,D,E) on Dwarf Phacelia

Dwarf Phacelia is a scattered endemic ephemeral annual known from mid-montane areas of the Intermountain Region. It has been collected from near seeps in sagebrush and aspen habitat. More often it is found on vernally wet side slopes of grassland and meadow complexes. These habitats are often within a larger matrix of bunchgrass or snowberry stands. The plant is dependent upon spring and early summer soil moisture for flowering. Soil conditions are usually well drained yet silty and of basalt parent material. Typical sites are at least partially sunny and open and range from 4,500 to 8,200 feet.

There is one known occurrence of dwarf phacelia within the LIRA area and 16 total occurrences across the Forest with virtually all of those residing in the Hells Canyon National Recreation Area. This is a very difficult species to detect. There is a vast amount of suitable habitat with in

the LIRA area and it is highly likely that additional occurrences exist undetected. The effects to those occurrences would be the same as that discussed here for the known occurrence.

As with the majority of sensitive plant species, conclusive information as to their growth habits and response to or tolerance of grazing, is largely unknown. Grazing impacts could occur if the timing of grazing was during spring or early summer when Dwarf Phacelia habitat is moist and still green. Dwarf phacelia response to livestock grazing is unknown but it may be able to tolerate incidental use (Moseley 1995). Herbivory impacts to this species are not very likely within the LIRA project as little of the grazing season overlaps the early spring period. Also, in terms of palatability, it is very small and probably rarely to never grazed unless in an area of livestock concentration.

Trampling would be the main mechanism of impact. Ephemerally moist soils are easily displaced by heavy, hooved animals. Its habitat matrix contains many other palatable species that would draw in livestock. How spring/summer ephemerally moist habitats respond to winter precipitation and freeze-thaw cycles is not well understood, but they are likely vulnerable to hoof impacts. Most known dwarf phacelia sites are found on gently sloping ground so compaction may be more of an issue than soil shearing or displacement.

Habitat adjacent to spring sites is probably at the greatest risk from wildlife and livestock impacts as those habitats draw in and concentrate use. By policy and procedure future spring developments will receive site specific analyses that would provide an opportunity to protect any dwarf phacelia discovered in the area. Unprotected spring sites are at the greatest risk of receiving detrimentally high levels of trampling impacts. The edges of small riparian areas of headwater draws in the upper elevations of the LIRA project area are likely to face a similar risk of trampling impacts. Dwarf phacelia is not likely to be found in the lower elevation terrain of the LIRA project and so most of the proposed winter grazing would pose little threats to this species. The areas that are most at risk would be the shoulders of the main ridgelines and upper 1/3 of the terrain within the LIRA area. In these locations the risk of impact to dwarf phacelia is greatest when livestock are grazing near the end of the grazing season in late winter or early spring, and when the herds are being moved between one side canyon and another or on to summer allotments.

Salting locations are chosen to avoid moist areas, so there should be no direct effects from that activity. The standard protective buffer (as discussed above) of salting away from known Sensitive plant locations would also provide some additional protection.

Cumulative impacts to dwarf phacelia and its habitat within the LIRA project area are assumed to occur only from recreational activities, wildfire, wildfire suppression actions, wildlife use, and the presence of and treatment of noxious weed patches.

Recreation Actions

Very few roads exist within the LIRA area. Dwarf Phacelia has not been found near existing roads in the project are. Trails are the major transportation and recreation feature of the upland terrain within the LIRA area. Trails in the vicinity of dwarf phacelia could lead to impacts to individuals adjacent to the trail from humans or animals traveling outside the trail tread. Horses and mules tend to eat anything along the way when enlisted as packstock and they often stray

off the existing tread when the trail is wet. Packstock can also find dwarf phacelia habitat enticing as it provides more succulent forage in early summer when most of the bunchgrasses have entered a summer dormant period. So far no dwarf phacelia occurrences have been found adjacent to system trails so recreational use would pose a very small risk of impacts. Trail-side impacts to White Cushion Fleabane in LIRA are found to be very limited at this time. Without a recreation feature (trail or campground) that would concentrate recreational use it is assumed that impacts from recreational activities (foot travel for hunting, camping etc.) would be very dispersed and infrequent.

Wildfire and Wildfire Suppression incidents

Residing in Hells Canyon this species would have evolved under a regime of periodic fire events across this landscape. Still, the response to fire of this small annual plant is not understood. How the seed bank of this annual forb would respond to nearby fire on the landscape is unknown. Experience and observations on the district indicate that prescribed fire (Upper Imnaha project of 1999 – USFS 1999) has very little effect on this species. Effects to this species from wildfire are expected to be minimal as its critical growth period is late spring to early summer when wild fire activities rarely occur. The LIRA project area does not have a plan to implement prescribed fire. Generally, during wildfire events in the grasslands that contain White Cushion Fleabane, the fires travel through its habitat quickly, and by not lingering long pose only a small risk to the soil seed bank. Dwarf phacelia habitat is generally slightly moister than the surrounding grassland matrix and that should further reduce the potential wildfire intensity. There is likely some unquantifiable risk that fire suppression actions could impact undocumented occurrences. Prediction when or where fire line will be prescribed is virtually impossible. In some cases TES plant sites can be avoided by communicating areas to avoid to the fire management team, but this is usually not very effective during the initial attach phases of a fire. It should be assumed that, over time some individuals would be impacted from this activity but line construction usually does not impact whole occurrences and occurs on a very tiny fraction of the landscape.

Wildlife

Little is known on the effects of wildlife use of dwarf phacelia plants or habitat. Wildlife generally causes different and less extensive patterns of trailing impacts than cattle. The potential for Wildlife to graze on dwarf phacelia is pretty unlikely but trampling impacts are probable.

Noxious Weeds

Through policy and procedure, noxious weed treatments are coordinated with TES plant managers to avoid unintended impacts to TES plant occurrences. Other than medusa-head, most of the noxious weeds we deal with in this project area are forb species. When noxious weed treatments are successful, TES plants benefit from the reduction in competition for resources from noxious weeds. When noxious weed treatments cannot be completed TES species like dwarf phacelia face strong competitive threats and potentially localized extirpation if the weeds take over their entire suitable habitat. Dwarf phacelia habitat is likely just as vulnerable to invasion from aggressive non-native species as bluebunch wheatgrass stands. Even under the best of treatment plans, it is expected that over time some individuals of dwarf

phacelia would be impacted by the spread of noxious weeds or other undesirable invasive species.

Effects from climate change

The effects of climate change are speculative, but it has the potential to affect rare plants, including Spalding's catch-fly. Researchers speculate that a warming climate will alter precipitation patterns, with some regions becoming drier and others wetter. Within the Pacific Northwest, a recent model predicts warmer and wetter winters in 80 years. Being stationary, plants must migrate through dispersal, colonization and recruitment strategies, a relatively slow process compared to mobile organisms. Some researchers believe that plant species will not be able to migrate at a pace dictated by a warming climate, which would isolate and eventually doom some species, unless new adaptations arise to cope with a changing environment.

Direct Indirect and Cumulative Effects Specific to Alternatives B on Dwarf Phacelia

Dwarf phacelia has only been found in the Tully pasture of the Toomey Allotment (this is the pasture being reassigned from Rhodes Creek allotment to the Toomey allotment in all action alternatives). Given the kind of habitat where this species is found and the large amount of suitable habitat within the project area, it is likely that some undocumented patches of these species exist elsewhere in the project area. It is assumed that effects to undocumented occurrences would be similar to those at known occurrences.

The Tulley pasture occurrence is some place in the vicinity of Buckhorn springs along the edge of the pasture but its exact location is undermined. Occurrence size data is missing from this site as the rare plant database was populated from a historic collection and herbarium sheet data was limited relative to its size and distribution information. Although botanists have not been able to relocate this occurrence, the original location is probably within the area now encompassed by a fence surrounding the Buckhorn spring campground – within which the spring site is also protected. So it is unlikely that the original occurrence would be impacted by livestock herbivory or trampling. However it is difficult to predict where this species might have migrated to across the adjacent landscape. Where that terrain contains suitable habitat, these ephemerally moist sites would be especially at risk of impacts from livestock use in the spring season. Currently the potential for impacts cannot be quantified.

Because of the constructed features of the Buckhorn campground facility, recreational trampling of this occurrence is also unlikely, although undiscovered patches adjacent to this area could see very limited trampling impacts from dispersed foot travel. This facility would be protected from wildfire events but adjacent ground would be used for line construction to protect the campground. This was done most recently in the 2012 Cache Creek fire. Initial attack hand line would not necessarily avoid dwarf phacelia habitat, so some individuals could be impacted from that action, but predicting the amount of plants or habitat impacted from this activity is impossible. There is no trail or other recreation facility in the area to pose a recreational trampling threat. Trail 1724, the Tully Creek stock driveway is nearly a mile away.

There are several yellow starthistle patches in the vicinity of this area. Most of these patches are scattered in steep and rocky rim terrain down slope of Buckhorn springs. Treatment of

these sites has been limited and stalled as access is extremely difficult and expensive. If containment of these sites cannot be attained, this noxious weed species could be a significant threat to dwarf phacelia in the long term.

Summary and conclusion of effects to Dwarf Phacelia from Alternative B – Current Management.

The effects of livestock herbivory on dwarf phacelia is expected to be slight as it does not appear to be a preferred forage species and is essentially too small to be grazed, but its habitat could be impacted by late winter and early spring grazing when associated species are highly palatable. Thus there is a slightly greater risk that dwarf phacelia could incur some level of trampling impacts as livestock seek other forage species in its moist habitat. Given the conditions of the occurrences and the actions proposed in Alternative B, it is concluded that any impacts from trampling would most likely be incidental. Cumulative impact from other ongoing activities within the allotment area was also found to be impacting dwarf phacelia at levels too low to measure.

Direct, Indirect, and Cumulative effects have all been identified as small or immeasurable. Forest Service Policy and Forest Plan guidance to protect sensitive plants when planning future activities would also help minimize the potential for sustained adverse effects to sensitive plants from federal actions. Thus without a better system of quantifying these impacts it is difficult to identify enough effects to rise to the level of certain adverse effects to the viability of the species as it exists in the project area or on the Wallowa-Whitman National Forest. Only a small number of individuals are expected to be impacted.

Therefore this analysis concludes that Alternative B of the LIRA project May Impact Individuals or Habitat of Dwarf Phacelia, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause a Loss of Viability To The Population or Species.

Direct Indirect and Cumulative Effects Specific to Alternatives C on Dwarf Phacelia

In the Toomey allotment, dwarf phacelia has only been found in the Tully Creek pasture, so changes to this allotment's grazing scheme would not change the potential effects to this species from that discussed in alternative B. The effects conclusions and determinations for this species would be the same as that for alternative B.

Alternative C would have the same affect to dwarf phacelia alternative B**,** therefore it is concluded that **Alternative C of the LIRA project May Impact Individuals or Habitat of Dwarf Phacelia, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause A Loss of Viability To the Population or Species.**

Direct Indirect and Cumulative Effects Specific to Alternatives D on Dwarf Phacelia

The dwarf phacelia has only been found in the Tully Creek pasture of the Toomey allotment. This Alternative would allow for rest from grazing 1 year in every 3 years for the entire Toomey Allotment.

The rest rotation of the entire Toomey allotment would inherently decrease the potential effects (discussed in detail above) to dwarf phacelia in this allotment simply by reducing the frequency over time that those occurrences would encounter the presence of livestock. However the degree of reduction would be difficult to measure. The potential for impacts would be lower than current management and alternative B, but would not be eliminated.

The risk of impacts to dwarf phacelia is clearly but immeasurably reduced in this alternative by grazing near the occurrences less frequently but the potential for some impacts has not been completely eliminated. **Therefore this analysis concludes that Alternative D of the LIRA project May Impact Individuals or Habitat of Dwarf Phacelia, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause a Loss of Viability To the Population or Species.**

Direct Indirect and Cumulative Effects Specific to Alternatives E on Dwarf Phacelia

No dwarf phacelia has been recorded in the Lone Pine allotment; therefore any difference in this alternative compared to Alternative C is immeasurable. Thus the analysis and conclusions would be the same as that stated for Alternative C.

Therefore this analysis concludes that Alternative E of the LIRA project May Impact Individuals or Habitat of Dwarf Phacelia, But Will Not Likely Contribute To a Trend Towards Federal Listing or Cause a Loss Of Viability To The Population or Species.

Effects to TES Listed Species

Effects Common to All Alternatives, including the No-Action Alternative for TES Listed and Candidate Plant Species

Direct and Indirect Effects:

Whitebark Pine

All alternatives would result in No Effect to Whitebark Pine. The project area lacks this species or suitable habitat for this species.

MacFarlane's four-o'clock

All alternatives would result in No Effect to MacFarlane's four-o'clock.

Spalding's catchfly

Because of its presence within the project area and differential responses to different grazing regimes, the effects to this species are discussed and determined in each of the following sections addressing each action alternative (B, C, D, and E).

Summary of Effects and Effects Determination

Most of this suite of species is geographically separated from the activities associated with livestock management. **Therefore it is determined that all LIRA alternatives would have No Effect to Whitebark Pine or McFarlane's four o'clock. Spalding's catchfly determinations are explained in the analysis of alternatives below and summarized in Table B-3 below.**

Table B-3 Summarizes the Effects and Determinations for all Alternatives to Spalding's Catchfly.

Alternative	Determination	Risk of impacts to Spalding's catchfly	Alternative Comparison of Effects
Alternative B - Current Management	LAA	Risky	Small risk of effects from Herbivory of Spalding's catchfly. Risk of Livestock trampling combining with minor cumulative effects
Alternative C – The Proposed Action	*LAA	Slightly Less Risky	Risk of effecting Spalding's catchfly is nearly the same as Alt B, there is a reduction in trampling risks from this alternative in 3 Toomey Allotment pastures
Alternative D – Rest/Rotation	LAA	Least Risky	Still a risk of trampling and habitat impacts to Spalding's catchfly but this alternative provides a substantial reduction in risk by reducing livestock numbers and utilizing both rest and deferment rotational grazing. This reduces the amount of Impact to this resource over time and allows for more recovery between grazing seasons
Alternative E – Forage Reserve	LAA	Slightly Less Risky	Risk of effecting Spalding's catchfly is nearly the same as Alt B but there is a reduction in trampling risks from this alternative by only using the Lone Pine allotment 3 of every 5 years
No Grazing Alternative (A)	No Effect	No Risk	Livestock management actions removed from the landscape

*May Effect - Likely To Adversely Affect (LAA)

If the determination in the biological assessment is that the project May Effect - Likely To Adversely Affect a listed species or critical habitat, formal consultation must be initiated (50 CFR 402.12). Formal consultation must be requested in writing through the Forest Supervisor (FSM 2670.44) to the appropriate FWS Field Supervisor, or NMFS office.

Effects Common to Spalding's catchfly Across Its Range

On December 3, 1999 the USFWS published a proposed rule to list Spalding's catchfly as Threatened (64 FR 67814). The final rule for listing was published October 10, 2001 (66 FR 51597). The Final Recovery Plan for Spalding's catchfly was released on September 7, 2007.

Extensive range-wide losses of suitable sites for Spalding's catchfly relate to a combination of habitat conversion to agricultural uses in tandem with extensive degradation by weed invasion by multiple species. As detailed in the Final Recovery Plan (USFWS 2007), the resulting habitat fragmentation has left primarily small genetically isolated populations. More than half of the

remaining populations are on private land, with the majority of these unprotected (USFWS 2007).

The Conservation Strategy for Spalding's catchfly (Hill and Gray 2004) discusses in detail the causes of rarity, the reasons for Federal Listing, and the current and future threats to the species. According to the Conservation Strategy, the threats of greatest concern relative to the continued existence of Spalding's catchfly included, in order of priority:

1) habitat degradation from weed invasion and livestock grazing

2) habitat loss and concurrent population fragmentation with associated pressures typical of small populations, i.e., pollinator limitation and inbreeding depression,

3) alteration of fire regimes and vegetation character through long-term fire suppression

4) increased fire frequencies and out-of-season fires resulting primarily from ecological modifications attributed to invasive weed population establishment

5) herbivory by domestic livestock, native ungulates, rodents and insects, i.e., seed predation

6) herbicide drift

7) prolonged drought and global climate modifications

The 2009 5 year status review (USFWS 2009) found that overall Spalding's catchfly populations were still not secure from these threats. For more detailed information about the lifecycle of the species, conservation, recovery, and delisting refer to the plant species Biological Evaluation for the LIRA project in the project file.

Spalding's catchfly is a long-lived perennial herb with a lifespan that is poorly documented, but may well be in excess of 50-years in some specimens (Lesica pers. comm. 2011). The species has a large taproot that may grow to three feet or more in length and can store reserves for multiple seasons until conditions are conducive to flowering (Lesica 1997). The large taproot is instrumental in allowing the species to enter multi-year dormancy in some cases – occasionally up to 3 seasons in length (Lesica 1999). Spalding's catchfly can exhibit prolonged dormancy (Hill and Gray 2004b), with plants persisting underground on stored root reserves. Lesica (1995, 1999) found that most plants spend nearly half their summers in a dormant state, and that in a given year, depending on climatic conditions, between 10 and 70 percent of the individuals in a site could be dormant. Reproduction is by seed only (Lesica & Heidel 1996), and both that study and Lesica's 1988 publication suggest that Spalding's catchfly is an obligate or para-obligate out-crossing species requiring insect pollination in order to set viable seed.

The typical flowering period across most of its range had been reported as from July through August with some specimens still flowering well into September (Lesica 1995). In the lower Imanah Canyon this flowering starts in early June. The seed pods then commence to mature from late June through August, at which time the plants senesce and become dormant. The growth period for the species range-wide has been documented as being from April 1St through October 31st (Hill and Gray 2004, Lesica 1997). Virtually nothing is known about seed dispersal

mechanisms. The seed is small and slightly flattened enabling it to possibly blow around like soil particles. It is also surmised that the sticky nature of the plant makes it possible for portions of the plant to break off and stick to the fur of passing animals. This method of seed dispersal is probably infrequent but may provide an opportunity for more long distance dispersal. Seeds of Spalding's catchfly typically germinate in the spring. The seedlings grow for approximately two months before entering dormancy. Cooler early fall temperatures and rains may support a further seasonal growth period (Lesica 1988). The plants grow as only as broad-leaved rosettes during their first year and may produce rosettes, vegetative stems or flowering stems in subsequent years.

Seed germination on the Zumwalt Prairie was observed to start in early May (Taylor et al. 2012). Seedling emergence in the Imnaha Canyon has not been studies but is expected to be earlier because of the lower, warmer environment. It is likely that seedlings could emerge in the Canyon in April. Factors influencing Spalding's catchfly seed production are but one factor influencing its sustainability. Even when Spalding's catchfly does succeed in producing seed, the quality of seed may be low. A study of germination rates of seeds collected from the Zumwalt population found that only 9% of seeds germinated (Taylor and DeBano 2012). Using that data on successful levels of fruit production along with estimates of seed production and seed viability, they estimated that across their study area, each Spalding's catchfly plant produces on average approximately 1 viable seed per plant per year. Once germinated, factors affecting seedling establishment are poorly understood, but is assumed to be most influenced by spring moisture and habitat integrity (USFWS 2007). In a demography study in Montana, Lesica (1997) found that significant recruitment (germination and seedling survival) of Spalding's catchfly occurred in only 2 of 7 years, indicating recruitment is a rare and sporadic event.

Direct and Indirect Effects for No Action Alternative (No Grazing):

This alternative might result in a slightly Beneficial Effect to Spalding's catchfly (Silene spaldingii). This alternative has the potential to relieve Spalding's catchfly from one of the main habitat stresses it faces in the canyon. It may also relieve some stress on the habitat for the associated ground nesting bee pollinators. However, it would be difficult to measure the effectiveness of removing an activity.

Spalding's catchfly is known from nearly 70 sites in 3 of the 4 allotments being addressed in this range analysis. On average, the numbers of individuals at each site is low and the overall occurrence level is low compared to the occurrence and distribution of the common native plants associated with it.

Historically impacts to Spalding's Catchfly occurred from both herbivory (consumption of plants or plant parts or pulling them out of the ground) and trampling as many kinds of livestock used the area year round. During the homestead era, many acres of occupied habitat were converted to agricultural fields, small holding pastures, home sites, loafing areas and similar high intensity uses. From the time of Nez Perce grazing horses and cattle through the era of extensive homesteading, habitat for Spalding's catchfly was altered and reduced dramatically. Many of the areas converted to cultivated fields had been fescue grasslands. Current impacts to Spalding's catchfly are manifested through direct damage to plants from livestock trampling and indirectly through habitat alterations resulting from hoof caused soil disturbance. Only a

small threat exists from potential herbivory in the action alternative for this project as most of the proposed seasons of use are winter through early spring. Spalding's Catchfly is dormant through most of the permitted season and is only partially developed by the end of the permit season. The site specific effects discussion of the action alternatives contain a detailed description of how the season of use influences the potential for herbivory and trampling. Eliminating a small potential for herbivory effects would have little measurable impact to the species. How eliminating livestock grazing influences subsequent elk and deer grazing of this area is difficult to calculate.

Trampling is the biggest threat to Spalding's catchfly from livestock management actions at the current use time of year. At the permitted time of year, the north facing steep soil where Spalding's catchfly grows is vulnerable to displacement from heavy cattle when the soil surface is going through freeze-thaw cycles and when the soil is moist and soft during April and May when spring moisture arrives. This soil displacement can take Spalding's catchfly plants with it as well as provide a disturbance regime that can favor the establishment of competitive non-native plant species. See the discussion of effects of the action alternatives for a more details. This situation has likely been in play for many years. Perhaps conditions have at least stabilized and likely improved for this species since the period of time when the canyon saw horse grazing introduced and then subsequently, sheep, homesteading activities, and cattle. The impacts to steep slopes started then and were likely just as troubling with homestead animals grazing for very long seasons and through almost all seasons. Over the last 20 years, livestock numbers using the area continued to decline to the current level of use established around 2005. Given the lack of historical reference data on the occurrence and distribution of Spalding's catchfly, it is difficult to gauge whether this species is recovering from that historical surge in impacts, and if so at what rate and to what level. The small number of individuals found at most sites within this project area is a challenge to its sustainability, but does not tell us much with respect to its response to a relative reduction in the level of grazing impacts. It is therefore difficult to say how the elimination of grazing and trampling impacts would affect Spalding's catchfly, but it is assumed reducing one more threat would likely be a positive change for this species.

Removal of livestock grazing under this alternative would serve to take away any remaining potential impact to this species from livestock trampling, grazing, or altering the surrounding habitat attributes. The top agents of disturbance would then shift back to being fire, wildlife, and climate. Wildlife use of the area would be expected to increase as human activities decrease and more forage is made available. Spalding's catchfly is known to be palatable to deer and especially elk but other impacts from wildlife are not well known (see action alternative discussions for details). The spread of noxious weeds would not stop with the secession of grazing but the rate of spread would decrease and that may allow the weed treatment program to keep up control efforts. This could reduce some of the negative competitive pressure these non-native species put on Spalding's catchfly reproduction and survival. There would not be permittees or permit administrators in the project area taking inventory of new weed sites. As a result noxious weed detection and treatment work may decline, and the rate of weed spread increase. Wildfire initial attack suppression activities would continue to pose a small threat to Spalding's catchfly patches but those disturbances would not be exacerbated by subsequent livestock trampling of the soils. Currently wildfire itself poses little threat to this species other than fire's ability to aid in the spread of noxious weeds. Recreational activities are not known to pose a threat to Spalding's catchfly in the project area. Overall this alternative has the potential

for a slight positive or beneficial effect to Spalding's catchfly because of the elimination of the potential for livestock trampling impacts resulting from soil displacement or compaction and in slowing the probable noxious weed rate of spread. The results would be difficult to predict and to measure and would be someplace between no effect and some positive effects.

Though the reduction in threats to Spalding's catchfly may be useful to the species, it is not the same as proposing an active restoration activity. There for this alternative is determined to have No Effect to Spalding's catchfly.

Effects Common to All Action Alternatives for Spalding's catchfly

Common Direct Indirect and Cumulative Effects from Grazing Activities (Alternatives B, C, D, E) on Spalding's catchfly

The remainder of this discussion intends to focus on two of the most tangible kinds of effects to *Spalding's Catchfly* from livestock management. The two most relevant Direct Effects are manifested through herbivory and trampling actions. All action alternatives propose livestock grazing in the same places (with slight timing and number differences) so most of the effects would be similar. The main differences in direct effects would be noted in the season, location, or duration of the proposed use. These factors have a greater influence on trampling impacts than on the potential for consumption (herbivory). The site specific effects discussion below contains a detailed description on how the season of use would interact with the potential for herbivory and trampling. Because the overall permitted season of use would run from November through May the risk of herbivory is expected to be low. Dormant stalks left over from the previous season's growth would not be very desirable forage during the winter months. The risk of herbivory would increase slightly as the use period overlaps with March, April, and May as Spalding's Catchfly is putting on new growth. How livestock grazing influences subsequent elk and deer grazing of this area is difficult to calculate. The risk of trampling remains substantial throughout the permit period and varies with the variability in the season's moisture and temperature regime.

Cumulative effects to Spalding's catchfly plants will generally be the same across all the action alternatives but may differ by alternative in how they interact with grazing management. Because of small changes in the timing and duration of livestock management, the surrounding ongoing activities may interact differently in the degree, extent, or duration to which they potentially add to the direct and indirect effects. All action alternatives assume some level of Nez Perce Tribe grazing could or will occur alongside permittee grazing. Lone Pine is the only allotment where this use has been initiated and that is the only foreseeable use the tribe has expressed interest in. There is no timber management or prescribed fire actions within LIRA to consider and very few roads. The only road to be maintained is the main one to Dug Bar an there are no Spalding's catchfly near that road. Cumulative effects to Spalding's catchfly are most likely to come about from recreation activities and impacts resulting from wildfire events, the spread of noxious weeds or wildlife use of the area. One Spalding's catchfly site is overlapped by a power-line maintenance corridor.

Effects from livestock management

Livestock grazing can directly impact Spalding's catchfly by herbivory and trampling and indirectly impact Spalding's catchfly via soil compaction, soil displacement, soil erosion, the introduction of non-native plants, and loss of pollinator habitat. Grazing of Spalding's catchfly has been observed and is considered a threat to the species (Kagan 1989, Hill and Gray 2004, Taylor 2007). Direct herbivory removes flowers or seeds, thereby limiting reproduction. Herbivory of leaves inhibits a plant's ability to manufacture carbohydrates necessary for seasonal growth and storage in the perennial taproot. Trampling can easily break off entire plants at the ground level and damage the root crowns from which stems emerge. Root crown damage is more frequently associated with early season grazing (Hill and Gray 2004). Late summer grazing or heavy grazing can be especially detrimental to Spalding's catchfly (Hill and Gray 2004). The plants often stay green longer than their bunchgrass neighbors who enter summer dormancy earlier in the season. Sufficient research has not been completed to discern what levels of grazing may allow the Spalding's catchfly to persist (USDI 2007). In a browse study within the Zumwalt KSA, Cullen (et. al 2011) found high levels of browse during the peak growing season for Spalding's catchfly. Because they were able to control cattle use in the area, their results suggested that elk and deer may indeed be the primary consumers of Spalding's catchfly. They also note that elk herds are much larger than deer herds across their study sites. Although their results suggest that cattle do not consume significant numbers of catchfly plants during the peak of their growing season, they did not look at cattle herbivory levels after August 1. It is highly likely that that the historical grazing of the Imnaha Canyon by sheep had a much more dramatic impact to Spalding's catchfly than cattle. Sheep have a greater propensity to graze forbs than cattle (Holocheck 2001) and the animals were grazed for a much longer season during homesteading times.

Grassland ecosystems of the arid, intermountain west exhibit impacts from high levels of domestic livestock in the 1800s and early 20th century. Both *bluebunch wheatgrass* and *Idaho fescue* are poorly adapted to herbivory by comparison to other grass species, having little compensatory growth, such as tiller production (Caldwell et al. 1981). Disturbances, most frequently linked to adverse livestock grazing and trampling, have dramatically altered western arid ecosystems in a progression from native perennial bunchgrass communities to invasive non-native annual grasslands that are then susceptible to more invasive perennial plant invasions (DiTomaso 2000).

Another concern is the impact livestock grazing may have on the pollinator community in Spalding's catchfly habitat. Described as the first large-scale manipulative study of the effect of grazing intensity on native bee communities in a North American grassland, Kimoto (2010) found that increases in grazing intensity showed a linear decline in bee diversity, abundance, and richness, especially with bumblebees, which have been identified as the most significant pollinator of Spalding's catchfly in a range-wide study (Lesica and Heidel 1996). In the absence of open pollination, Spalding's catchfly experienced an 85 percent reduction in fecundity and a loss of fitness, due to inbreeding depression, resulting in an estimated total reduction in fitness of 99 percent (Lesica 1993). Therefore, management practices that significantly reduce pollinators, especially bumblebees, could have a significant impact on the recruitment of new plants into a Spalding's catchfly population. Even though Spalding's catchfly is long lived, without seedling recruitment populations would decline over time. Forage utilizations approaching 50 percent showed very little to zero bumblebee abundance (Kimoto 2010).

Therefore, grazing utilization of 50 percent within Spalding's catchfly populations and surrounding habitat would not likely contribute toward maintaining bumblebee populations, thereby limiting Spalding's catchfly reproduction. Grazing levels relative to bee density has not been studied in the Imnaha Canyon.

Sufficient research has not been completed to determine exactly what affects livestock trampling is directly having on Spalding's catchfly. Likewise there is no study to identify what specific level of trampling impacts would be adverse to Spalding's catchfly. However Johnson and Simon (1987) strongly recommended caution when applying grazing activities to steep canyon slopes containing Idaho fescue plant associations. These plant associations are suitable habitat for Spalding's catchfly. Trailing and trampling impact in the steep terrain of the Imnaha Canyon is more frequent and much more visually evident than what is observed along the more gentle ground where the Crow Creek and Zumwalt Spalding's catchfly populations reside. At some level careful livestock management may create space for seed germination (as fire would also do). Gauging how much ground disturbance is helping verses impacting seedlings or adults is very difficult to do. Habitat quality is one way to evaluate that point. Range condition data, soil condition data, ecology data and professional judgment will be utilized to the degree feasible to evaluate the risks of trampling impacts to Spalding's catchfly in the LIRA project area.

Water developments and salt (or other supplement) placement concentrates livestock use. Most of the time Spalding's catchfly is not located in terrain where salting or water developments are feasible. Historically salt placement was difficult to track. By design, future salt placement would be implemented in a way that would draw livestock away from Spalding's catchfly occurrences, thus reducing the potential for trampling impacts. The exact distance that salt should be separated from Spalding's catchfly or any TES plant site, so that concentrated impacts are eliminated is not known and varies by the local topography. (It is also desirable to place salt away from water sources.) A guideline distance of ¼ mile is prescribed as a general rule of thumb. This distance is arrived at by extrapolating percent utilization levels of rangeland plants found around both watering sources and salt sources as reported by Holecheck (2001). He surmised from available literature that one could expect up to 50% utilization of available forage up to ½ mile from a water source and slightly less utilization from a half mile from a salting source. Thus it is proposed that keeping both water developments and salt at least ¼ mile from TES plant sites would serve to protect these locations from detrimental levels of trailing and herbivory.

Effects from invasive plants

Exotic, invasive plant species threaten the viability of Spalding's catchfly. Invasive plants compete with Spalding's catchfly for water, nutrients, and light. Of greatest concern is the effect of invasive plants on seedling establishment, a vulnerable state for perennial plants. Not only are invasive species able to outgrow seedlings of Spalding's catchfly, they often leave behind increased leaf litter, inhibiting the germination of other plants. In one study in Washington, high levels of exotic plants (annual bromes, St. Johns wort, and Ventenata) were associated with less vigorous occurrences of Spalding's catchfly (Caplow 2002). Invasive plants might also provide competition for pollinators, affecting fecundity and individual fitness in Spalding's catchfly (Lesica and Heidel 1996). But depending on the flowering species composition Taylor and DeBano (2012) found the opposite. Lesica and Heidel (1996) found lower visitation rates

for Spalding's catchfly in sites infested with St. John's wort. Field observations during 2011 summer surveys of a newly-discovered Spalding's catchfly subpopulation on the Umatilla National Forest indicated a pronounced lack of tolerance to omnipresent invasive exotic species. In this locale dense populations of exotic species effectively and completely exclude Spalding's catchfly in what would otherwise be appropriate habitat (Darrach and Frazee 2013). Even if individual plants may survive in a weed-infested environment, recruitment of new plants is decreased or eliminated under such conditions (USFWS 2007). Other undesirable weedy species such as annual bromes can have equally deleterious effects but are not tracked as specifically as designated noxious weeds. Through policy and procedure noxious weed treatments are highly scrutinized and well-coordinated with rare plant management in order to avoid unintended impacts. Generally sites are avoided either by a large physical no-treatment buffer or by treating at a time that would avoid the critical growth period of this species. Noxious weed treatments are generally less harmful to the plants than the weed invasion and spread would be.

Effects from Fire related actions

Fire itself likely has a fairly neutral effect on Spalding's catchfly. It is presumed that *Spalding's catchfly* evolved in an ecological setting that included frequent wildfires (USFWS 2007). At worst, a full season's reproductive potential could be consumed in a wildfire event. Fruiting capsules of *Spalding's catchfly* do not dehisce on the plant, they remain as a deep cup-like vessel. As a result a considerable volume of the potentially viable seed is likely to still reside on the plant when summer fires occur. Observations of *Spalding's catchfly* after the 2012 Cache Creek fire found some plants completely burned and some plants still standing and only slightly scorched. Seeds that are dispersed to the nearby ground surface prior to or after the fire most probably stand a considerably enhanced probability of surviving the event with their germination potential intact. But even then, considerable amounts of this seed can be expected to be lost to the fire. Fire can also consume built up thatch, opening terrain for seed germination – Catchfly or weed. Wildfire is not a management action but has an interaction with ongoing management actions and the existing condition. Fire on the landscape would have its greatest influence on Spalding's catchfly through its ability to increase the spread of non-native vegetation, and alter the foraging patterns of wild and domestic animals. Handline constructed to control wildfires could end up any place it is needed within Spalding's catchfly habitat. Handline locations were installed on both north and south aspects of lateral ridgelines in the Imnaha canyon during the 2012 Cache Creek fire. Unlike many areas of the intermountain west, the fire regime within the grassland communities of the Imnaha canyon are not likely very far away from what their historical regime would have been. There are no prescribed fire activities proposed within the LIRA analysis area.

Effects from Wildlife (deer and elk)

The effects of elk on Imnaha Canyon Spalding's catchfly are not well documented. As stated above, elk have been found to be the ungulate most likely to graze on this species (in the absence of sheep). Elk exhibit a trailing and trampling pattern different than livestock. Often this is observed to be less extensive but often as intensive, especially in steeper deep soiled areas. Elk trailing impacts late in the spring, after cattle have left, have been observed at several Spalding's catchfly locations in the LIRA project area but it is not known how extensive those are. It is not clear how the interaction of grazing management and wildlife management is

influencing Spalding's catchfly. The project area is primarily important, summer, transitional and winter range for elk and big horn sheep.

The grazing preference for big horn sheep on Spalding's catchfly is not known but assumed to be similar to that for domestic sheep and elk. At current population numbers the threat to Spalding's catchfly is likely low. Elk numbers are estimated and management objectives (population size) are set by areas defined as Wildlife Management Units. The LIRA project area is included in the Snake River and Chesnimnus WMUs. The estimated size of the elk population exceeds the desired levels set in each of these WMUs (See the Wildlife Report in the project file for more details). While grazing of browsing of Spalding's catchfly by native herbivores has occurred historically, problems may arise when numbers of native ungulates are at levels significantly higher than those to which the plant has adapted (USFWS 2007).

Effects from Recreation

Unauthorized off road vehicle use is occurring in some areas of the canyon, but few signs of this activity are noted within the LIRA project area except for a few locations in the vicinity of Lord Flat and adjacent plateaus. Most of the upland recreation inside this project area revolves around, hunting, trail riding or hiking and dispersed camping. Deer, elk and bird hunting would intersect areas of suitable and occupied Spalding's catchfly habitat but the impacts are expected to be minimal because dispersed foot traffic does not incur a lot of acres and is not usually repetitious within an area. Only a few of the system trails are near occupied Spalding's catchfly habitat and travel off of those routes is generally infrequent. Grazing of packstock off of the trailside is expected to have effects similar to that discussed here for other livestock. Almost all of the known Spalding's catchfly sites are in terrain that does not make a good camp site.

Spalding's catchfly Population Factors

Spalding's catchfly population trends within the LIRA project area are not yet known. Elsewhere within the Wallowa-Whitman National Forest, Spalding's catchfly populations appear stable or increasing where multiple years (15 to 20 years) of inventory has been done (USDA 2008). All the populations on National Forest System lands in Oregon are within grazing allotments. Population monitoring at the Crow Creek KSA looks at estimating plant frequency and density. Given the pattern of distribution of these occurrences, frequency is the better indicator of population trend because it is less influenced by plant dormancy issues within the area being studied. Spalding's catchfly population monitoring within the Imnaha Canyon has not been implemented. The numbers reported are counts and estimates from detection surveys. Botanists have to balance the time put into documenting a new occurrence with time put toward locating additional new occurrences. It is likely that the numbers reported at each site underrepresent the actual numbers there because of dormancy issues and the need to minimize time spent documenting (finding and counting all) the initial find.

One of the largest concerns in all of the LIRA pastures is the small number of Spalding's catchfly at each site and how far part most of the sites are from each other. The current number reported for each site represents a plant count or visual estimate of the number at a given site as noted during detection surveys. At every other Spalding's catchfly site found on the Wallowa-Whitman National Forest, additional inventory and monitoring work doubled (at a minimum) the number of plants reported for a given site. The same result is expected at all of

the sites known in the LIRA project area. Even with an expected doubling of the number of Spalding's catchfly plants reported, the patches are still considered vulnerably small.

Population trend monitoring of Spalding's catchfly in the LIRA project area is to be initiated in the near future. Currently there is no known trend or information on the historical occurrence of this species across any of the affected allotments. Because of the small size of each Spalding's catchfly patch and the widely scattered spatial distribution of each patch, the only currently feasible population monitoring technique would be to census each site. The highly successful sampling methodology used to track Spalding's catchfly frequency on the Zumwalt Prairie and at Crow Creek will not work (yet) at these canyon grassland sites.

Because of Spalding's catchfly's set of challenging biological traits, its unique spatial distribution across the landscape, and annual climatic fluctuations, detecting a population trend takes a long time (perhaps 10 to 25 yrs.). Habitat condition parameters are expected to respond more quickly and clearly to management actions. Thus assessing trends in vegetation and soil (habitat) quality will be used as a surrogate for gauging how range management actions are affecting Spalding's catchfly. The proposed allotment management schemes are not designed as a scientific experiment to directly assess the effects of different (grazing) treatments on Spalding's catchfly. Because the grazing "treatments" are not designed like a scientific study, one cannot directly assign any eventual trend result to a specific allotment management cause. What this grazing management evaluation and the eventual Spalding's catchfly monitoring work will attempt to do is assess what management practices are likely compatible with Spalding's catchfly and do the most toward meeting the recovery goals of the Spalding's catchfly recovery plan (USFWS 2007).

Direct and Indirect Effects Alternative B, Current Management on Spalding's catchfly

There is currently no feasible way to quantify effects to Spalding's catchfly from the various factors of each alternative and cumulative activity. Thus this discussion will inherently be qualitative and based on professional judgment and professional interpretation of reported impacts as discussed above, applied to the project area. Most of the time, the purported effects will be couched in terms of their probability of occurring and the risk to Spalding's catchfly if they do occur. Current management is assumed to be the baseline condition for current effects. Probable effects to Spalding's catchfly will be discussed in detail under this current management alternative, and then the probable effects from the other alternatives will be compared to current management.

<u>Cow Creek Allotment</u>

To date, no Spalding's catchfly have been found within the Cow Creek allotment. A review of the existing habitat information, aerial imagery, and field experience strongly suggests that there could be undocumented occurrences of this species within suitable habitat in this allotment. Effects to any potential or undocumented Spalding's catchfly site would be similar to that already discussed above for Spalding's catchfly across it's range and similar to probable effects at known sites within the whole LIRA project area. Still, livestock management in this allotment currently poses the least risk to Spalding's catchfly of the four allotments being analyzed.

Toomey Allotment

Eleven (11) patches of Spalding's catchfly are found in the Toomey allotment. These sites will likely be aggregated into one Element Occurrence based on USFWS guidelines (USFWS 2007). This population delineation is currently in process. The largest patch contains 100 plants and the smallest has three. A total of 453 Spalding's catchfly plants have been found in this allotment.

All of the Spalding's catchfly sites in this allotment are found on steeper slopes, all with some northerly aspect component and all would fall into the Idaho fescue – prairie junegrass (low elevation) plant association (Johnson and Simon 1987). These areas have deep rich soil deposits that are very susceptible to compaction, displacement, and rotational slumping when the soils are moist. Evidence of the historical impacts to these slopes is quite evident in the extensive micro-terraces seen on any slope where livestock have access. Sheep and other livestock repeatedly applied to the land over long seasons for over a century develop trails across these deep soils as they foraged. In some areas up to half of the perennial grassland on these sites was lost (Johnson and Simon 1987). Subsequent use by heavy cattle, especially in the winter and spring when soils are near saturation, continue to cause soil movement and threaten further site deterioration leading to declining site productivity and reduced species diversity (Johnson and Simon 1987). Since sheep are small enough and agile enough to utilize these steep slopes, over time they were The heavy weight of cattle can impact the soil through shearing and displacement at the edges of the terraces and along the steep slope between each level of terrace.

The soils in this area of the Imnaha canyon generally receive a pulse of moisture throughout the fall, then gradual inputs throughout the rest of the winter as snow falls in the high country. Another pulse of moisture usually comes in the form of spring rain storms from May through June. Temperatures can fluctuate widely any time of the year in this canyon, but generally cold temperatures prevail from November to February. Generally during November, December, and January, temperatures are low, typically below freezing, the sun is at a very low angle this time of year, and the ground on the north aspects stays frozen most of the time. Frozen ground is less desirable to walk on by cattle and less likely to be displaced. When freeze thaw cycles hit because of unusually warm weather during the winter, or later in the winter when ambient temperatures start to increase, the top several inches of soil melts and is very slippery and vulnerable to shearing and compaction. Later in the season, when the soils have thawed, the spring rains saturate and soften the soil structure and similarly make them vulnerable to displacement under the weight of heavy hooves.

Spring Gulch Pasture Direct and Indirect Effects

The four Spring Gulch pasture Spalding's catchfly sites are all in the south and western half of the pasture. This pasture would be used from approximately March through April 15. During this time period the likelihood of incurring any impacts from herbivory would be very low. Spalding's catchfly growth for the season would not have produced enough biomass to be evident as forage (stems rosettes and seedling would just be too small), nor would it be as desirable as the surrounding flush of Idaho fescue.

The soils are expected to be moist during this use period, so there is the potential for trampling impacts as cattle forage across the area. There is no way to calculate the probability of livestock stepping on a Spalding's catchfly plant, nor which step would be lethal verses incidental. Displaced and dead clumps of Idaho fescue and sometimes bluebunch wheatgrass have been observed in this situation. Although it is not uncommon to observe this in isolated areas, the extent of these impacts has not been quantified. It is assumed that the same fate could befall adult or seedling Spalding's catchfly. Small seedlings with only a little root development would be especially at risk. Spalding's catchfly probably does not get stepped on very often but cattle have a lot of time to spend in the allotment and they are there every year.

The Spring Gulch Spalding's catchfly sites are not close enough to the fencelines to be impacted by maintenance or fenceline trailing.

In this pasture there is no specific range condition data available to indicate habitat conditions. There is one Interpreting Indicators or Rangeland Health (IIRH) soil monitoring plot in the southern end of this pasture. This plot indicates a moderate-to-extreme departure from what is expected and desired in the Biotic Integrity attribute and a slight to moderate departure in the soil stability attribute. This indicates some range resource management issues that could be impacting Spalding's catchfly or its habitat. This plot was on a flat bench where it is easy for livestock to congregate. This bench was also highly altered during the homesteading era.

Lower Spain Saddle Pasture Direct and Indirect Effects

The four Spalding's catchfly sites in this pasture are all in the south and eastern half of the pasture. The possibility for impacts to Spalding's catchfly form herbivory under use proposed in this pasture is only slightly higher than that just discussed for the Spring Gulch pasture. Although a little more growth is expected to occur by May, Spalding's catchfly is still not likely to be well developed enough to be evident forage to cattle, especially compared to the surrounding bunchgrass. In December the likelihood of incurring any impacts from herbivory would be nearly zero. This season is way past the time Spalding's catchfly has entered winter dormancy. Any rosettes would be gone. If there are any stalks left standing they would be dry, hard, brown, sticky, and less desirable as forage than the surrounding matrix of bunchgrass.

The potential for livestock trampling impacts to Spalding's catchfly is expected to be nearly the same as that discussed above for the Spring Gulch pasture. There is little predictable difference in soil moisture levels between April and May, so the soil's vulnerability to displacement that could impact Spalding's catchfly is roughly the same as that discussed in the Spring Gulch pasture.

In this pastures there is no Interpreting Indicators or Rangeland Health soil monitoring plots to specifically relate to habitat conditions. There is one range condition plot in this pasture near Vance draw. This plot showed that the range monitored in this area was in very poor condition with a declining trend. This indicates some range/resource management issues that could be impacting Spalding's catchfly or its habitat.

Johnson Canyon Pasture Direct and Indirect Effects

Five Spalding's catchfly sites will be discussed in relationship to this pasture. A sixth site, is in a closed area just north of and directly adjacent to this pasture, it is located on an extremely steep and remote north facing slope that shows little sign of having livestock access. It is assumed that any livestock use of this area is at most incidental and would not be contributing to any potential negative impacts to the occurrence as a whole.

The other five Spalding's catchfly sites are grouped at each end of this pasture with two being near the northern edge and the other three in the southern end of the pasture. They are all in north facing settings similar to that discussed above.

This pasture would be used throughout the month of January, during this time period the likelihood of incurring any impacts from herbivory would be nearly zero. This season is way past the time Spalding's catchfly has entered winter dormancy. Any rosettes would be gone. If there are any stalks left standing they would be dry, hard, brown, sticky, and less desirable as forage than the surrounding matrix of bunchgrass.

There is a chance for trampling impacts to occur but those are considered low. Temperatures can fluctuate widely any time of the year in this canyon, but generally cold temperatures prevail in January. With the sun at a very low angle this time of year, and with temperatures typically low to below freezing, the ground on this north aspect should stay frozen most of the time. Frozen ground is less desirable to walk on by cattle and less likely to be displaced and so limits trampling impacts. The other sites would receive dispersed trampling impacts associated with general foraging behavior. Fenceline trailing impacts were observed to be minor.

In this pastures there is one range condition and trend plot but the trend could not be determined. There is one Interpreting Indicators or Rangeland Health soil monitoring plot in this pasture. This plot indicates a moderate departure from what is expected and desired in the Biotic Integrity attribute and a none-to-slight departure in the soil stability attribute. This indicates little to no range/resource management issues that could be impacting Spalding's catchfly or its habitat in this part of the pasture.

Lone Pine Allotment

Direct and Indirect Effects

The two Spalding's catchfly sites in the Lone Pine allotment are both in the Big Canyon pasture. These sites will likely be aggregated into one Element Occurrence based on USFWS guidelines (USFWS 2007). This population delineation is currently in process. Both sites reside in north facing settings very similar to that discussed above under the Toomey allotment. These were the first two locations of Spalding's catchfly to be discovered in the Lower Imnaha canyon. This pasture would be used in December and again in May.

The scenario affecting Spalding's catchfly from both herbivory and trampling is the same in this pasture as discussed above under the Toomey allotment. In December there is very little chance of impacts from herbivory or trampling because the plants are dormant and the ground should be frozen most of that time of the year, (see discussion above under the Toomey

allotment). The threat of herbivory to Spalding's catchfly in May is possible but still fairly low. Although a little more growth is expected to occur by May, Spalding's catchfly is still not likely to be well developed enough to be evident forage to cattle, especially compared to the surrounding bunchgrass. The potential for livestock trampling impacts to Spalding's catchfly is expected to be nearly the same as that discussed above for the Spring Gulch pasture of the Toomey allotment. There is little predictable difference in soil moisture levels between April and May, so the soil's vulnerability to displacement that could impact Spalding's catchfly is roughly the same.

Spalding's catchfly sites are generally not in or near locations suitable for water development, nor salt placement. Historically, water and salt sites were hard to track. The avoidance buffers prescribed under all alternatives will keep these features from being placed in areas that would impact Spalding's catchfly.

In this pastures there no range condition and trend plot that determined rangeland trends for this pasture. There is one Interpreting Indicators or Rangeland Health soil monitoring plot in this pasture. It indicates a moderate departure from what is expected and desired in the Biotic Integrity attribute and a none-to-slight departure in the soil stability attribute. This indicates little to no range/resource management issues that could be impacting Spalding's catchfly or its habitat in this part of the pasture.

Rhodes Creek Allotment

Fifty four (54) patches of Spalding's catchfly are found in the Rhodes creek allotment. These sites will likely be aggregated into one Element Occurrence based on USFWS guidelines (USFWS 2007). This population delineation is currently in process. The largest patch contains 50 plants and the smallest has one. A total of 334 Spalding's catchfly plants have been found in this allotment. One of the largest concerns in all of these pastures is the small number of Spalding's catchfly at each site and how far part most of the sites are from each other.

All of the Spalding's catchfly sites in this allotment also fall under the steep, deep soil, north aspect setting described and presented above under the Toomey allotment discussion. The seasonal influence on the risk of herbivory and trampling discussed under the Toomey allotment play out the same way in this allotment.

North and South Roy Pastures Direct and Indirect Effects

These pastures are discussed together as the proposed management for them is the same. The Spalding's catchfly patches in these pastures are all toward the east side of the pastures down slope of the rimrock and just a little up slope of Lightning Creek. One patch is along the fenceline between North and South Roy. These pastures would be from January to May. During this time period the likelihood of incurring any impacts from herbivory would be nearly zero. This season is way past the time Spalding's catchfly has entered winter dormancy. Any rosettes would be gone. If there are any stalks left standing they would be dry, hard, brown, sticky, and less desirable as forage than the surrounding matrix of bunchgrass.

There is a chance for trampling impacts to occur but those are considered moderate to low.

It is difficult to predict temperatures in November, as it can be cold and dry or cold and wet and only intermittently frozen. Unexpected warming could happen any time throughout the winter in this canyon, but generally cold temperatures prevail in December and January and sometimes in November. With the sun at a very low angle this time of year, and with temperatures typically low to below freezing, the ground on this north aspect should stay frozen most of the time. Frozen ground is less desirable to walk on by cattle and less likely to be displaced. Frozen ground should limit trampling impacts during this time. Problem is, if it does thaw, the top few inches of soil become very slick and unstable and are easily shed off of the top of the deeper, still frozen soil layers. This tends to be more damaging to the soil surface and the plants within it than when the entire soil profile is thawed and soft from spring rains. Twenty head in this big of a pasture area, during this time of year have a limited potential to trample Spalding's catchfly. Spalding's catchfly site 1281 has only 4 plants and is along the N/S Roy fenceline. Fencelines often concentrate livestock travel and so this site could be slightly more vulnerable to trampling than the others in this pasture. Site 1299 has two plants and it is directly adjacent to an old ranch-road leading up to the bench formation. Cattle likely use this road as a travel way to the bench grasslands and so this site could be slightly more vulnerable to trampling impacts. The other sites would receive dispersed trampling impacts associated with general foraging behavior. Overall the trampling impacts to Spalding's catchfly in these pastures are likely incidental. On one hand there are very few plants to hit so the chances are low and the ground is generally frozen, and on the other hand impacts are more costly to small patches if it does happen.

Spalding's catchfly sites are generally not in or near locations suitable for water development, nor salt placement. Historically, water and salt sites were hard to track. The avoidance buffers prescribed under all alternatives will keep these features from being placed in areas that would impact Spalding's catchfly.

In these two pastures there is no range condition or soil condition monitoring data to indicate habitat conditions. Observations associated with locating the Spalding's catchfly sites are inconclusive as to habitat conditions.

Bull Pasture Direct and Indirect Effects

The Spalding's catchfly patches in the Bull pasture are all toward the east side of the pastures down slope of the rimrock and just a little up slope of Lightning Creek. No patches are along any fencelines. This pasture would be used by from January to May. During this time period the likelihood of incurring any impacts from herbivory would be nearly zero. This season is way past the time Spalding's catchfly has entered winter dormancy. Any rosettes would be gone. If there are any stalks left standing they would be dry, hard, brown, sticky, and less desirable as forage than the surrounding matrix of bunchgrass.

There is a chance for trampling impacts to occur but those are considered moderate to low. The reasons are exactly the same as that provided in the discussion of the Roy pastures above – it should be cold or frozen most of the time and the Spalding's catchfly sites are not by any features that would concentrate livestock use.

The grassland terrain in this pasture is quite extensive and not greatly dissected (in a relative sense) by rock ridges and deep draws or other features to concentrate livestock movements. At

most the Spalding's catchfly sites would receive dispersed trampling impacts associated with general foraging behavior. Overall the trampling impacts to Spalding's catchfly in these pastures are likely incidental. On one hand there are very few plants to hit so the chances are low and the ground is generally frozen, and on the other hand impacts are more costly to small patches if it does happen.

Spalding's catchfly sites are generally not in or near locations suitable for water development, nor salt placement. Historically, water and salt sites were hard to track. The avoidance buffers prescribed under all alternatives will keep these features from being placed in areas that would impact Spalding's catchfly.

In this pastures there is no range condition monitoring data to indicate habitat conditions. However there are two Interpreting Indicators or Rangeland Health soil monitoring plots. Both indicate a moderate departure in the expected and desired Biotic Integrity attribute. Both indicate at least a slight departure from what is the expected and desired Soil Stability attribute. This indicates some range/resource management issues that could be impacting Spalding's catchfly. These two plots are near 3 Spalding's catchfly sites and likely represent conditions at similar settings across this pasture. Observations associated with locating the Spalding's catchfly sites are inconclusive as to habitat conditions.

East Lightning Bench Direct and Indirect Effects

The Spalding's catchfly patches in the East Lightning Bench pasture are all found within the southern half of this pasture and toward the west side of the pastures down slope of the rimrock and just a little up slope of Lightning Creek. All of the Spalding's catchfly sites are on steep north aspect slopes. Only one patch is along any fenceline. This is a large pasture and would be used by 500 head in mid-January through February and again in May. During this time period the likelihood of incurring any impacts from herbivory are low with a slight increase by the end of May. Even by May, Spalding's catchfly should be exhibiting only a little growth and likely not enough to be very detectable. Any seedlings or rosettes would be too small and low to be very vulnerable to grazing impacts. It is unlikely that there would be any stalks left in January from the previous season's growth.

The north aspect soil stability concerns discussed above in every pasture are also a concern in this pasture for exactly the same reasons. But in this pasture there is a slightly greater potential for trampling impacts associated with soil shearing and displacement. Many more cattle are being applied to this pasture. From February on, temperatures are not as consistently cold or frozen. The sun is not as low on the horizon and has more influence on soil surface temperatures. This pasture is on the east side of the Lightning creek canyon, that runs northwest. Both factors contribute to earlier access to late winter sun. So from February through March there can be periods of time when the top several inches of soil thaw more frequently and are very slippery and easy to displace. Although it is difficult to quantify or predict, March through May (April) is likely a time of year with substantial potential to incur livestock (or wildlife) trampling impacts to Spalding's catchfly sites. On one hand there are very few widely scattered plants to hit so the chances are low but there are a lot more animals over a lot longer time than discussed previously. This pasture is large but predicting livestock distribution is a challenge. Still, the ground is less frequently frozen and so impacts happen easier. As stated before, impacts are more costly to small patches if it does happen. The

Spalding's catchfly site at greatest risk may be 1233. It has only 4 plants and is adjacent to the fenceline between this pasture and the Homestead pasture. The fenceline may concentrate livestock in this area.

Spalding's catchfly sites are generally not in or near locations suitable for water development, nor salt placement. Historically, water and salt sites were hard to track. The avoidance buffers prescribed under all alternatives will keep these features from being placed in areas that would impact Spalding's catchfly.

In this pastures the range condition and trend monitoring data indicated that range conditions were poor in 2012, but no trend could be determined. This plot site is in the north half of the pasture so it may or may not represent pasture conditions overall. There are two Interpreting Indicators or Rangeland Health soil monitoring plots, one in each end of the pasture. Both indicated only slight to no departure from what is expected and desired in the Biotic Integrity and Soil Stability attributes. However there were some other soil stability concerns in this pasture (see soils and range report for more details). This may indicate some concern for habitat conditions for the Spalding's catchfly sites but not imminent ones. Observations associated with locating the Spalding's catchfly sites are inconclusive as to habitat conditions.

West Lightning Bench Direct and Indirect Effects

The Spalding's catchfly patches in the East Lightning Bench pasture are scattered from the north end to the south end of the pasture but are all toward the east side of the pastures down slope of the rimrock and just a little up slope of Lightning Creek. All of the Spalding's catchfly sites are on steep north aspect slopes. No Spalding's catchfly site is along any fenceline. This is a large pasture and would be used by 200 head from mid-January through February and again in May. During this time period the likelihood of incurring any impacts from herbivory are zero to low with a slight increase by the end of May. Even by May, Spalding's catchfly should be exhibiting only a little growth and likely not enough to be very detectable. Any seedlings or rosettes would be too small and low to be very vulnerable to grazing impacts. It is unlikely that there would be any stalks left from the previous season's growth.

The potential for trampling impacts would be very similar to that discussed for the East Lightning Bench pasture, but a little bit less. There are only 200 head in this pasture and the orientation of the benches and north aspects (being on the west side of the canyon) would provide frozen ground conditions more regularly and for a somewhat longer time. Still the ground is going to be just as vulnerable to soil displacement impacts in March through May.

Spalding's catchfly sites are generally not in or near locations suitable for water development, nor salt placement. Historically, water and salt sites were hard to track. The avoidance buffers prescribed under all alternatives will keep these features from being placed in areas that would impact Spalding's catchfly.

In this pastures there is no range condition or soil condition monitoring data to indicate habitat conditions. Observations associated with locating the Spalding's catchfly sites are inconclusive as to habitat conditions.

Effects Summary of Alternative B, Current Management on Spalding's catchfly

Direct and Indirect Effects

Potential Direct Effects have been identified from herbivory of Spalding's catchfly plants but this effect is anticipated to be very low because of the time of year that livestock grazing is permitted. Spalding's catchfly plants would not be available forage during that time period although May grazing is getting close to when Spalding's catchfly could be bolting in the canyon.

Potential Direct Effects to Spalding's catchfly and suitable habitat have been identified from the aspects of trampling while livestock forage through these allotments. The moist steep north-facing slopes and deep loess soils typical in the habitat Spalding's catchfly occupies combine to make these sites unstable and highly susceptible to soil displacement. Displaced soil can take Spalding's catchfly with it, although there is currently no way to quantify this potential impact. It is anticipated that the later in the season that grazing is applied in this canyon environment the greater the potential for trampling impacts to occur because the soils are the most moist and least firm in late winter and early spring.

In some locations near Spalding's catchfly, the condition of the habitat is possibly having a small compromising effect on the ability of Spalding's catchfly to sustain itself. Spalding's catchfly seems to prefer later seral, good condition Idaho fescue habitat. Where range or soil conditions indicate possible degradation of this habitat, it also suggests that there could be commensurate impacts to Spalding's catchfly and its suitable habitat. This threat is likely impacting seedling establishment more than the established, long lived adults. Habitat impacts on the fate of ground nesting bees needed to pollinate Spalding's catchfly is also a concern.

Cumulative Effects

Numerous Spalding's catchfly sites are clearly threatened by the spread of noxious weeds let alone the spread of other undesirable non-native invasive species. Currently successful control efforts are vulnerable to future levels of funding, and stochastic events mostly outside of our control. Cattle are one of the main weed spread vectors on this landscape although wildlife is also adept at spreading weeds. Treatment activities pose little threat because of regulatory and design elements built into the noxious weed treatment program.

Fire (except for its effects on spreading noxious weeds) is generally thought to be nearly neutral to Spalding's catchfly in the canyon environment. Seed loss is the main cost to Spalding's catchfly from August wildfires. With wildfire comes suppression activity and some line construction could impact some individuals of Spalding's catchfly but it is not very likely that very many would be disturbed because of the relatively small amount of acres disturbed this way across this large landscape. Recreation activities have been identified as having some potential to impact Spalding's catchfly through trampling or similar forms of ground disturbance. However this threat is considered to be relatively low because there is just not a lot of concentrated recreational traffic or activities in the vicinity of most Spalding's catchfly sites.

All of the effects identified here were certainly more intense historically. It is difficult to say how much effect is residual from historical times and how much is a continuation under current

management. It is difficult to say how much improvement current management has been able to show in just nine years, but it is likely that Spalding's catchfly has fared better than it did previously. There are still over 1442 Spalding's catchfly plants (and quite likely twice that given our experience with monitoring this species) in this allotment, so it is not likely to be extirpated from this area. However 1442 is a relatively small number of plants in a landscape this large. Small populations are likely going to have a difficult time regaining higher densities when the plants are so spread out. There are also concerns at a finer scale, in that there are few plants located at any one site. This is not a situation easily sustained by this plant species. Given all these factors and potential impacts, it seem logical that some unknown number of Spalding's catchfly are being impacted by range management actions under this alternative or by both range management and other factors acting cumulatively.

For more detailed cumulative effects by pasture and by plant site refer to the plant Biological Evaluation in the project record.

Thus it is concluded that Alternative B May Effect – Likely To Adversely Affect Spalding's catchfly within the allotments governed by its design.

Direct and Indirect Effects of Alternative C, The Proposed Action on Spalding's catchfly

The kinds of effect from this alternative to Spalding's catchfly are expected to be the same as that discussed for Alternative B. The degree to which they could affect Spalding's catchfly and the chances of that effect happening would be the only differences. None of the possible effects discussed here are quantifiable and all are qualitative. Thus the following discussion bases the effects analysis on a comparison with those effects disclosed under Alternative B.

The Direct, Indirect, and Cumulative effects to Spalding's catchfly from the livestock management actions proposed under Alternative C would be the same as those discussed for Alternative B in the Cow Creek, Lone Pine and Rhodes allotments as the grazing regime is the same. Alternative C differs from alternative B in respect to Spalding's catchfly, only in the Toomey Allotment. In the Toomey allotment, the only difference between Alternative B and Alternative C is in the use of the Upper Spain Saddle, Lower Spain Saddle, Johnson Canyon and Toomey pastures. The livestock numbers, pasture rotations, and most of the seasons of is the same for the rest of the pastures.

Under Alternative C, in the Toomey allotment, immediate changes would come to the use of the Upper and Lower Spain saddle pastures. Potential changes to the season of use and the length of use of the Toomey pasture and Johnson Canyon pasture may eventually result from several years of monitoring and subsequent adaptive management decisions.

Spalding's catchfly has not been found in the Toomey pasture so changes to the management of that pasture would not have a measurable effect to the overall effects to Spalding's catchfly from this alternative as compared to Alternative B. Within the Toomey allotment, Spalding's catchfly is only known from the Spring Gulch, Lower Spain saddle, and Johnson canyon pastures. Alternative C does not propose any different management in the Spring Gulch pasture from that found in Alternative B, so the effects would the same as in Alternative B.

The only difference in the effect to Spalding's catchfly between Alternative B and Alternative C, is in the use of the Johnson Canyon pasture, the Lower Spain Saddle pasture and the creation of the Pig Pine Pasture. The effects summary, conclusions and determinations for Spalding's catchfly in this alternative would be the same as that stated for Alternative B except for the few differences in Direct and Indirect Effects found in the Johnson Canyon, Lower Spain Saddle and Big Pine Pasture.

Johnson Canyon Pasture

There would be no immediate change in the management of this pasture. This alternative assumes that current management (in practice for around 9 years) has not been operating long enough to adequately change the effects of historic management in this pasture. This alternative proposes to continue management in the Johnson canyon pasture the same way as under alternative B for the next 3 to 6 years. In essence its potential effects to Spalding's catchfly are immeasurably different than that discussed for Alternative B – at least for the first 6 to 9 years. So for a considerable time, this pasture would continue to be used each season during the months of January, February, and March. See the discussion of the effects of this pastures use in Alternative B as the effects would be the same in this alternative for an indefinite length of time. Basically January & February use poses no threat to Spalding's catchfly from herbivory, and March is only slightly risky. The impacts to Spalding's catchfly would come from potential trampling impacts when unusually warm weather warms the upper few inches of frozen soil and makes it and its plants very vulnerable to displacement – same problem as that discussed above in Alternative B.

If, after several years of long term habitat monitoring, resource conditions (primarily soil disturbance) do not reach the desired state, then grazing management would shift toward a two year deferred rotation schedule.

Under this adaptive management plan, this pasture could, in the distant future, be used by the same number of cattle for two months (November through December) one winter, and then the next winter (next grazing season) it would be used for two months from February through March.

Over a 10 year period this would reduce the months of use by 1/3rd. It would also alternate the time of use between early and late winter, rather than annually repeating the December through March use as in Alternative B. Even with 1/3rd less use over time, there would likely be no change in the risk of herbivory to Spalding's catchfly from this schedule change as it still proposes winter use and March gazing is only slightly more risky. The effects would be the same as has been repeatedly discussed.

The reduction in use over time would correspondingly reduce the potential for trampling impacts. It is difficult to predict if alternating the use to times both earlier in the winter and later in the spring is going to add to, or detract from any advantage of use reduction – at least with respect to Spalding's catchfly. But it is likely advantageous to Spalding's catchfly to not graze at exactly the same time every time. Temperatures and moisture can be unpredictable at any time of the winter but are even more so in November and March. The differences in potential effects of trampling could be incremental.

If, after monitoring the effectiveness of this schedule for several more years, the desired condition was still not being attained, then the months of grazing would be shifted again. There would be no further reduction in overall use, and the use would still be in a deferred rotation schedule as described above. The rotation would simply use a different combination of January, February, and March time periods. Although perhaps beneficial, this change would have no calculable difference in trampling or herbivory effects to Spalding's catchfly.

If, after still further use under this schedule and further monitoring, the desired condition was still not being attained, then the months of grazing use might be shifted again.

While it could be advantageous to Spalding's catchfly habitat to not graze it the same months every year, it would still get grazed every year, but for less time (less total months) over time – if monitoring results over a 3 to 6 year period were conclusive that current management (Alternative B) was not getting the terrain toward the desired conditions. There is no way to know if changing the time of the winter grazing will substantially reduce the potential for soil damage. There is no way to tell if temperatures in November and December are going to be consistently colder (more frozen) than in January, February, or March. The soils in April and May are likely to be moist and soft and vulnerable to displacement, but the ground would only be used every other spring. Any changes in how other ongoing actions could interact differently with the possible seasonal changes proposed here would probably be immeasurable. In the end the differences between Alternative B and Alternative C in conceivable effects to Spalding's catchfly from livestock use of this pasture is very minor, with Alternative C having some potential to reduce the overall amount of use over time.

To the degree that these changes would reduce impacts to Spalding's catchfly they also would reduce impacts to the suitable habitat surrounding this plant. Even this small amount (in just a few pastures) of rest would provide more of an opportunity for recovery and stabilization of the habitat, thus improving habitat conditions for the Spalding's catchfly in the area and making it more resilient to further impacts.

Lower Spain Saddle and Big Pine Pastures

In this alternative discussion these two pastures will be discussed together because the Big Pine Pasture would be created from the northeastern half of the Lower Spain Saddle pasture. Once the Pig Pine pasture is created, the new configuration of the Lower Spain Saddle pasture does not contain any Spalding's catchfly, so its schedule of use for this alternative would have no further influence on effects to Spalding's catchfly. In this alternative the Big Pine pasture would be used in a two-year rotation where one year the pasture would be rested and the following year used as a pasture. The season of use during the year of use has not been decided but would fall some place within the permitted season for the allotment as a whole. This would reduce the livestock use of the area by ½ as compared to how this portion of the pasture would be used in Alternative B. So for the Spalding's catchfly in the Big Pine pasture the chances of being impacted through herbivory or trampling would be similar when grazing is being applied but the application of grazing would happen half as often, thus reducing the overall potential to impact those plants over time. This scenario is likely moving things in an advantageous direction for Spalding's catchfly as well as for conditions in the surrounding habitat.

Effects Summary of Alternative C, Proposed Management on Spalding's catchfly

The grazing management proposed under this alternative is identical to that proposed for Alternative B for the Cow Creek, Lone Pine, and Rhodes Allotments. The grazing management proposed by Alternative C for the Toomey Allotment is only slightly different than that proposed under Alternative B (Current Management). This small difference reduces some of the potential direct and indirect effects to Spalding's catchfly from livestock use but does not measurably change how these effects interact with the other cumulative actions going on in the allotments as compared to Alternative B. Overall the summary of effects to Spalding's catchfly described for Alternative B would apply here. The changes in season proposed here would not make a measurable difference in the potential for herbivory effects to Spalding's catchfly. The slight reduction in potential effects to Spalding's catchfly in this alternative would come from reducing by half (over time) the frequency that the Spalding's catchfly in the Big Pine pasture would be exposed to potential trampling effects. Also this Alternative has the potential to reduce by 1/3 (over time) the frequency that the Spalding's catchfly in the Johnson Canyon pasture would be exposed to potential trampling effects. This scenario should also be as advantageous to the surrounding suitable habitat (in terms of allowing for some level of rest and recovery) as it is to Spalding's catchfly plants.

However the risks of effecting Spalding's catchfly in the other pastures and the other allotments remain the same as with Alternative B. It is likely that some Spalding's catchfly are going to be impacted. Potential Direct Effects have been identified from herbivory of Spalding's catchfly plants but this effect is anticipated to be very low because of the time of year that livestock grazing is permitted. Spalding's catchfly plants would not be available forage during that time period although May grazing is getting close to when Spalding's catchfly could be bolting in the canyon.

Given all these factors and potential impacts, it seem logical that some unknown number of Spalding's catchfly are being impacted by range management actions under this alternative or by both range management and other factors acting cumulatively.

Thus it is concluded that Alternative C May Effect – Likely To Adversely Affect Spalding's catchfly within the allotments governed by its design.

Direct Indirect and Cumulative Effects of Alternative D on Spalding's catchfly

The kinds of effect from this alternative to Spalding's catchfly are expected to be the same as that discussed for Alternative B. The degree to which they could affect Spalding's catchfly and the chances of that effect happening would be the only differences. None of the possible effects discussed here are quantifiable and all are qualitative. Thus the following discussion bases the effects analysis on a comparison with those effects disclosed under Alternative B, and where meaningful, Alternative C.

Please refer to the LIRA DEIS, Chapter Two for more details on the exact rotation and rest schedules for these pastures.

Toomey Allotment

This Alternative would allow for rest from grazing 1 year in every 3 years for the entire Toomey Allotment. This would have the effect of reducing the potential for herbivory and trampling impacts from livestock by 1/3 for all of the Spalding's catchfly sites over a 9 year period compared to current management (Alternative B). This is a substantial reduction in the risk of impacts to Spalding's catchfly and its habitat as well as a meaningful opportunity to increase the rate of recovery and stabilization of the surrounding habitat. While grazing is being implemented in the two active use years, the effects would likely be the same as that previously discussed because the scheduled use would be the same as that proposed in Alternative B.

Spalding's catchfly has not been found in other Toomey pastures though suitable habitat exists. The effects to any undiscovered would be the same as that discussed to known occurrences.

Effects to Spalding's catchfly from the scheduled use in the Toomey allotment have been identified in Alternative B. Those potential effects are not changed or different in this alternative. The difference is that the frequency with which those effects could be impacting Spalding's catchfly has been substantially reduced and more recovery time is available between periods of use. In essence there would be less potential for impacts over time.

Lone Pine Allotment

The two Spalding's catchfly sites in the Lone Pine allotment are both in the Big Canyon pasture

Spalding's catchfly has not been found in other Lone Pine pastures though suitable habitat exists. The effects to any undiscovered would be the same as that discussed to known occurrences.

This Alternative would allow for rest from grazing 1 year in every 3 years for the entire Lone Pine Allotment. This would have the effect of reducing the potential for herbivory and trampling impacts from livestock by 1/3 for all of the Spalding's catchfly sites over a 9 year period compared to current management (Alternative B). This is a substantial reduction in the risk of impacts to Spalding's catchfly and its habitat as well as a meaningful opportunity to increase the rate of recovery and stabilization of the surrounding habitat.

While grazing is being implemented in the two active use years, the effects would likely be the same as that previously discussed because the scheduled use would be the same as that proposed in Alternative B.

Alternative B, Current Management, proposed grazing in the Big Canyon pasture during December and May every year. The effects of that schedule are presented above in the discussion of effects of Alternative B. Under this alternative, use of the Big Canyon pasture would alternate between being used in April and May one year, and then the next period of use would be in January and February. The potential effects to Spalding's catchfly of grazing during January, February, April, and May have been discussed above, and apply here. However in this alternative Spalding's catchfly would essentially be exposed to herbivory and tramping impacts during the winter once out of every three years instead of every winter. Similarly Spalding's catchfly would be exposed to herbivory and trampling in the spring once out of every

three years instead of every year. These two factors multiply the potential benefits to Spalding's catchfly and the surrounding habitat beyond just resting one of three years because when the pasture is used it is in a different season with different levels of risk than the last time. Any time the opportunity for impacts is lowered there is a concurrent reduction in the risk of damage to Spalding's catchfly.

The interaction of gazing management and other ongoing actions would likely be the same as that discussed above in Alternative B, but the ability of the Direct and Indirect effects to contribute to cumulative effects has been substantially reduced.

Rhodes Creek Allotment

Fifty four (54) patches of Spalding's catchfly are found in the Rhodes creek allotment. This Alternative would allow for rest from grazing 1 year in every 3 years in the East and West Lightning Bench pastures in the Rhodes Creek Allotment

While in the use phase of the rotation cycle, the East and West Lightning pastures would follow the scheduled use described in Alternative B. Therefor the kinds effects would be the same as that described for Alternative B, but the overall risk to Spalding's catchfly would be less because the frequency of those impacts would be reduced by at least 1/3rd. While in the rest phase of the rotation cycle the East and West Lightning cattle will be dispersed to other pastures and allotments. However they will not be added to the Bull pasture or the North and South Roy pastures.

Spalding's catchfly has not been found in other Rhodes Creek pastures though suitable habitat exists. The effects to any undiscovered would be the same as that discussed to known occurrences.

The use scheduled for North and South Roy and Bull pastures would be the same as that proposed in Alternative B. Therefor the effects in these pastures would be the same as that described for Alternative B. There is no rest proposed for these pastures in this alternative.

Effects Summary of Alternative D, on Spalding's catchfly

The amount or rest and deferment proposed in this alternative for pastures containing Spalding's catchfly significantly reduce the amount of exposure to potential impacts as compared to Alternative B (and C) although this reduction in potential effects is difficult to quantify. Every allotment with Spalding's catchfly contains changes advantageous to it and its habitat. This alternative multiplies the potential benefits of rest and rotation by also significantly reducing the number of livestock utilizing these four allotments. The permitted numbers for Cow, Rhodes, and Toomey would be run across all four allotments. This is another reduction in potential threats to Spalding's catchfly over time. This alternative presents a substantial reduction in the risk of impacts to Spalding's catchfly and its habitat as well as a meaningful opportunity to increase the rate of recovery and stabilization of the surrounding habitat. Any time the opportunity for impacts is lowered there is a concurrent reduction in the risk of damage to Spalding's catchfly and its suitable habitat. The interaction of gazing management and other ongoing actions would likely be the same as that discussed above in Alternative B, but the

ability of the Direct and Indirect effects to contribute to cumulative effects has been substantially reduced.

Although the potential for impacts has been reduced, the kinds of activities are still the same. Their incidence has been reduced in most areas but use in the North and South Roy, and Bull pastures would remain the same as in Alternative B.

Although this alternative poses much less risk of potential impacts than Alternative B (or C), it seems logical that there is still potential for some unknown number of Spalding's catchfly to be impacted by range management actions under this alternative or by both range management and other factors acting cumulatively.

Thus it is concluded that Alternative D May Effect – Likely To Adversely Affect Spalding's catchfly within the allotments governed by its design.

Direct Indirect and Cumulative Effects of Alternative E on Spalding's catchfly

The kinds of effect from this alternative to Spalding's catchfly are expected to be the same as that discussed for Alternative B. The degree to which they could affect Spalding's catchfly and the chances of that effect happening would be the only differences. None of the possible effects discussed here are quantifiable and all are qualitative. Thus the following discussion bases the effects analysis on a comparison with those effects disclosed under Alternative B, and where meaningful, Alternative C and D. The Lone Pine Allotment would be utilized as a Forage Reserve through a Temporary Grazing Permit (reference the FSM) for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment.

The effects to Spalding's catchfly from this alternative are essentially the same as that described for alternative C because the management prescriptions are the same in the areas affecting this species. There would be a slight reduction in the risk of impacting Spalding's catchfly under this alternative because the proposed grazing scheme for the Lone Pine allotment would only be implemented in 3 of 5 years maximum, and perhaps less. Over time this would reduce the potential impacts to Spalding's catchfly by reducing the frequency over approximately a 10 year period – that Spalding's catchfly would be exposed to those effects. Alternative C would use Lone Pine every year.

A couple factors challenge any potential benefit of reducing the frequency of Lone Pine use. Livestock that are new to an area and lack the knowledge of where to find forage, water, and salt, and often express different and unpredictable trailing and foraging behavior compared to that expected of a herd whose cows have experience in the area. Meeting standards is still required but will be more difficult and at a greater risk of failure. Predicting how this might change effects to Sensitive plants from what has been discussed is difficult, but you generally end up dealing with more unexpected impacts with more different herds using an area. This scenario can also be compounded by the potential situation where more than one permittee is trying to use the same allotment at the same time. Once complexity is added to the management environment there is additional risk that management will not go as planned. However none of these concerns are quantifiable.

Effects Summary of Alternative E, Proposed Management on Spalding's catchfly

Currently there are only 108 Spalding's catchfly plants in two sites in the (Big Canyon pasture) Lone Pine allotment. There is ample suitable habitat across this allotment and there could be undocumented Spalding's catchfly sites that would benefit from the allotment rest in 2 of the 5 years. Because so few Spalding's catchfly individuals would see an advantageous change in management compared to the total number in the LIRA project area it is concluded that there is only an incremental difference in this alternative compared to Alternative C.

Thus it is concluded that Alternative E May Effect – Likely To Adversely Affect Spalding's catchfly within the allotments governed by its design.

Soil Resources

Introduction

Livestock grazing can have a number of potential effects on soil quality. Grazing began in the LIRA area as early as the 1700's by Nez Perce tribe livestock, and increased dramatically with the homesteading that occurred in the late 1800's and early 1900's. As a result, impacts to soil quality from intensive grazing are found throughout the LIRA area. The extent and degree of divergence from natural conditions resulting from permitted grazing activities is variable and has been influenced by many factors. These factors include the type and intensity of historic and current management, soil type, topography, elevation and aspect.

Impacts to soil quality are generally associated with animal trails and terraces, (both in the uplands and along fence lines), water sources, salting and loafing areas, and abandoned hay and cultivated farm fields (USFS 2009). Soil quality of the LIRA area has also been altered by a variety of other management and natural disturbances (e.g. fires). These impacts are still evident on the landscape today (Quigley et al. 1997). However, since approximately the 1960s permitted numbers and grazing season have been reduced, which has allowed soil and ecological conditions to improve (refer to Chapter 1 of the LIRA EIS).

Analysis Framework: Statute, Regulatory Environment, Forest Plan and Other Direction

Forest Plan

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Forest Plan direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for Soil Resources.

1990 Wallowa-Whitman Forest Plan

The Wallowa-Whitman Forest Plan includes the following standards and guidelines for soils (4-21):

- Give maintenance of soil productivity and stability priority over uses described or implied in all other management direction, standards, or guidelines.
- Minimize detrimental conditions with total acreage of detrimentally impacted soil not to exceed 20% of the total acreage within the activity area including landings and system roads. Where detrimental conditions affect more than 20% or more of the activity area, restoration treatments will be considered. Detrimental soil conditions include compaction, puddling, displacement and severe burning.

2003 Hells Canyon Comprehensive Management Plan (CMP)

The CMP identifies "… a healthy ecosystem that is an integral component of a larger biological region. Sustainability of ecological functions and processes is deemed important to maintaining ecosystem health …" as key to area management. The HCNRA also states "… manage grassland vegetation to ensure continued ecological function and sustainability of native ecosystems …" Objectives, Standards, and Guidelines are provided in Appendix C (CMP 2003: Soil C64-66 and C80-84). The Objectives, Standards, and Guidelines for the Lower Imnaha Rangeland Analysis Area are summarized in the Consistency Review in the project file.

The LIRA analysis uses the definition for capable grazing lands for cattle (less than 45 percent slopes) to calculate stocking rates. However, it is generally acknowledged that cattle do access sites with slopes greater than 45 percent. Use, and the extent and degree of related resource impacts on sites with greater than 45 percent slope depend on the severity of topographic features, and presence of rock outcrop and/or the amount of cobble and stone-sized rock cover limiting livestock access. Steep rocky sites tend to have fewer soil impacts associated with livestock management as compared to low gradient and non-rocky sites.

Action alternatives for this analysis and resulting effect are in compliance with the current management directives. Current soil conditions indicate that adequate soil protection and soil productivity is being maintained under current management. Greater than 80 percent of the activity area is being maintained in non-detrimental soil conditions. Natural soil stability processes appear to be satisfactorily maintaining soil integrity, productivity and overall rangeland health.

Environmental Consequences

Affected Environment

Landscape Characteristics

The Lower Imnaha Range Analysis Area elevation ranges from approximately 1,000 feet for river and valley bottoms to 5,421 feet for mountain and ridge tops. Four dominant landform association groups are represented within the LIRA, 1) Alluvial terraces and alluvial valley floors, 2) Gentle mountain slopes, 3) Steep mountain slopes, and 4) Canyons (USDA FS 2006).

Landform type and topography directly influence soil characteristics and productivity, and erosional, sedimentation and hydrologic processes. These processes specifically include mass wasting, surface erosion and runoff.

Soil Properties and Characteristics

General Soil types

Soils within the LIRA are grouped based on relative amounts of volcanic ash influence and soil depth, defined as total depth to bedrock or restrictive layer. In general, predictable patterns of volcanic ash distribution across the landscape serves as an index to soil productivity, vegetation communities, erosion processes and landscape stability, and disturbance factor regimes, including fire (USDA FS 2006, NRCS 2013). Soils with a high volcanic ash influence respond differently to use and management than do residual soils (USDA 2007, USDA FS 2006, McDaniel and Miller 2007). Soils with a high amount of ash content in the LIRA are associated with dry non-forest vegetation zones on moderately steep to steep slopes with northern aspects.

Sites with mixed ash soils generally indicate a less stable and more erosive environment, either from slope steepness, lower inherent vegetation cover, or episodes of vegetation removal (i.e. fire). Sites associated with mixed ash soils generally have climatic zones with more frequent fire regimes than sites associated with soils with high ash content (USSA FS 2006, NRCS 2013).

Shallower, less productive, residual soils with no to minimal volcanic ash content are generally found on steep mountain slopes with southern and western aspects, and wind-swept noses of ridges and benches. Residual soils are also associated with old alluvial terraces and flood plains on valley floors where volcanic ash has been washed away in swift runoff since it was originally deposited (USDA FS 2006). Sites with residual soils indicate an active erosional environment.

Residual soils tend to be very shallow to moderately deep, with loam, silt loams and silty clay to clay texture (NRCS 2013). Gravel and cobble content tends to be high to extremely high, as compared to both ash capped and mixed ash soils. These soils are generally associated with dry non-forest vegetation zone consisting primarily of Bluebunch wheatgrass plant communities (NRCS 2013). The inherent susceptibility to sheet and rill erosion of these soils is low. Potential for soil compaction and displacement from hoof shear is low to moderate (USDA FS 2006).

Soil Organic Matter

Soil organic matter is composed of plant and animal residues including microbial biomass in various stages of decomposition. The productivity of rangelands is tightly bound to soil organic matter content (Page-Dumroese et al. 1990). Soil organic matter enhances a number of physical and chemical soil functions. It serves as a reservoir of nutrients and water in the soil, aids in reducing compaction and surface crusting. It increases water holding capacity, and improves soil aggregate stability (Page-Dumroese et al. 1990). Soil aggregate stability is vital for good soil structure, permeability, infiltration, and resistance to erosion.

Soil Erosion Potential

Surface soil erosion is a natural process usually described by three components: 1) detachment, 2) transport and 3) deposition. The dominant natural erosion processes in the LIRA are water and wind erosion, and mass wasting and soil creep.

The inherent soil erosion potential is an estimate of the sites ability to resist erosion based on the characteristics of soil texture, infiltration rate, effective soil cover, landform and climate (USDA FS 2006). Soils with faster infiltration rates, higher levels of organic matter, and good soil structure have a greater resistance to erosion. Limiting alteration of soil structure and aggregate stability will reduce the risk of accelerated soil erosion (USDA FS 2006).

Generally, soils that are high in silt and low in clay and organic matter are the most erodible. Soils with moderate textures (e.g. silt loams silty clay loam, silty clays, sandy loams) are associated with moderate to high erodability. Coarse textured soils, (e.g. sands and loamy sands) with higher infiltration rates are associated with low erodablity (USDA FS 2006, NRCS 2013).

Erosion potential is directly related to amount of effective soil cover. In addition, the loss of valuable surface soil organic matter through accelerated soil erosion can change surface soil structure, lower the moisture holding capacity of the soil and reduce overall soil productivity (Blackmann 1992).

Detachment and transport of exposed soils is highly related to slope gradient and slope length. In general, the greater the slope angle and slope length of a site, the greater the erosion potential, and greater amount of soil loss by water due to accumulation of runoff (USDA FS 2006, Robichaud and Brown 1999).

Landtype Association

The Landtype Association (LTA) is an ecological inventory conducted on a landscape level, which identifies similar physical and biological processes. The LTA ecological inventory's primary purpose is to identify concepts used in Forest-level resource planning to identify significant differences in the landscape, and to aggregate landscape elements with similar management considerations and interpretations (USDA FS 2006).

Capable Grazing Lands

There are approximately 13,627 Capable Grazing Land acres in the LIRA area (Tables S-1). Ten dominant LTAs are represented on Capable Grazing Lands in the LIRA. Representative soil series for the dominant LTAs are listed, along with key soil properties in the Soil Resource Report Appendix A in the project record. Official descriptions for each soil series are also described in detail and published by the National Soil Survey (NRCS 2013).

Table S-1. Capable Grazing Land acres by Allotment.

Allotment	Total Allotment (Acres)	Capable Grazing (Acres)	Percent of Allotment with Capable Grazing (%)
Cow Creek	5,824	1,322	23
Rhodes Creek	22,660	6,687	30
Toomey	4,276	2,096	49
Lone Pine	11,138	3,162	28
LIRA Total	43,848	13,267	30

LTAs 316 (*Anatone Bocker)* and 317 *Anatone Imnaha Rock Outcrop)* are the dominant LTAs in the LIRA. LTA 316 comprises approximately 50 percent (6,631acres) of LIRA Capable Grazing acres. LTA 316 is associated with slopes less than 30 percent and a low to moderate disturbed soil erosion potential. LTA 317 comprises approximately 28 percent (3,731acres) of Capable Grazing acres, and is associated with 30 to 60 percent slopes, and a moderate to high risk of disturbed soil erosion. Although LTA 317 is associated with greater than 45 percent slopes, only the acres with less than 45 percent slopes are included in the Capable Grazing Land acres. The Soil Resource Report in the project record provides additional information on LTAs by allotments.

Approximately 30,230 acres of the LIRA are considered not capable of supporting cattle grazing. Non-capable lands may occasionally be used by domestic livestock, but not commonly due to the severity of topography and canopy.

Effective Ground Cover

Maintaining adequate ground cover is critical for erosion control. A minimum effective ground cover of 60-70 percent to prevent excessive soil loss of rangeland soils is set by the CMP, Forest Plan standards and guidelines, and the Range Analysis and Management Handbook. Due to low plant production, high percentage of bare ground cover and lower inherent soil aggregate stability dry grassland communities are naturally at risk of runoff and soil erosion (USDA FS 2006, NRCS 2013, Redman 2012). The inherent ground cover type and amount are dependent on site specific annual precipitation levels. Dry non-forested bunchgrass plant communities in the LIRA receive annual precipitation of ranging from approximately 20 to 40 inches. Actual amount is highly dependent on elevation (NRCS 2012).

Long term Condition and Trend plots (C & Ts) within the LIRA have been monitored for percent bare ground since the late 1950 and the early 1960s. Due to loss of long term records in a Forest Service office fire in 2010, ground cover trends can only be determined for 5 of the long term plots (Lower Imnaha 1, 2 and 4, and Lone Pine 3 and 14). However, the long-term data from these plots show a trend in increased effective ground cover over time.

Ground cover data for twelve LIRA C& T plots read in 2012 and nine IIRH soil condition point intercept transects read in 2013 are displayed in the Soils Resources specialist report Appendix D (Tables 1 through 4) in the project file for Lone Pine, Cow Creek, Rhodes Creek and Toomey Allotments, respectively. It is important to note that several C&T plots and IIRH sites are located within the same pastures and on similar LTAs. However, they may be on different ecological

sites, aspects and percent slope. Therefore, data of different monitoring sites within same pastures are used only for describing a range of current conditions. Data from different survey sites should not to be compared to each other or to determine trends.

A minimum effective ground cover of 60-70 percent was observed on the majority of long term C&T plots and IIRH point intercept transects. Two IIRH point intercept transects had less than 60 percent minimum effective ground cover, including IIRA site 18 in Spring Gulch Pasture of the Toomey Allotment (56% effective cover), IIRA site 19 in Tully Pasture of the Rhodes Creek Allotment (60% effective cover).

Compaction and Displacement Potentials

Compaction potentials for LTA representative soil series in the LIRA are listed in the project file, in the Soils Resource specialist report, Soil Appendix A (Table S-1). Soil compaction (increase in soil bulk density with a decrease in soil porosity), can alter soil productivity, hydrologic function and water holding capacity. Reductions in infiltration rates caused by soil compaction can lead to increased runoff, surface erosion, and sedimentation of creeks. Reduction in water holding capacity of a soil can reduce the amount of water available for plant growth, and storage and release.

In general, ash capped soils and ash or loess influenced soils have a high compaction potential. Residual basalt soils have a lower compaction potential relative to ash soils (NRCS 2013). Fine and medium textured soils are more susceptible to compaction when moist as compared to coarse textured soils. Compaction potentials of LIRA representative soil series are based on published soil bulk densities (NRCS 2013).

Other factors affecting the degree and extent of soil compaction include the degree or duration of pressure exerted on the soil and soil moisture content at the time of disturbance. Prolonged trampling by animals or humans can compact the soil surface to the same degree as mechanical equipment (NRCS 1996).

Displacement is the movement of soil from one place to another by mechanical forces such as an animal hoof, a wheel or blade. Similar to soil compaction, displacement can alter the soil properties and reduce site productivity. Soils differ in their inherent ability to resist displacement. In general soils most susceptible to compaction are those most susceptible to displacement (NRSC 2013).

Effects Analysis Methodology

One assessment protocol, Interpreting Indicators of Rangeland Health (Pellant et al. 2005) herein known as IIRH or rangeland health, and two long term monitoring protocols were used to evaluate soil quality 1) long-term C&T monitoring plots (USFS 1994), and 2) line point intercept transects to determine soil compaction, soil displacement and accelerated erosion, and percent ground cover type (Pellant et al. 2005, Herrick et al. 2005). Rangeland Health is an assessment used to provide early warnings of resource problems on upland rangelands (Pellant et al. 2005), and provide support the need and type of further quantitative monitoring. The two monitoring protocols listed quantitatively measure the amount of surface soil displacement from grazing,

amount of detrimental impacts to soils, and demonstrate trend in soil condition as referred to in Chapter 1, Significant Issues discussion.

Indicators of Rangeland Health

The Interpreting Indicators of Rangeland Health (Pellant et al. 2005) is an interagency approved procedure of qualitative assessment of upland rangeland health. Rangeland health is defined as: "The degree to which the integrity of the soil, vegetation, water, and air, as well as the ecological processes of the rangeland ecosystem is balanced and sustained" (Pellant et al. 2005).

The Interpreting Indicators of Rangeland Health Assessment (IIRH) protocol provides a framework to assess seventeen qualitative indicators of ecological functional status for three interrelated attributes of rangeland health. These attributes include 1) soil and site stability, 2) hydrologic function and 3) biotic integrity. Ten of the seventeen indicators relate to soil characteristics and include; rating amount, degree, pattern and extent of rills, water flow patterns, pedestals/terraces, bare ground, gullies, wind scours/deposition, litter movement, surface resistance to erosion, surface loss or degradation, and compaction. The hydrologic function attribute includes the ten soil indicators for soil stability in addition to plant composition relative to infiltration, and compaction (Pellant et al. 2005).

This protocol will produce three ratings, one for each of three attributes. The ratings range from None to Slight, Slight to Moderate, Moderate, Moderate to Extreme and Extreme to Total. The ratings reflect a degree of departure from expected conditions per a specific ecological site description reference sheet (Pellant et al. 2005, NRCS 2013). The severity of departure from conditions expected for the site is based on the professional judgment of qualified personnel which is supported by baseline data, literature or other local studies (Pellant et al. 2005, NRCS 2013).

Interpreting Indicators of Rangeland Health, (Pellant et al. 2005), was completed for twenty sites within the LIRA area. Four IIRH sites (1, 2, 3 and 4) were located within the Lone Pine Allotment, three IIRH sites (7, 8 and 9) were located in the Cow Creek Allotment, Ten IIRH sites were located in the Rhodes Creek Allotment, and three IIRH sites were located in the Toomey Allotment. IIRH surveys were conducted in 2010. The percent ground cover type, biological soil crust and soil condition data were incorporated into the IIRH assessments in 2013.

IIRH assessment sites were located on dry non-forested plant community types. Topography ranges from lower, mid and upper slopes, alluvial outwash terraces, tops of ridges, and plateaus. Slopes ranged from 5 to greater than 60 percent. The majority of sites were located on slopes greater than 15 percent and less than 50 percent. The average slope gradient was 35 percent. IIRH sites were predominately located on south, southeast and southwest facing slopes. Three IIRH sites were located on north or northeast facing slopes (one in the Lone Pine, Cow Creek and Rhodes Creek Allotment).

Summary of IIRH Ratings

IIRH surveys indicates that soil stability and hydrologic function are strongly associated with historical homesteading activities, cultivation, and permitted grazing on gentle gradient sites,

and sites on steep northern facing slopes with deep, moist soils. IIRH surveys conducted on homesteaded sites generally indicate that soil and hydrologic conditions are slightly to moderately departed from expected conditions. Departures from conditions expected are generally due to a greater amount of bare ground, presence of soil compaction, and change in plant community composition associated with historic soil loss and degradation (NRCS 2013). Plant communities on many low gradient, non-rocky sites have generally been transitioned from dominant native bunchgrass plant communities to dominant annual grass plant communities or shallower rooted bunchgrasses (red three awn and sand drop seed).

IIRH surveys conducted on moderately steep and steep northern slopes generally indicate that soil and hydrologic conditions range from slight to moderate, and moderate to extremely departure from expected conditions. Departures from conditions expected are generally due to soil displacement and compaction, and increased sheet wash erosion associated with hoof shear and animal formed terraces (NRCS 2013). Exposed fine textured soils will harden when they dry, slowing soil permeability and infiltration rates. These changes in hydrologic function are associated with slow vegetation recovery rates (NRSC 2013).

Biotic Integrity ratings broadly ranged from slight to moderate and moderate to extreme departure from conditions expected for the ecological sites (NRCS 2011). Compared to the desired condition, a decline in native bunchgrasses and an increase in annual vegetation were noted in many of the sites within the LIRA area. Risks to most IIRH site conditions include the encroachment of annual bromes and other invasive species.

The evaluation area for an IIRH site is at least one half to one acre in size, and is considered an indicator of rangeland conditions within a pasture. Seven of the 20 IIRH sites (2, 7, 10, 11, 12, 16, and 18) assessed in the year 2010 indicated a moderate or greater departure for soil and site stability or hydrologic function than expected for the associated ecological sites (Table S-2). A moderate or greater divergence from ecological conditions expected are considered to be at risk of soil loss from accelerated soil erosion and reduced of soil productivity, and therefore the site is considered not in satisfactory conditions for rangelands (CMP 2003, Bliss 2000, Pellant et al. 2005, Mellmann-Brown 2013).

TableS-2. IIRH Sites in the LIRA area with moderate/ greater departure from expected

Allotment	Pasture	Soil and Site Stability	Hydrologic Function
Lone Pine	Doug Creek (#2) (South Slope)	Slight to Mod	Mod
	Doug Creek (#2) (North Slope)	Slight to Mod	Mod
Cow Creek	Rowley (#7)	Moderate	Moderate to Extreme
Rhodes Creek	Eastbench Lightning (#10)	Sight to Mod	Mod
	Bull (#11)	Mod to Extreme	Mod to Extreme
	Bull (#12)	Moderate	Moderate
	Sleepy Breaks (#16)	Mod to Extreme	Mod to Extreme
Toomey	Spring Gulch (#18)	Mod to Extreme	Mod to Extreme

Lone Pine Allotment

IIRH assessments were conducted on 4 sites within the Lone Pine (Table S-3). IIRH results for soil and site stability and hydrologic function ranged from none and slight to moderate. Soil stability tests indicated slight to moderate departure.

Table S-3. Interpreting Indicators of Rangeland Health Ratings for the Lone Pine Allotment.

Pasture (IIRH Site #)	**Soil and Site Stability**		**Hydrologic Function**		**Soil Stability Test**
Little Deep Creek (#1)	None to slight (4.9).	• Bare soil • Hoof shear	None to slight (4.8).	• Bare soil • Hoof shear	None to slight (5.9).
Doug Creek (#2) South Slope	Slight to mod (4.7).	• Bare soil associated with annuals	Mod (4.2).	• Bare soil associated with annuals	None to slight (4.0).
Doug Creek (#2) North Slope	slight to Mod (4.7).	• Bare soil associated with annuals	Mod (4.2).	• Bare soil associated with annuals	None to slight (4.0).
Birch Creek (#3)	None to slight (5.0).	• Little evidence of surface soil loss	Slight (4.7).	• Little evidence of surface soil loss Change in plant community	None to slight (5.0).
Big Canyon (#4)	Sight to mod (4.6).	• Bare soil • Pedestals • Rills • Water flow	Slight to Mod (4.4).	• Bare soil • Pedestals • Rills • Water flow • Amount litter • Change in plant community	Slight to Mod (3.8).

Cow Creek Allotment:

Three IIRH sites were assessed in the Cow Creek Allotment (sites 7, 8 and 9), (Table S-4). IIRH results indicated a range from none to slight, and moderate for soil and site stability. Hydrologic function ranged from slight, and moderate. Soil stability tests indicated none to slight departure from conditions (NRCS 2013).

Table S-4. Interpreting Indicators of Rangeland Health Ratings for the Cow Creek Allotment.

Pasture (IIRH Site #)	**Soil and Site Stability Attribute**		**Hydrologic Function Attribute**		**Soil Stability Test**
Rowley (#7)	Mod (3.8)	• Surface soil loss • Compaction • Pedestals • Bare soil • Terraces	Mod / Mod to ext (3.4)	• Surface soil loss • Compaction • Pedestals • Bare soil • Terraces • Change in plant community	None to slight (4.5)
West Cow Creek (#8)	Sight to mod (4.7)	• Surface soil loss • Compaction	Slight to Mod (4.7)	• Surface soil loss • Compaction • Change in plant community	None to slight (5.0)
Salt Gulch (#9)	None to slight (4.8)	• Surface soil loss	Slight (4.6)	• Surface soil loss • Change in plant community	None to slight (4.8)

IIRH site 7 is located in the Rowley pasture. The soil and site stability rating for IIRH site 7 indicated moderate departure from expected conditions. This rating was due to a moderate to extreme departure for surface soil loss and degradation and soil compaction (deep seated compaction, up to 4” deep on of terraces), and a moderate departure for pedestals and bare ground from that expected for the site. The greater than expected amount of bare ground is attributed to active soil slumping, accelerated erosion and presence of invasive weeds. It appears that soil and site conditions are associated with the historic formation of terraces from animal trailing that are common throughout the site. The soil stability test conducted on site soil indicated relatively stable aggregation and soil stability to erosion (NRCS 2013).

The hydrologic function rating site 7 indicated moderate/moderate to extreme departure from expected conditions. The rating is primarily due to a moderate to extreme departure for plant community composition, soil compaction and historic surface soil loss and degradation. The terraces are primarily vegetated with invasive annuals. However, the sidewalls of the terraces have vegetation composition of late seral bunch grass communities, with some forbs and annuals similar to what is expected for the site (Johnson and Simon 1987). The biotic integrity rating for site 7 indicated a moderate to extreme departure for conditions expected for the site. This rating is due primarily to the change in vegetation composition from late seral bunch grasses to annual grasses and forbs on animal formed terraces.

Rhodes Creek Allotment:

Interpreting Indicators of Rangeland Health, (Pellant et al. 2005), was completed for ten analysis areas (sites 5, 6, 10, 11, 12, 13, 14, 15, 16 and 19) within the Rhodes Creek Allotment (Table S-5).

Table S-5. Interpreting Indicators of Rangeland Health Ratings for the Rhodes Creek Allotment.

Pasture (IIRH Site #)	Soil and Site Stability Attribute		Hydrologic Function Attribute		Soil Stability Test
Willow Spring (#5)	Sight to mod (4.7)	• Bare soil • Pedestals • Soil movement • Rills	Sight to mod (4.6)	• Bare soil • Pedestals • Rills • Change in plant community	Slight (3.4)
Private land within Holmes Pasture (#6)	None to slight	• Pedestals • Soil sloughing and hoof shear	None to slight	• Pedestals • Soil sloughing and hoof shear • Change in plant community	Slight (3.9)
East-bench Lightning (#10)	Sight to Mod (4.4)	• Surface soil loss • Compaction • Bare soil	Mod (4.1).	• Surface soil loss • Compaction • Bare soil • Change in plant community	None to slight (5.7)
Bull (#11) .	Mod to Ext (3.2)	• Water flow patterns • Bare soil • Pedestals • Active erosion • Hoof shear	Mod to Ext (3.2)	• Water flow patterns • Bare soil • Pedestals • Active erosion • Hoof shear • Change in plant community	Slight (4.3)
Bull (#12)	Mod (4.0)	• Bare soil • Pedestals • Active erosion • Water flow • Hoof shear	Mod (4.0)	• Bare soil • Pedestals • Active erosion • Water flow • Hoof shear	None to slight (6.0)
East-bench Lightning (#13)	Slight (4.7)	• Bare soil • Soil loss and degradation	Slight (4.6)	• Bare soil • Soil loss and degradation	None to slight (5.9)

Pasture (IIRH Site #)	**Soil and Site Stability Attribute**		**Hydrologic Function Attribute**		**Soil Stability Test**
Pvt. Land within South Roy Canyon (#14)	Sight to mod (4.6)	• Bare soil • Compaction • Terraces • Soil loss and degradation	Slight to mod (4.5)	• Bare soil • Compaction • Terraces • Soil loss and degradation • Change in plant community	None to slight (5.7)
Rhodes Creek (#15)	Sight (4.7)	• Pedestals • Soil loss and degradation • Hoof shear	Sight (4.7)	• Pedestals • Soil loss and degradation • Hoof shear • Change in plant community	None to slight departure (5.3)
Sleepy Breaks (#16)	Mod to extr (3.1)	• Water flow paths • Bare soil • Soil loss and degradation • Rills • Pedestals • Low soil stability	Mod to extr (3.0)	• Change in plant community • Water flow paths • Bare soil • Soil loss and degradation • Rills • Pedestals • Low soil stability	Mod (2.7)
Tully (#19)	None to slight (4.9)	• Bare soil	None to slight (4.9)	• Bare soil	None to slight (5.6)

IIRH sites 10 and 13 were located in the Eastbench Lightning Creek pasture. Site 10 was located on shallow, rocky soil with silt loam to silty clay loam textures on a 12 percent southwest slope at 2,160 feet elevation. The soil and site stability rating for site 10 indicated a slight to moderate departure for conditions expected for the site. This rating is due to the presence soil compaction layer, and historic surface soil loss and degradation. Soil compaction is evident by presence of platy soil structure to a depth of 3 inches and moderately widespread throughout the site, and up to 4-6 inches deep in isolated areas. Pedestals are in flow paths and interspaces. Bare ground cover is higher than expected for the site (Johnson and Simon 1987). Soil biotic crust and moss cover is less than expected (Johnson and Simon 1987). Soil resistance is good.

The hydrologic function rating for IIRH site 10 was moderate. The ratings and justifications for hydrologic function generally reflect those for soil and site stability. In addition, the plant community on site 10 has been markedly altered from a deep rooted bunch grass community to a plant community composted of shallow rooted perennial grasses and annuals. Infiltration relative to plant community changes appears to be reducing water infiltration between plant interspaces and water flow paths. The biotic integrity rating for site 10 indicated a moderate departure from conditions expected for the site.

Site 13 was located on moderately deep soil with silt loam to silty clay loam textures, and on a 22 percent east to southeast facing slope at 2495 feet elevation. Soil and site stability rating for site 13 indicated a slight departure from expected conditions. The rating for site 13 is due to a slight departure for amount of bare soils, and soil loss and degradation. Rills, water flow patterns, and pedestals match that expected for the site. Compaction layer is minimal and does not appear to be restricting infiltration or root penetration. Surface soil loss and degradation that occurred with historic sheep grazing appears to be improving. Evidence of healing is indicated by the healing of erosion scares and pedestals. Soil resistance to erosion is good. Soil stability test was none to slight and slight departure for site 13.

Hydrologic function rating for site 13 indicated slight departure from expected conditions. The rating is due to a departure in plant community composition expected for the site. The biotic integrity ratings for site 13 indicated a moderate to extreme departure from conditions expected for the site. This rating is due primarily to the change in vegetation composition from late seral bunch grasses to annual grasses and forbs common throughout the site or associated with animal formed terraces.

IIRH sites 11 and 12 were located in the Bull pasture. However, the IIRH results are considered representative of site and resource conditions found in the Westbench Lightning pasture.

Site 11 was located on very shallow, rocky soils with silt loam to silty clay loam textures on a 25 percent southeast slope at 2214 feet elevation. Soil and site stability rating for site 11 indicated moderate to extreme departure from expected conditions. Th**is** is due primarily to a moderate to extreme departure in the amount and connectivity of water flow patterns and bare soils. Signs of active erosion and deposition, pedestal formation, and surface soil sealing are evident. Accelerated erosion within water flow paths, and hoof shear appear to be influencing the higher than expected amount and extent of bare soils cover for this type of plant association (Johnson and Simon 1987, NRCS 2013). Moss and soil biotic crust cover is lower than expected (Johnson and Simon 1987). Soil stability tests indicated none to slight departure from that expected for the site.

Hydrologic function rating for site 11 indicated moderate to extreme departure from expected conditions. The ratings and justifications for hydrologic function generally reflect those for soil and site stability. In addition infiltration on site 11 appears to be reduced due to decreased bluebunch wheatgrass population and increase in annual grass, and a decreased soil biotic crust cover from that expected for the site (Johnson and Simon 1987).The biotic integrity ratings for site 11 indicated a moderate departure from conditions expected for the site.

Site 12 was located on moderately deep soils with silt loam to silty clay loam textures on a 22 percent east to southeast slope at 2100 feet elevation. Soil and site stability rating for site 12 indicated a moderate departure from expected conditions. The rating is due to a moderate departure for amount of pedestals and bare soil. Pedestals are associated with water flow paths and hoof shear and show signs of active erosion including exposure of plant roots. Surface soil loss and degradation is associated with increase in bare soil cover over that expected for the site (Johnson and Simon 1987). The soil moss and biotic crust cover is less than expected (Johnson and Simon 1987). Soil resistance to erosion is good. Soil stability tests indicated none to slight departure from that expected for the site.

Hydrologic function rating for site 12 indicated a moderate departure from expected conditions. The ratings and justifications for hydrologic function generally reflect those for soil and site stability. In addition infiltration on site 12 appears to be reduced due to decreased bluebunch wheatgrass population and increase in annual grass, and a decreased soil biotic crust cover from that expected for the site (Johnson and Simon 1987). The biotic integrity rating for site 12 indicated a moderate to extreme departure from conditions expected for the site. This rating is due primarily to the change in vegetation composition from late seral bunch grasses to annual grasses and forbs common throughout the site or associated with animal formed terraces.

Toomey Allotment:

Three IIRH sites were assessed in the Toomey Allotment. IIRH ratings for soil and site stability and hydrologic function ranged from slight, slight to moderate, and moderate to extreme. Departure from expected conditions biotic integrity attributes ranged from slight to moderate, and moderate to extreme. Ratings for soil stability tests ranged from none, and slight to moderate (Table S-6).

Table S-6. Interpreting Indicators of Rangeland Health Ratings for the Toomey Allotment.

Pasture (IIRH Site #)	Soil and Site Stability Attribute		Hydrologic Function Attribute		Soil Stability Test
Johnson Canyon (#17)	Slight (4.7)	• Water flow paths • Hoof shear	Sight to mod (4.6)	• Water flow paths • Hoof shear • Change in plant community	None to slight (5.7).
Spring Gulch (#18)	Mod / Mod to extr (3.9)	• Pedestals • Bare soil • Active erosion • Slumping • Hoof shear • Surface soil loss	Mod/ mod to extreme (3.9).	• Pedestals • Bare soil • Active erosion • Slumping • Hoof shear • Surface soil loss • Change in plant community	Slight to mod (3.0).
Upper Spain Saddle (#20)	Sight to mod (4.1)	• Pedestals • Bare soil • Active erosion • Water flow	Sight to mod (4.3).	• Pedestals • Bare soil • Active erosion • Litter movement • Water	None to slight (4.6).

IRH site 18 was located on very shallow soils with very gravely sandy clay loam to clay texture derived from basalt colluvium over basalt bedrock on a 40 percent east facing slope at 2050 feet elevation. Soil and site stability rating for site 18 indicated a moderate/moderate to extreme departure from expected conditions primarily due to a moderate to extreme departure for pedestals and bare soils, and moderate departure for water flow patterns, rills, and historic surface soil loss and degradation. Pedestals tend to be associated with hoof shear, and show active erosion and slumping. Water flow patterns show signs of erosion, slumping and

instability. Soil surface sealing, caused by rain splash of exposed soils, appears to be adding to increased soil erosion and runoff. The rock-moss matrix generally associated with these types of sites, typically allows for good infiltration and stability (Johnson and Simon 1987). However, the moss cover (0%) was less than expected for the site (Johnson and Simon 1987). The soil stability test indicated that surface soil resistance to erosion is slightly to moderately reduced from that expected for the site.

The hydrologic function rating for site 18 indicated a moderate/moderate to extreme departure from expected due to changes in plant community composition relative to infiltration. Change in structural and functional groups includes decreased amount perennial bunchgrasses and soil biotic crust cover (0%) and a relative increase in annual grasses. Increase in litter (33%) does not appear to be compensating for loss in decline in perennial plant composition and rock-moss cover. Increased fine gravel exposure appears to be related to rain splash and sheet wash. The soil stability test indicated that surface soil resistance to erosion is slightly to moderately reduced from that expected for the site (NRCS 2013).

Long Term Condition and Trend Monitoring Plots

Long term C&T monitoring plots were established on key areas in the LIRA in the early to mid-50s and 60s. Legacy C&T data is valuable for understanding past range conditions and trends.

C&T ratings for overall rangeland soil condition are designated as Very Poor, Poor, Fair, or Good. Rangeland forage rating is based on a compilation of the numerical data associated with type of plant species and percent cover of species within each C&T plot. Detailed information on forage C&T ratings for the LIRA is provided in the Rangeland Resources section.

A standardized soil stability field test to measure soil resistance to erosion (Herrick et al 2001) was conducted for each of the 2012 C&T readings and during the 2012 IIRH assessments (discussed below). This field test is used to evaluate differences in soil stability in relation to biotic crust, plant community composition and effects of management (Belnap et al 2001, Herrick et al., 2001). According to the ecological site descriptions developed by the NRCS for the Ecosystems present within the LIRA, (NRCS 2011), soil stability ratings should predominantly fall between 3 and 5. The procedure is described in detail in Interpreting Indicators of Rangeland Health (Pellant 2005).

C&T Plot Soil Condition Ratings

Existing soil conditions were assessed for twelve long term C&T plots in the LIRA in the year of 2012 (Table X). Three C&T plots were located within the Lone Pine Allotment, two C&T plots were located within the Cow Creek Allotment, five C&T plots were located within the Rhodes Creek Allotment and two C&T plots were located within the Toomey Allotment. Although, much of the historic data was lost in a Forest Service office fire (2010), five of these twelve C&T plots has been read three times since the plots were established. Scored trend of soil and forage condition were determined by comparison of data over time for these five plots, and for all of the plots in the year 2012.

The overall soil condition, soil stability ratings and effective soil cover were good for 11 of the twelve C&T plots read in 2012. The data indicates that adequate protection from accelerated

erosion and soil productivity is being maintained for these eleven C&T plots under current management.

C&T plot RC 5 in the West Side Cow pasture in the Rhodes Creek Allotment had an upper fair soil condition rating, evidence of “moderate soil movement”, and moderate resistance to erosion. Although, greater than 94 percent ground cover is being maintained on C&T plot RC 5, it does not appear adequate to aid in the control of excessive soil loss by runoff and erosion.. However, the site characteristics and current soil conditions are considered to be representative of the Eastbench lightning pasture in the Rhodes Creek Allotment. Survey results indicate that soil stability in C&T RC 5 in the West Side Cow pasture site has not been maintained under current management, and therefore the site is not in satisfactory conditions for rangelands (CMP 2003, Bliss 2000, Pellant et al. 2005, Mellmann-Brown 2013).

C& T plots LI 1 and LI 2 are located in the Rowley pasture within the Cow Creek Allotment. C&T plots LI1 and LI2 in the Rowley pasture indicate adequate protection from soil erosion and soil productivity is being maintained under current management is therefore in compliance with Forest Service standards and guidelines (USDA 1990, Bliss 2000, Pellant et al. 2005, Mellmann-Brown 2013).

Current Detrimental Soil Conditions (DSC)

Detrimental soil disturbance (DSC) is defined as soil compaction, puddling, displacement, severe burning, or the loss of ground cover resulting from any forest or range management practice (USDA 1990). Detrimental soil disturbance is associated with reduced soil quality, soil productivity and overall soil rangeland health. Forest Service Standard and Guidelines and direction states that a minimum of 80 percent of a project area be maintained in non-detrimental soil conditions (USDA 1990).

Quantitative measures of soil disturbance were assessed by line point intercept transect (Herrick et al 2005) in concurrence with several IIRH assessments to help identify DSCs as directed by the Forest Plan (1990) and Region 6 Forest Service manual (supplement No. 2500.98-1). One of three soil disturbance types were tracked on the line point intercept transects; 1) soil compaction (platy soil structure), 2) soil displacement (hoof shear or terracing from animal trailing) and 3) signs of accelerated erosion (rills, pedestals, and waterflow patterns). Soil compaction was determined by presence of platy soil structure of a small sample pit (6 inches in diameter), or by qualitatively measuring soil penetration resistance with a pin flag.

Each disturbance type was rated into one of 3 disturbance severity classes. Severity class 1 represents slight, or “non-detrimental” soil disturbance. Severity classes 2 and 3 represent “detrimental soil disturbance”. Severity class 2 represents conditions that are moderately altered from conditions expected for the site. Severity class 3 represents conditions that are highly altered from conditions expected for the site. Definitions of Class 3 closely match those defined in the Forest Plan (1990).

In general, sites with greater than 35 percent cobble and stone sized soil rock content and/or surface rock appear to have higher resistance to soil disturbance from cattle trampling and loafing, and tend to have a greater number of native perennial bunchgrasses

and forbs as compared with sites with lower rock content. Increased bare ground cover appears to be the dominant soil disturbance associated with rocky sites with slopes less than 20 percent (plateau and bench tops, bench shoulders and lower 1/3 of slopes, and alluvial terraces). Soil disturbance associated with rocky sites with greater than 20 percent slope (mountain, terrace and plateau mid slopes) is generally increased bare ground and soil loss from accelerated erosion. However, soil stability tests on rocky soils, for all slope gradients tends to indicate good resistance to erosion.

Soil disturbance associated with soils with medium to fine soil texture and low rock content with slopes less than 20 percent is generally compaction at 1 to 2 inch soil depth. Low gradient sites historically plowed or used as hay fields tend to have compaction at 1 to 4 inches soil depth. Often the surface 0.5 to 1 inch depth of soil compaction on low gradient sites is recovering naturally from root penetration, freeze thaw and gopher activity. Soil stability tests indicate good to slightly reduced resistance to erosion. Signs of accelerated surface soil erosion are generally slight, and limited to sheet erosion. No rill or gully erosion was observed on low gradient sites.

Soil disturbance associated with medium to fine textured soils on moderately steep to steep, north facing slopes is generally associated with hoof shear and animal formed terraces. Soil disturbance is generally in the form of soil compaction at 1-3 inch at soil depth, soil sloughing and displacement, and increased soil loss from erosion. There is little natural recovery of soil compaction on animal formed terraces. Soil displacement associated with hoof shear is a concern due to exposure of soil to raindrop impact and erosion, and invasive plants. Plant communities on animal formed terraces have been transitioned from dominant native bunchgrasses to dominant annual grasses and forbs. However, dominance of native perennial bunchgrass and forbs tends to coincide with non-terraced areas and terrace walls. Soil resistance to erosion is slightly to moderately decreased from that expected. Active rill and pedestal formation is often associated with soil compaction and displacement. No gully erosion was observed on any moderately steep to steep gradient sites.

Four of the nine IIRH sites (7, 11A, 13, and 18) assessed for Detrimental Soil Conditions in the year 2013 indicated that the sites out of or close to compliance with Forest Plan standards and guidelines (1990) (Table X). Soil condition survey for IIRH site 7 in the Rowley pasture of the Cow Creek Allotment indicated 28 percent detrimental soil conditions under current management. Soil condition survey for IIRH sites 11A and 13 in the Bull and Eastbench Lightning pastures of the Rhodes Creek Allotments indicated 15 percent detrimental soil conditions under current management. Soil condition survey for IIRH site 18 in the Spring Gulch pasture of the Toomey Allotment indicated 19 percent detrimental soil conditions under current management.

In order to assess compliance with FS direction, an effort has been made to quantify the percent of the LIRA area with detrimental soil conditions using the average DSCs (12 percent) associated with permitted grazing on IIRH sites, and impacts from roads and water developments within the LIRA area (Chapin 2013) (Table S-7).

Table S-7. Percent Capable Lands and Percent with DSCs associated with Water Development Sites, Roads and permitted grazing activities.

Allotment	Suitable Allotment (Acres)	Water Development Site (Acres)	Road by Allotment (Acres[1])	DSCs from Permitted Grazing*	Total DSC (Acres)	Capable Lands with DSC (Percent)
Lone Pine	3,162	2 ac	26ac	380	408	13
Cow Creek	1,322	17	11	159	187	14
Rhodes Creek	6,687	16ac	29ac	802	847	13
Toomey	2,096	6	24	253	283	13.5
LIRA area	13,267	41	89	1,592	1,722	13
Percent LIRA		0.3%	0.5%	12%		

[1]Includes all open and closed FS and private roads.

*Based on 13 percent DSCs across the project area, see DSC discussion below.

The percent area with DSCs associated with salting sites and loafing sites are incorporated in the average percent DSCs associated with permitted grazing on Capable Lands. The amount of detrimental soil conditions associated with water development sites is estimated to be an additional 1 acre per site (Birkmaier 2012). This is estimated to be equivalent to 41 acres of DSCs, or less than 0.3 percent Capable Lands in the LIRA area.

The estimated amount of DSCs in the LIRA area associated with Capable Lands is estimated to be approximately 1,722 acres or 13 percent of the LIRA area. There are approximately 408 acres of DSCs associated with permitted grazing in the Lone Pine Allotment, 187 acres of DSCs associated with permitted grazing in the Cow Creek allotment, 847 acres of DSCs associated with permitted grazing in the Rhodes Creek allotment and 283 acres of DSCs associated with permitted grazing in the Toomey Allotment.

Forest Plan Compliance for Detrimental Soil Conditions (DSC)

Permitted grazing is the primary current land based activity impacting soil conditions on non-forested sites with 0 to 45 percent slopes. Risks include soil compaction and displacement, increased soil erosion, and reduced composition, diversity and cover of vegetation and soil crusts. Rangeland activities with high potential for causing DSCs are those activities which are concentrated on sites with fine textured soils with low cobble and stone sized rock cover and soil rock content on gentle slopes, and on sites with deep, fine textured moist soils and low rock content on moderately steep to steep, north facing slopes.

Detrimental soil compaction associated with permitted grazing activities is found at soil depths of 1 to 4 inches. Sites with greatest severity and extent of soil compaction are associated with historic cultivation of low gradient sites and terraces formed by animal trailing on steep, north facing slopes with deep, fine textured moist soils. Signs of natural recovery of historic compaction were often observed at noted at 0.5 to 1 inch of soil depth. Sites with off- site (e.g. adjacent to trails used to move cattle from pasture to pasture), or on- site influences (water

developments or winter feeding lots) causing extensive animal trailing or use did not exhibit signs of natural recovery.

Forest direction, permit administration and compliance with utilization and grassland condition requirements intended to maintain the rangeland in satisfactory condition appear to be effective at maintaining soil resource conditions in most pastures of the four Allotments assessed. However, impacts from historic use are still visible on the landscape today and slightly to moderately affecting the soil and site stability, hydrologic function, biotic integrity and overall rangeland health.

The combination of soil condition surveys and general reconnaissance surveys indicate that greater than 80 percent of Capable Lands within LIRA pastures are currently being maintained with non-detrimental soil conditions. The amount of detrimental soil conditions associated with permitted grazing activities within the LIRA Capable Lands is estimated to be approximately 1,722 acres or 13 percent of the LIRA area.

Rangeland health, Indicators of Rangeland Health, and soil condition surveys have indicated isolated areas in specific pastures with greater than 20 percent detrimental soil disturbance (Tables S-7 above) include the Dug Creek pasture in the Lone Pine Allotment, the Rowley pasture in the Cow Creek Allotment, and the Bull, Eastbench Lightning, Westbench Lightning, Sleepy Breaks and West Side Cow pastures in the Rhodes Creek.

Environmental Consequences

As described in the existing soil conditions section above, soil provides a foundation for vegetation establishment and growth as well as provides for the processes of air, gas, water, and nutrient movement vital to plant growth. These soil processes are dependent on soil physical, chemical and biological properties, including a consistent supply of organic matter.

The key for range management is to maintain adequate soil structure (soil porosity) and supply of organic matter. Loss of either component may lead to decreased soil productivity and an increased risk of erosion, especially as the slope increases.

Current forage utilization standards help maintain ground cover and reduce other soil effects such as compaction. Utilization standards allow for maintenance of soil porosity and a supply of organic matter. The current estimates of detrimental soil conditions for most pastures in the LIRA are consistent with the Forest Plan's standards and guidelines. No allotment exceeds the 20% standard for detrimental soil conditions (refer to existing conditions section of this document). The rangeland analysis section of this plan also indicates that the trend in rangeland conditions has improved over the last 50 years, with substantial improvement in ecological status and increases in native grass species and ground cover. These improvements are most likely associated with improved soil productivity and a decrease in accelerated soil erosion in areas that were intensively cultivated and grazed during the 1st half of the 20th century.

However, isolated areas of specific pastures within LIRA Allotments do exceed or are close to exceeding the Detrimental Soil Conditions (Forest Plan). Project Design Criteria (PDC) and

Mitigation measures common to all Action Alternatives are proposed to maintain or move current conditions toward desired soil conditions as directed in the CMP.

Alternative A – No-action Alternative

Direct and Indirect Effects of No Action

Under this alternative, livestock grazing would no longer be authorized within the LIRA. Without continued disturbance from livestock grazing there would be less compaction, bare ground and disturbance of biotic crusts in areas where livestock concentrate such as low gradient sites, trails, water sources, and salting and loafing areas and on steep sites where trailing is prevalent. Detrimental soil conditions in these areas would likely improve over time through natural processes including freeze\thaw cycles, wet\dry cycles and vegetative growth (Daniel et al 2002, Allington and Valone 2011). Effective ground cover of pastures and allotments would most likely continue to improve. These factors would increase infiltration rates, improve soil stability and decrease any associated surface soil erosion. Natural potential vegetation may or may not improve with absence of livestock grazing (Loeser et al. 2007). The amount of natural recovery and the total amount of time for soil damage to recover to acceptable levels depends on the extent, depth and degree of existing soil damage, and extent and degree in changes to potential natural vegetation.

Water development sites would be abandoned and hardware such as troughs, pipe and exclosure fencing would be left on the landscape if needed for wildlife, or until further NEPA decisions or adequate funding is provided to remove them. If water development sites were not dismantled or removed, trough drains could plug over time allowing water to pool around the trough or run downhill creating new wetland areas and perhaps new channels on the landscape. The degree that new channels would form would depend on the amount of water flow and how much soil erosion occurred before vegetative recovery.

Grazing by wild ungulates would continue to occur in the LIRA. Shallow, south facing sites receive moderate to high late winter and early spring use by wild ungulates. Due to the susceptibility of these sites to impacts, soil disturbance from grazing by wild ungulate would also continue.

Removal of grazing from the project area is expected to result in a decrease in the percent of acres exceeding detrimental soil conditions over time, and it is expected that the recovery rate would be faster than under the action alternatives.

For the soil resource, the removal of cattle from the LIRA would have the most beneficial effect on the LIRA area as a whole, and in particular on isolated areas exceeding Forest Plan standards and guidelines. This is because livestock grazing is not completely controllable and even with careful management, hoof shear, trampling, and herbivory do occur. With Alternative A, biological soil conditions including soil crust recovery and expansion would occur at the highest rate. Erosion risk would be reduced due to increased groundcover and litter, and decreased soil compaction and displacement. Under Alternative A, there would not be a continuation of resource condition monitoring.

Effects Common to Action Alternatives

Under the Action Alternatives maintenance of rangeland improvements (fences and water developments) prior to turning cattle out in the allotments and while the allotments or adjacent allotments are in use, would continue, therefore limiting or reducing potential direct and indirect livestock impacts to soils (BMP, 2013 Range Section – control of livestock distribution and maintenance of rangeland improvements).

Proposed management under all Action alternatives would be designed to meet and maintain desired soil conditions. Management would include:

- maintenance of a minimum of 60 - 70 %, or at the natural potential for the site, of effective ground cover to protect against accelerated soil erosion,
- the calculation of stocking rates to be based on the bench/footslope acres with slopes less than 45 percent, and capable of supporting permitted livestock grazing,
- placing of salt to improve cattle distribution,
- prohibition from moving livestock back into an earlier season pasture if soils are too wet, or if area identified in unsatisfactory soil condition, and
- re-distribution of livestock to sites less prone to hoof shear impact when soils are using low-stress handling techniques (Cote, 2004) to reduce risk of soil disturbance.

The calculated stocking rates would reduce pressure and potential grazing effects on areas with low or limited capability of supporting permitted grazing. In addition, grazing strategies identified in Allotment Management Plans and term grazing permits would reduce the occurrence of cattle on slopes greater than 45 percent, rim rock and inter-slope areas of the LIRA. This would help to maintain plant diversity, protect fragile soils on steep slopes, and account for wildlife use of these areas.

The proposed mitigation measure of decreased utilization rates (35 percent) in upland areas identified with unsatisfactory soil conditions (Table 21) would decrease direct soil impacts from grazing (soil compaction, displacement and accelerated erosion), help improve current soil conditions and allow sites to move toward desired soil conditions at a faster rate than under current management.

Proposed monitoring would include short and long term monitoring of soil conditions by line point intercept to assess areas with higher soil impacts. It is proposed to reduce utilization rates in areas identified with unsatisfactory soil conditions (see mitigation measures common to all Action Alternatives section above). Adaptive management measures would reduce utilization rates and decrease direct soil impacts from grazing (soil compaction, displacement and accelerated erosion), reduce drying of northern slopes, reduce accelerated erosion on shallow dry slopes, and promote regeneration of deep rooted native vegetation, and to work towards achieving the desired condition for the site (Forest Plan and CMP). The improvement in native vegetative condition may benefit soil stability, soil productivity and may increase the rate of overall rangeland condition's upward trend.

New long term monitoring sites may be added to determine trends on sites with resource concerns, and to identify changes in management (modify the numbers of permitted livestock or

the season of use, or construction of new water developments or enclosure fencing) to move the site toward desired soil conditions.

Changes in management needed to address soil concerns and compliance with Forest Plan soil standard and guidelines, and are listed below would be incorporated into the Allotment Management Plans and term grazing permits and implemented through the AOIs to provide for further protection of the soil resources. Management would be designed to meet and maintain desired soil conditions.

- The proposed water development in the Westside Cow pasture of the Rhodes Creek Allotment and the redevelopment of Tips Trough in the Toomey Allotment would would allow for more even distribution of livestock and reduce direct and indirect soil impacts including soil compaction, displacement and accelerated erosion throughout the Allotments.
- The rotation between North Roy, South Roy and Bull pastures in the Rhodes Creek Allotment would decrease the frequency of surface disturbance and decrease potential soil effects from grazing. The rate of recovery of soil conditions in these pastures would be greater than that realized under current management.
- The reconstruction of the fence between Upper and Lower Spain Saddle pastures in the Toomey Allotment would prevent drift of livestock, ensuring use only during specified grazing times and therefore limiting overall direct and indirect grazing impacts to soils. The rate of recovery of soil conditions in these pastures would be greater than that realized under current management.
- The proposed reconfiguring of fencing in the Cow Creek Allotment to reduce the current number of pastures from ten to four would allow more effective management and monitoring of livestock distrubution and Capable lands in these pastures by the permittee and therefore, potentially reduce direct and indirect impacts of livestock grazing to soils. The proposed incorporation of the Tulley pasture of the Rhodes Creek Allotment into the Toomey Allotment would have minimal effects on overall soil conditions in the LIRA.

Alternative B (Current Activity)

Direct and Indirect Effects

Current range management appears to be maintaining soil productivity and soil stability processes at acceptable levels throughout the LIRA. Rangeland C&T monitoring plots, IIRH surveys and soil condition point intercept surveys indicate that in general greater than 80 percent of capable lands in the LIRA are currently being maintained with non-detrimental soil conditions.

However, detrimental soil condition surveys indicated greater than 20 percent detrimental soil conditions on isolated areas. IIRH assessments indicated a moderate and moderate to extreme deviation of soil stability and hydrologic function from ecological conditions expected for some areas within individual pastures. Deviations from expected conditions are related to soil type, topography, off-site influences and historic use.

Under this alternative soil ground cover would generally be adequate to allow continued improvement in soil cover and to maintain or improve maintain current soil erosion rates. In addition, in upland areas identified with unsatisfactory soil conditions, the amount of effective ground cover is expected to increase where utilization will be decreased to 35 percent. Monitoring would be required to insure long-term compliance with Forest Plan ground cover guidelines.

Under this alternative, high use areas where permitted livestock concentrate causing detrimental soil disturbances including soil compaction and displacement, bare ground, impacts to soil biotic crusts and transition of vegetation communities would persist. High use areas include fence lines, trails, water sources, and salting and loafing areas. These high use areas are generally located on gentler slopes of open grasslands with shallow to very shallow soils and sites with steep north facing slopes with deep soils and low rock surface rock prone to animal formed trails. The extent of detrimental soil conditions associated with high use areas encompasses approximately 13 percent of the LIRA area.

In summary, greater than 80 percent of the LIRA Allotments are being maintained in non-detrimental soil conditions and a continued upward trend in overall soil conditions and rangeland health is expected under this alternative. However, under this alternative, high use areas where permitted livestock concentrate, it is expected that soil disturbances including compaction and displacement, bare ground, impacts to soil biotic crusts and transition of vegetation communities would persist.

The extent detrimental soil conditions associated with high use areas encompasses approximately 13 percent of the LIRA area. Detrimental soil conditions associated with roads and timber accounts for approximately 89 acres of detrimental soil conditions, or 0.5 percent of the LIRA area. Detrimental soil conditions associated with permitted grazing soil impacts ranges from zero to twenty eight percent of isolated areas monitored by soil conditions line point intercept transect method. Soil conditions would improve under this Alternative, but at a slower rate than the rate of improvement and move toward desired soil conditions under Alternative A (No Grazing), and other Action Alternatives C, D and E.

Alternative C (Proposed Action)

Direct and Indirect Effects

The type of effects of livestock grazing on soils are expected to be similar to those described for Alternative B, though the intensity of the effects is expected to be less than under Alternative B, though greater than under Alternatives D and E. The project design of Alternative C would include mitigation measures designed specifically to address the significant issue of soil disturbance on pastures with deep soils on steep north facing slopes. Specific mitigation measures would include 1) the creation of a new pasture (Big Pine) from a portion of the Lower Spain Saddle pasture allowing a rotation schedule where each pasture would be rested every other year, 2) and the implementation of adaptive management strategies for the Johnson Canyon and Toomey pastures.

A rest rotation grazing system where Big Pine and Lower Spain Saddle pastures in the Toomey Allotment where grazing occurs every other year and pastures would be rested every other year

and are expected to decrease the frequency of surface disturbance and decrease potential soil effects from grazing.

Under Alternative C it is proposed to assess soil resource concerns with long and short term soil condition monitoring with point intercept transect method. Management would be designed to meet and maintain desired soil conditions (see above) and to provide for further protection of the soil resources if warranted. If after initial monitoring, or after long term trend monitoring, it is found that the Forest Service standards and guidelines, are not met for Johnson Canyon and Toomey pastures, than adaptive management strategies for the Johnson Canyon and Toomey pastures would be implemented (See Chapter 2 and section on adaptive management strategies common to Action Alternatives C, D and E above). Adaptive management strategies may include, increased riding and herding to distribute livestock to less sensitive areas, season of use, deferred rotation schedule, and decreased stocking numbers. The proposed adaptive management strategies would increase the rate of recovery over current conditions, and help move concern sites with deep soils on north facing slopes toward desired soil conditions.

Recovery would be realized at an increased rate under Alternative C than Alternative B due to a reduction of direct impacts from cattle grazing as a result changes in management to include rest rotation, change of season, and increased active management. Rest rotation schedule and would increase overall effective vegetative biomass ground cover, and would reduce overall erosion rates.

Under Alternative C greater than 80 percent of the LIRA Allotments would be maintained in non-detrimental soil conditions and a continued upward trend in overall soil conditions and rangeland health would be expected particularly in Big Pine, Lower Spain Saddle, Jonson Canyon and Toomey pastures.

Alternative D

Direct and Indirect Effects

The effects of livestock grazing on soils would be similar to those described for Alternatives C (Proposed Action). However, Alternative D represents the greatest change from current management. Proposed activities would allow the greatest rate of recovery and movement toward desired soil conditions. Pastures identified through the analysis process as having challenges to the soil resource include all of the pastures in the Toomey Allotment, the Rowley pasture in Cow Creek Allotment, and the East and West Bench pastures in the Rhodes Creek Allotment. The effects would be less in magnitude under Alternative D than under Alternative C due to the project design and inclusion of mitigation measures designed specifically to address areas with soil resource concerns.

Alternative D proposes to assess soil resource concerns with long and short term soil condition monitoring with point intercept transect method. Management would be designed to meet and maintain desired soil conditions (see above) and to provide for further protection of the soil resources if warranted. If after soil condition monitoring, it is found that the Forest Service standards and guidelines are not met in any of the pastures in any of the Allotments, changes in management may be implemented to reduce grazing impacts to soils. Management changes

may include, increased riding and herding to distribute livestock to less sensitive areas, season of use, deferred rotation schedule, and decreased stocking numbers.

Alternative D proposes to incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations to allow for additional opportunities for rest, change in season of grazing and deferment of pastures within all four allotments. This alternative was driven by the assumption that management changes would reduce direct and indirect livestock impacts to soils (Allington and Valone 2011, Daniel et al. 2002). The proposed actions to change current management on the four LIRA allotments are thoroughly described in Chapter 2. In summary, this Alternative would allow for rest from grazing 1 year in every 3 years for the all six pastures in the Toomey Allotment, and spring grazing would be eliminated in the Johnson Canyon for one of the two scheduled grazing years allowing for greater rate of soil recovery and movement toward desired soil conditions. Minimal soil impacts are assumed to occur with the ingress/egress of cattle from the Chesnimnus Allotment during moves in Nov/Dec and May through the Tulley stock driveway in the Toomey Allotment due to use of low stress handling techniques, and high intensity of riding and herding to move livestock through the Allotment and to avoid sensitive areas.

Under this Alternative, the Rowley pasture in the Cow Creek Allotment and the East and West Lightning Bench pastures in the Rhodes Creek Allotment and all five pastures of the Lone Pine Allotment would be rested from grazing one year in every three years. This rest period would allow for a greater rate of soil recovery, and movement toward desired soil conditions. For this alternative the rotation through the Rhodes Creek Allotment would remain the same as current management, however the numbers throughout the season would be reduced.

Under Alternative D the Rowley pasture would have two additional weeks of grazing in adjacent pastures. There would be minimal change in current soil conditions resulting from the proposed two additional weeks of grazing. This is due to the practice of basing stocking rates of all areas on the bench/footslope acres, slopes less than 45 percent, mitigating adverse effects of grazing on soils. Even with proposed additional grazing time, the stocking rates, and utilization and soil condition standards in all pastures would be met under Alternative D. Management would be changed to reduce grazing impacts to soils and help move the site toward desired soil conditions if soil condition monitoring identifies areas within these adjacent pastures with unsatisfactory soil conditions.

Additional proposed management changes under Alternative D includes a change in grazing season to allow deferment between spring and winter grazing (meaning the plants would be grazed during the spring in year one would be grazed during the dormant season in year two, and rested year three) in the Jonson Canyon pasture in the Toomey Allotment and all five pastures of the Lone Pine Allotment allowing areas with soil resource concerns to move more quickly toward desired soil conditions. This assumption is based on the findings of Loeser et al. (2007) and Warren et al. (1982) that properties affecting soil resilience to degradation from cattle trampling are affected by grazing season. (Loeser et al. (2007) and Warren et al. (1982) found that soil aggregate stability and soil organic matter were higher and soil bulk density was lower during the growing season, creating greater overall soil stability and providing greater resistance to and resilience from livestock impacts. Loeser et al. (2007) and Warren et al. (1982 found that reduced resiliency of soils to resist detrimental soil impacts and shifts in plant communities from grazing may become more severe during periods winter dormancy due to the

reduced activity of soil organisms and a decline in soil stability. Allington and Valone (2011) and Warren et al. (1982) suggest that rangeland management should consider lower stocking rates and/or longer rest periods during winter dormancy to reduce grazing impacts to soils.

Recovery would be realized at an increased rate under Alternative D than under Alternatives B or C due to a reduction of direct impacts from cattle grazing as a result changes in management to include rest rotation and change of season for pastures identified with soils that are not in the desired condition. Rest rotation schedule and would increase overall effective vegetative biomass ground cover, and would reduce overall erosion rates.

Under Alternative D greater than 80 percent of the LIRA Allotments would be maintained in non-detrimental soil conditions and a continued upward trend in overall soil conditions and rangeland health would be expected. Management changes may include, increased riding and herding to distribute livestock to less sensitive areas, season of use, deferred rotation schedule, and decreased stocking numbers

Biological soil crust density and diversity is limited to protected sites, deferred rotation spring grazing would promote recovery of the biological soil crust in grazed areas and slow expansion of the populations may be realized.

Alternative E

Direct and Indirect Effects

The effects of livestock grazing on soils are well documented, and would be similar to those described for Alternative C. Effects would be less in magnitude under Alternative E than under current management due to the project design of Alternative E that would include mitigation measures designed specifically to address the significant issue of soil disturbance on pastures with deep soils on steep north facing slopes (see alternative C above). However, Alternative E also proposes to use the Lone Pine Allotment as a Forage Reserve through a Temporary Grazing Permit (reference the FSM) for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. Alternative E also proposed to allow an increase of 306 head months during the same grazing season as under current management and as proposed under Alternative C (Proposed Action).

This is due to the practice of basing stocking rates of all areas on the bench/footslope acres, slopes less than 45 percent, mitigating adverse effects of grazing on soils. The stocking rates, and utilization and soil condition standards in all pastures of the Lone Pine Allotment would be met under Alternative E. As with all Action Alternatives, under Alternative E it is proposed to assess soil conditions with long and short term soil condition monitoring by point intercept transect method. Management would be designed to meet or maintain desired soil conditions (see above) and to provide for protection of the soil resources if warranted.

Under Alternative E the same management proposed in Alternative C would apply to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Recovery would be realized at an approximately the same rate as assumed under Alternative C due to a reduction of direct impacts from cattle grazing as a result changes in management to

include rest rotation, change of season, and increased active management. Rest rotation schedule and would increase overall effective vegetative biomass ground cover, and would reduce overall erosion rates.

Under Alternative E greater than 80 percent of the LIRA Allotments would be maintained in non-detrimental soil conditions and a continued upward trend in overall soil conditions and rangeland health would be expected particularly in Big Pine, Lower Spain Saddle, Jonson Canyon and Toomey pastures.

Summary of Effects

Within the LIRA, benefits to the soil resource with continued grazing come from fence maintenance, careful management of stocking rates, adhering to utilization standards and length of time and season the LIRA pastures are grazed. These management strategies help to manage cattle grazing patterns to reduce impacts to soils. These strategies also help to ensure the native bunchgrasses and desired vegetation complete their growth cycles and set seed. Table S-8 summarizes cattle grazing soil effects by Alternative.

Table S-8. Degree of Cattle Grazing Soil Effects by Alternative Compared to Existing Conditions

Key Soil Indicator	Alternative A (No Grazing)	Alternative B (Current Activity)	Alternative C (Proposed Action)	Alternative D	Alternative E
Detrimental Soil Conditions	Least effect, no cattle hoof shear or trampling would occur. Elk grazing effects would continue.	No change to slightly less risk from the existing condition due to mitigations, monitoring and other elements of livestock management changes in the AOI.	Moderate amount of change to areas with current resource concerns due to mitigation measures specific to this Alternative. Slightly less risk from the existing condition of other areas due mitigations, monitoring and other elements of livestock management changes in the AOI.	Highest decrease in risk of effects than existing conditions under current management due to livestock management changes in the AOI. Greatest risk specifically to areas identified with resource concerns and site with deep soils on steep north facing slopes.	Similar to Alternative C. Moderate amount of change to areas with current resource concerns due to mitigation measures specific to this Alternative. Slightly less risk from the existing condition of other areas due to livestock management changes in the AOI. Slight reduction in cumulative affects to adjacent Imnaha Canyon Allotment pastures or summer grazed pastures with resource concerns.
Effective Ground Cover as an indicator of resistance to soil erosion	Least risk of reduced effective ground cover due to vegetation growth and retention on site. Elk grazing effects would continue.	No change to slightly less risk from the existing condition due to mitigations, monitoring and other elements of livestock management changes in the AOI.	Moderate amount of change to areas with current resource concerns due to mitigation measures specific to this Alternative. Slightly less risk from the existing condition of other areas due mitigations, monitoring and other elements of livestock management changes in the AOI.	Highest decrease in risk of effects than existing conditions under current management due to livestock management changes in the AOI. Greatest risk specifically to areas identified with resource concerns and site with deep soils on steep north facing slopes.	Similar to Alternative C. Moderate amount of change to areas with current resource concerns due to mitigation measures specific to this Alternative. Slightly less risk from the existing condition of other areas due to livestock management changes in the AOI. Slight reduction in cumulative affects to adjacent Imnaha Canyon Allotment pastures or summer grazed pastures with resource concerns.
Key Soil Indicator Relative rate of recovery towards desired future conditions	+++++	+	+++	++++	+++

Implementing additional adaptive management strategies under Alternative C would provide further benefits to soil conditions on sites with deep soils on steep north facing slopes (significant issue number 2). Table S-9 summarizes cattle grazing effects on deep soils on steep north facing slopes by Alternative.

Cumulative Effects

Cumulative effects of all action Alternatives would allow maintenance of greater than 80 percent of the LIRA activity area to remain with non-detrimental soil conditions. Alternative D would have the least amount of cumulative effects on current soil conditions. Alternative E would be similar to Alternatives B and C, but less severe due to the opportunity to improved soil conditions within adjacent Allotments in the Imnaha River Canyon, or other summer grazed allotments with resource concerns that are provided rest through Temporary Grazing Permits.

Cumulative effects consider the past, present, and foreseeable future actions in the LIRA. Soil conditions in the LIRA vary, and have been affected by a variety of human-caused impacts. Cumulative effects on soil productivity are generally caused by direct impacts such as hoof shear and trampling, which can lead to detrimental soil damage. Cumulative effects to soil productivity has led to decreased soil productivity and accelerated erosion in the LIRA.

On National Forest System lands, management activities include current and past grazing, motorized and non-motorized recreation, prescribed fire and wildfires, and mining. Roads can impact soils by providing easy access to high use areas, but can also aid in achieving proper livestock distribution. Recreational activities can result in soil compaction, displacement and reduced effective ground cover or change vegetation soils. These impacts can lead to decreased soil productivity and increased soil loss by erosion.

Cumulative effects on LIRA soil conditions may be influenced by activities on privately-owned lands. Private land ownership is present within and bordering parts of the allotments, and land uses on these lands include roads, livestock pastures, and recreational uses. Approximately 2,823 acres of private land is located in the LIRA area. There is no Term Private Land Grazing Permit issued for these private land acres. This private land is grazed at the time of the LIRA permitted season of use, but is not managed by the Forest Service. Grazing activities on private lands within the LIRA may overlap with the permitted grazing LIRA activities in time, but not in space. The impacts to soils from grazing private lands would be similar to those described in earlier sections of this document. In short, impacts would include localized areas of compaction, displacement and increased soil erosion hazard. Although impacts from private land activities are difficult to quantify, Alternative B is not expected to result in measurable impacts to the soil resource on National Forest System lands from private land uses.

Specific actions that may contribute to cumulative effects are included in Table S-9.

Table S-9: Cumulative Effects Analysis for LIRA

Project or Action	Overlap		Cumulative Effect	Rationale
	Time	Space		
Road Use and Maintenance (ongoing)	Yes	Yes	Minimal expected	Roads in some areas may provide easier access for cattle to access streams, and low gradient, high forage production areas leading to a potential cumulative effect from grazing due to higher livestock concentrations. Action Alternatives includes methods to disperse cattle to achieve proper livestock distribution. This would help to avoid cumulative effects from livestock grazing where roads allow easy access high use areas. A large portion of road miles are within private lands. In addition, the potential for a cumulative effect from roads in the LIRA is minimal.
Trail Use and Maintenance (ongoing)	Yes	Yes	Minimal	Trails are used to implement management activities. Trails often provide easier access to streams, and areas of high forage production, or other high use sites. All Action Alternatives (B, C, D and E) provide methods to disperse cattle to achieve proper livestock distribution. This would help to avoid cumulative effects from livestock use of trails. Soil conditions will minimally change from existing conditions due to continued, historic use of trails.
Prescribed Burning	Yes	Yes	Minimal	Areas of prescribed fire recover quickly and usually naturally re-vegetate within one year. Future prescribed burning within the analysis area would reduce potential impacts to soil resources by preventing large catastrophic wildfires that could result in perennial bunchgrass mortality and increased soil loss from erosion.
Large Fires and Wildfire Suppression (ongoing)	Yes	Yes	Yes	Large wildfires can cause loss in soil productivity from severe soil burning and soil loss from accelerated erosion. A mitigation measure is included in action alternatives to adjust grazing after wildfires (Chapter 2).
Outfitting (ongoing)	Yes	Yes	No	Minimal impact. Use is concentrated on the same trails and low gradient sites that cattle tend to congregate and utilize.
Dispersed and Developed Recreation (ongoing)	Yes	Yes	Minimal	Dispersed camping is scattered across the landscape and occurs on a seasonal basis. Dispersed camping within the LIRA typically depends on boat, road or trail access to sites.
Big-Game Hunting (ongoing)	Yes	Yes	No	Hunting activities are scattered across the landscape and occurs on a seasonal basis. Hunting activities within the LIRA typically depends on boat, road or trail access to sites.
Mining	No	No	No	Historic activity only. None of the claims have filed a Plan of Operation and therefore would not add to cumulative effects.
Private Land Activities	Yes	No	Minimal	Private land ownership is present within and bordering parts of the allotments. Land uses on these lands include roads, livestock pastures, and recreational uses.

The above-mentioned activities within the LIRA are expected to continue into the future on both private and National Forest System lands. Landscape changes associated with these continued activities would be similar to the existing conditions and would be evaluated as future new actions are permitted or planned. Wildfire is an unknown entity. If and when wildfire occurs in the allotment, decisions would be made to continue or restrict grazing on the allotment depending on resource needs.

The effects from Alternative B are expected to only minimally overlap with effects from past and ongoing activities. Few to no impacts are expected from outfitting, hunting, camping and mining. Potential cumulative impacts could occur from roads and wild and prescribed fire activities. Grazing of the LIRA is on-going and its effects have been described under the existing condition discussion. Monitoring and mitigations have been proposed under the Alternative B to reduce grazing effects on soil resources. Continued grazing of the LIRA would have a minimal additive effect on soil resources.

Compliance with the Forest Plan and Other Direction Cumulative

All Action Alternatives (B, C, D and E)

Management of the LIRA allotments under Alternatives A, B, C, D and E are consistent with both the Wallowa-Whitman Forest Plan (1990) and the Hells Canyon National Recreation Area CMP (2003) because of the application of Best Management Practices, mitigation measures and monitoring of management goals and objectives. Action Alternatives B, C, D and E would meet Forest Plan and HCNRA CMP goals, desired future conditions and objectives because livestock would be managed on the allotments while implementing protection utilization measures, monitoring (long and short term) and adaptive management strategies (Alternative D), to address any site-specific soil concerns issues as they are identified.

Action Alternatives include long and short term soil condition monitoring that would assess compliance with Forest Plan standards and guidelines and the significant issue of soil impacts from grazing on deep soils on steep north facing slopes. Areas currently not in compliance with Forest Service soil standards and guidelines, and address cumulative impacts would be addressed through changes in management to help improve soil conditions and move soils toward desired conditions.

Probable Adverse Environmental Effects Which Cannot Be Avoided

Grazing may result in potential adverse environmental effects that cannot be mitigated or avoided. Under the proposed action there would be impacts to upland soils through herbivory and hoof action by both wildlife and livestock. These effects would be reduced to an acceptable level by utilizing grazing guidance as well as adaptive management and monitoring. It is recognized that recovery of degraded soils can occur under proper grazing management,

though at a slower rate compared to recovery without the presence of livestock grazing. The potential for greatest impacts generally occur during hot/dry years when there is less vegetation re-growth following grazing. This is due to the reduced resiliency of ecosystems during unfavorable growing conditions.

Biological Soil Crusts

Introduction

This section describes the existing condition and analysis of effects on biological soil biocrust (biocrust). Hell's Canyon National Recreation Area Comprehensive Management Plan 2003 (CMP) includes management direction for biocrusts; they have not been addressed in past AMP analysis documents. In support of the biocrust assessment for this project, nine sites were sampled throughout the LIRA area. Biocrust sampling was done according to direction from the Area Ecology Program and used a modified version of Line-Point Intercept (Herrick et.al. 2009) in which the categories short and tall moss, lichen and cyanobacteria.

Biocrusts are important components to overall soil quality and the plant community. Biocrusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi and bacteria. Biocrusts occupy the interspaces between vascular plant vegetation creating a matrix of tissue just below the soil surface and stabilizing the soil by trapping soil particles. Soil biocrusts also function as living mulch by retaining soil moisture and discouraging annual weed growth (Belnap et. al. 2001).

Biocrust composition, diversity and distribution is related to soil type (especially texture), natural and man caused disturbances, potential natural vegetation, climate, and the soil organic matter quality and quantity (Olarra 2011, Belnap et al. 2001). Biocrust organisms are active only when moist, so they tend to be most highly developed on north or east-facing slopes in more arid areas (USFS - HCCMP EIS 1999; Brooks 2009).

The extent and degree of divergence from potential natural community for biocrusts resulting from permitted grazing activities is variable and has been influenced by many factors. These factors include the type and intensity of historic and current management (season of use, livestock use patterns and type of grazing animal), soil type (soil depth, volcanic ash content), topography, elevation and aspect.

The decrease in cover and species diversity of biocrust is generally associated with animal trails and terraces, (both in the uplands and along fence lines), water sources, salting and loafing areas, and abandoned hay and cultivated farm fields (USFS 2009). Biological soil biocrust disturbance associated with high use areas include altered natural potential vegetation communities, soil displacement, soil compaction, increased bare ground cover, and increased sheet and rill erosion.

Forest Direction

The Soils Resource section and specialist report in the project file provides a thorough list of current management direction which applies to soils. Likewise, the Rangeland Resources section and resource report provides a list of current management direction which applies to rangeland vegetation. Refer to those sections or the project file for management direction which is not specific to soil biocrust, but may be applicable.

The CMP provides 9 objectives, standards and guidelines specific to biocrust (Biological Soil Biocrust Appendix E). Three of these directives, Bic-02, Bic-03, and Bic-G1, are centered on developing a biocrust management plan for the HCNRA at the WWNF Forest level, and include developing desired levels of biocrust development based on site capability, and designating reference areas as genetic reserves. As of 2014, the biocrusts management plan has not been completed for the HCNRA. For this analysis, biocrust baseline data was collected for the LIRA project (McCormack and Chapin 2013) and the Snake-Pine Rangeland Analysis project (Geer 2013) and will serve as a starting point for baseline data in support of HCNRA directives relating to biocrusts.

Bic-01 is concerned with maintaining, enhancing, and facilitating restoration of biocrusts, and Bic-S1 with reducing and eliminating human impacts to biocrust. Bic-G2 and Bic-G3 are specific to grazing and mention minimizing grazing in dry periods and spring when moisture is limited, and placing water developments and salt away from biocrust and using fencing to divert from biocrust. Bic-G4 and Bic-G5 are concerned with the effects of fire on soil biocrust, and is not addressed in this analysis.

Effects Analysis Methodology

Specific Assumptions

- Changes in biocrusts as a response to management and climate are reflected in species composition, diversity, and percent cover and distribution. Changes in biological biocrusts in response to management can be assessed quantitatively (Herrick et al. 2005, Belnap et al. 2001). Both past and on-going activities may contribute to current biocrust conditions.
- Species composition, diversity, and percent cover and distribution is related to soil type (especially texture), natural and human caused disturbances (including blow down, landslides and fire), potential natural vegetation, climate, soil moisture, and the soil organic matter quality and quantity (Olarra 2011, Belnap et al. 2001).

Affected Environment/Environmental Consequences

Affected Environment

Quantitative measures of four biocrust categories (short moss, tall moss, lichen and cyanobacteria) were assessed in the fall of 2013 by line point intercept transect (Herrick et al 2005) at nine Interpreting Indicators of Rangeland Health (IIRH) sites within the LIRA area. One

biocrust assessment site (IIRH 4A) was located in the Lone Pine Allotment, two biocrust assessment sites (IIRH sites 7 and 9) were located in the Cow Creek Allotment, three biocrust assessment sites (IIRH sites 11A, 13 and 19) were located in the Rhodes Creek Allotment, and three biocrust assessment sites were located in the Toomey Allotment (IIRH sites 17, 18).

Under current management, biocrusts in the analysis area occur in all non-forested bunchgrass plant communities. However, composition and cover by biocrust categories varies with plant community type and historical land management. The summary statements that follow are drawn from analysis of 9 sites (150 sample points each site) on bunchgrass plant communities. The percent cover by biocrust category for each assessment site, along with plant community and land type characteristics are displayed for Lone Pine, Cow Creek, Rhodes Creek and Toomey Allotments, in the Biological Soil Crust report Appendix (Tables BC-1,BC- 2,BC- 3 and BC-4, respectively).

The average percent cover by biocrust category and plant community type under current management for the LIRA area is displayed in Table BC-1. Field data was used to show ranges of current biological soil cover types and composition according to potential natural vegetation group, and soil and geomorphological types. Trends and potential natural variability could be determined in the future with more extensive sampling at long-term monitoring sites. For more details, refer to the Soil Resource and Range Resource reports in the LIRA project file.

Summary of Biological Soil Biocrust Data

Biocrusts of moister grassland communities with potential for Idaho fescue were generally dominated by short and tall mosses, with minimal cover by lichens or cyanobacteria. In the drier bluebunch wheatgrass plant communities, short and tall mosses were prevalent on most sites. The rockier, drier and more sparsely vegetated (bluebunch wheatgrass, Sandberg's bluegrass, prickly pear cactus) plant community had greater total soil biocrust coverage and lichen cover than any of the other plant communities assessed. Cyanobacteria was present on several assessment sites, but with only minor coverage.

Table BC-1. Average cover by soil biological biocrust category in non-forested plant communities sampled the LIRA area.

Plant community	N (Sites)	Short Moss (%)	Tall Moss (%)	Lichen (%)	Cyano-bacteria (%)
Idaho fescue – prairie junegrass	2	14.5 (11-18)	10.5 (0-21)	1	0
Idaho fescue – arrowleaf balsamroot	1	15	0	0	0
Bluebunch wheatrass – sand dropseed – red threeawn	1	9	0	2	2

Plant community	N (Sites)	Short Moss (%)	Tall Moss (%)	Lichen (%)	Cyano-bacteria (%)
Bluebunch wheatgrass – Sandberg's bluegrass – prickly pear cactus	4	17.3 (8-33)	0	14.3 (3-30)	0.5 (0-2)
Bluebunch wheatgrass – silky lupine	1	2	1	1	0

Past studies often show that just as vascular plant communities are likely to become more specialized as time goes on with little to no disturbance, so may biocrust communities. A well-developed lichen component is considered part of the climax stage for biocrust communities and requires some development of vascular plants and bryophytes in order to establish and persist. Tall moss (*Syntrichia ruralis*) grows under shrub and bunchgrass canopy. Short mosses (various species) are found in the interspaces and under bunch grasses, thus it is considered that tall mosses is evidence of later seral phases than short mosses (Kaltnecker and Wicklow-Howard 1994, Belnap et al. 2001).

In a Columbia Basin study, Ponzetti et al. (2007) found the following variables were most highly related to biocrust integrity; total biocrust cover, biocrust species richness, and bluebunch wheatgrass and Sandberg's bluegrass cover. Native vascular plants are generally positively correlated to biocrust integrity. Belnap et al. (2001) found invasive exotic plants generally decrease the structural diversity of native vascular plant communities by creating monocultures of densely spaced plants and by homogenizing litter distribution. Invasive exotic plants also lead to decreased biocrust cover and species richness in most ecosystems (Belnap et al. 2001).

With limited sampling of the analysis area, no statistical data analysis was conducted to determine correlations between plant basal cover and cover by biocrust elements. Future field assessments and monitoring of biocrust identified in Chapter 2 would allow for analysis and determination of trends by plant community and determination of effects of permitted cattle grazing. In the LIRA area, basal plant cover and total effective ground cover at long term C&T plots has been maintained or increased over the past 50 to 60 years (Range Section, Chapter 3). Further investigation is warranted to see whether biotic biocrust is increasing (with native plant cover), decreasing (with increasing non-native cover), or perhaps shifting in composition.

Biological Soil Crust Desired Conditions

In general, the desired condition for biocrust is the same as that for soils. Refer to the Soils Resource Section in Chapter 3 for a full description. In addition to attaining the desired conditions for soils, the desired condition for biocrusts is a variety of morphological forms and species appropriate to the various sites where they occur.

Trampling and crushing are the primary disturbances to biocrusts with recovery rates of less than 5-years to greater than 50 years. Reduced trampling is positive for biocrust maintenance or improvement. Warren and Eldridge (2001) found that:

- Damage to biocrusts by livestock trampling is proportional to the intensity of impact, determined in large part by stocking rate and distance to water sources.
- Biocrusts appear to be most susceptible to damage during the driest seasons.
- For any given level of livestock impact, biocrusts on sandy soil may suffer greater damage than biocrusts on finer textured soils.

Reduction or elimination of other disturbance agents is also desirable for maintenance or improvement of biocrusts. Biocrusts develop slowly and in addition to trampling, they are susceptible to damage from humans, off-road vehicles, invasion by exotic annual grasses, soil erosion and compaction, and fire (Belnap and Eldridge 2001).

The degree of degradation of soil biocrusts is related to soil type and soil moisture. More stable fine textured soils (such as silty loams) support greater cover and more varied populations of soil biocrust communities (Belnap et. al. 2001). The biocrusts actively grow when wet or moist. Under spring conditions, soil biocrusts may grow up to one mm/year (Finch et al. 2004). During periods of low soil moisture (summer and fall) soil biocrusts are dormant, dry, and brittle. In general, wet or moist clay is less stable relative to wet sand as a substrate for biocrusts. However, dry clay is more stable relative to dry sand as a substrate for biocrusts.

Belnap et al. (2001) and Finch et al (2004) recommend light to moderate grazing in the early to mid-wet season, when soil biocrusts are actively growing, to allow time for recovery before the dry dormant period, and to minimize grazing during periods of low soil moisture when livestock grazing may break soil biocrust connection with the soil or crush the biocrusts (Belnap et. al. 2001; Finch et. al. 2004). Frequent or continuous disturbance will keep the biocrust at an early successional stage (USFS – HCNRA CMP EIS 1999 and Brooks 2009).

In summary, grazing in the early to mid-wet season when soil moisture is high has less impact on medium to fine textured silt loam soils found in the LIRA analysis area, and would be the most desirable grazing scenario for biocrust maintenance.

Environmental Consequences

Effects of Cattle Grazing on Biological Soil Crusts

Generally the effects to biocrusts mirror effects to soils documented in the Soil Resources section. A summary statement specific to biocrusts is given for each Alternative below. The scale of the cumulative soil effects analyses are bounded in time by 10 to 15 years (or in perpetuity if grazing authorizations continue) and in space by the LIRA analysis area boundary. For this discussion, the analysis area consists of capable lands of the LIRA project area boundary.

Under the no grazing Alternative (Alternative A), grazing would not be re-authorized in the LIRA area. Term grazing permits would be cancelled in 2 years. Soil condition monitoring would not occur. Interior fences and water developments currently in existence would be abandoned if they were not maintained for wildlife.

All Action Alternatives (B-E) would reauthorize permitted livestock grazing and incidental horse grazing within the four LIRA Allotments. Alternative B (Current Management) would allow levels of permitted use similar to past management. Proper livestock distribution and biocrust management would be achieved through herding, salting, maintenance of rangeland improvements, and implementation of monitoring and mitigation measures.

The Proposed Action (Alternative C) and Alternatives D and E provide for more biocrust protection through additional rest, rotation or deferment of pasture use within Allotments. Alternative D would incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations. This Alternative represents the greatest change from current management and a greater rate of recovery of biological biocrusts.

For a complete description of the elements, project design criteria, monitoring and mitigation measures common to the Proposed Action (Alternative C) and all other Action Alternatives (Alternatives B, D and E), please see Chapter 2 and the Soils Resources section in Chapter 3.

Alternative A (No Grazing)

Direct and Indirect Effects of No Grazing

Alternative A would likely lead most quickly to continued biotic biocrust, soil integrity, and native plant restoration. However, with Alternative A, there would not be any monitoring of the resources.

Under Alternative A, livestock grazing would no longer be authorized within the LIRA. Areas within the LIRA would continue to provide critical habitat for wildlife in the winter and early spring. Grazing by wild ungulates would continue to occur in the LIRA. Shallow, south facing sites receive moderate to high late winter and early spring use by wild ungulates.

Without continued disturbance from livestock grazing there would be less direct effects to biocrust by trampling and crushing, and less indirect effects to biocrust from changes in native vegetation communities, soil compaction, displacement and accelerated soil erosion in areas where livestock concentrate such as low gradient sites, trails, water sources, and salting and loafing areas and on steep sites where trailing is prevalent.

As stated in the Soils section, as soil conditions improve over time through natural processes, biocrust cover would likely increase and composition would move toward later seral biocrust components including foliose lichens and tall mosses. Invasive plants would still persist and proliferate, but native plant cover would likely continue to increase and possibly compete more effectively, and hoof shear and soil compaction would be reduced to levels caused by native animals. Biocrust cover and composition would probably improve as native plant cover and composition does, though more slowly.

It remains to be seen how much improvement is possible, particularly in the most utilized areas with a long history of very heavy impacts prior to regulated grazing. Due to the susceptibility of these sites to impacts, soil disturbance from grazing by wild ungulate would also continue. In the

LIRA analysis area, potential recovery rates are currently unknown. Some sites may already be near their potential, while the most highly disturbed sites may take decades to recover. However, studies have shown that different components of biocrust recover at different rates (Kaltnecker and Wicklow-Howard 1994, and Belnap and Eldridge 2001). Kaltnecker and Wicklow-Howard (1994) found that biocrusts recovery rates varied with different levels of disturbance: light trampling by humans: 1-3 years to redevelop with less complex structure, partial recovery after livestock use: 14-18 years, and early to mid-seral community development after disturbance: 10 years (western Snake River Plain). Monitoring on Prineville BLM District (Demmer 2005) revealed that in most cases Pacific NW mosses recover more quickly than lichens. Conversely, Belnap and Eldridge (2001) map a successional sequence for the western U.S. in which very early successional lichens such as Collema spp. were the first to follow cyanobacteria and green algae.

Kaltnecker and Wicklow-Howard (1994) initially estimated the following recovery times: 30-40 years for cyanobacteria, 45-85 years for lichens (full recovery), and 250 years for bryophytes (late seral). However, Belnap and Eldrige (2001) recognize that this and other published estimates were based on linear extrapolations of observed recovery rates. In their Colorado Plateau studies, they found that when scalped plots were re-assessed after 2-5 and 10-14 years from disturbance, cyanobacteria that was predicted to recover in 45-110 years following the 2-5 year assessment actually recovered within 14-34 years; thus extrapolations based on 2-5 years greatly overestimated recovery times. Similarly, at first sample, moss recovery was predicted at 400 years and at second sample it was only 42 years. Thus one might find full recovery in less than 50 years in the LIRA area.

Cumulative Effects

Dispersed camping and hunting would continue to occur in the LIRA activity area. No prescribed burns are planned for the analysis area, but wildfires would continue to occur. The impacts to biocrusts from these activities would include localized areas of impacts. Since there is no Term Private Land Grazing Permit issued, use of the adjacent private land would occur. There would be no direct impacts to National Forest System (NFS) lands that would be independent of this analysis. Overall, improvements to biotic biocrust cover and composition may be expected under this alternative.

Action Alternatives (Alternatives B, C, D and E)

The Cow Creek, Lone Pine, Rhodes Creek and Toomey allotments contain lands identified as suitable and capable for domestic livestock grazing in the Forest Plan and CMP. In general, current management is consistent with the goals, objectives, standards and guidelines of the Forest Plan and CMP.

The action alternatives are B, C, D and E. Adaptive management is part of the proposed action (Alternative C), and part of action alternatives D and E. Adaptive management is a system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes, and if not, to facilitate management changes that would best ensure that those outcomes are met or re-evaluated.

Direct and Indirect Effects of Actions Common to Action Alternatives

Proposed management under all Action alternatives would be designed to meet and maintain desired biocrust conditions. Implementation of proposed mitigation measures and adaptive management strategies to adjust utilization rates and grazing rotations for sites identified with unsatisfactory biotic soil biocrust (Soil Resources Section, Chapter 3, Table 21) in combination with implementation of biocrust monitoring would create the feedback loop to ensure that biocrusts are working toward the desired condition. Generally the effects to biocrusts mirror effects to soils documented in the Soil Resources section.

Proposed management of all Action Alternatives would ensure maintenance of rangeland improvements (fences and water developments) prior to turning cattle out in the allotments and while the allotments or adjacent allotments are in use, therefore limiting or reducing potential direct and indirect livestock impacts to biocrust.

The rotation between North Roy, South Roy and Bull pastures in the Rhodes Creek Allotment would decrease the frequency of biotic biocrust disturbance from grazing. The rate of recovery of biocrust in these pastures would be greater than that realized under current management.

The reconstruction of the fence between Upper and Lower Spain Saddle pastures in the Toomey Allotment would prevent drift of livestock, ensuring use only during specified grazing times and therefore limiting overall direct and indirect grazing impacts to biocrust. The rate of recovery of biocrust conditions in these pastures would be greater than that realized under current management.

The proposed reconfiguring of fencing in the Cow Creek Allotment to reduce the current number of pastures from ten to four would allow more effective management and monitoring of livestock distribution in those pastures by the permittee and therefore, potentially reduce direct and indirect impacts of livestock grazing to biocrusts. The proposed incorporation of the Tulley pasture of the Rhodes Creek Allotment into the Toomey Allotment would have minimal effects on overall soil conditions in the LIRA.

Alternative B (Current Management)

Direct and Indirect Effects

Livestock grazing effects to soils are described in detail in the Soils Resource section. Livestock grazing effects to biocrust are similar to those described under the soils section. Rangeland C&T monitoring plots, IIRH surveys and point intercept surveys indicate that in general greater than 80 percent of livestock grazing capable lands in the LIRA are currently being maintained with non-detrimental soil conditions and therefore have potential for biocrust improvement or maintenance.

Alternative B is similar to the current stocking and timing regime for cattle grazing. Historic stocking levels on LIRA area started dropping in the 1940’s when the Forest Service started to control use through creation of allotments, implemented permitted season of use, and regulated

numbers of livestock. Significant decreased in permitted numbers occurred in 2004-2005 when the current permittee obtained additional allotments (Cow Creek and Toomey Allotments) but did not fully increase livestock number to fully stock all three allotments. Reduced livestock numbers continued the process of rangeland improvement from historic conditions (Rangeland Resource section). Several long term C&T plots and ecoplots show improvement in native plant cover in the last 30 – 60 years. Therefore, it is most likely that biocrust improvement would continue with overall range condition and native plant community improvement, though perhaps at a slower rate than vascular plants.

Under this alternative, intensive livestock use areas would continue to exist, so localized disturbance to biocrust would continue. These areas of high use and concentration include fence lines trails, roads, skid trails, water sources, and salting and loafing areas. As documented in the Soils section, these areas encompass approximately 13 percent of the LIRA area.

In summary, under this alternative soil biocrust would be maintained at current status. Monitoring of ground cover types by line point intercept transects would be required to insure long-term compliance with CMP management direction. A decrease in utilization for areas with unsatisfactory soil conditions may increase the current rate of improvement of biocrust communities and associated improved soil and site stability. Under Alternative B, improvement of range condition, native plant communities, and would likely continue, albeit at a slower rate than that of the No Action (no grazing) alternative. Time frames and degree of recovery by morphological forms in the biocrust are detailed above under Alternative A. At some point a plateau in improvement will likely be reached.

Alternative C (Proposed Action)

Direct and Indirect Effects

The effects of livestock grazing on biocrusts would be similar to those described for Alternative B. However, they would be less in magnitude under Alternative C than under Alternative B due to site specific changes proposed in the Toomey Allotment. As with all Action Alternatives, Alternative C proposes to assess soil resource and biological concerns with long and short term soil condition monitoring with point intercept transect method. Management would be designed to meet and maintain desired soil conditions and to provide for further protection of the resources if warranted. In addition, proposed adaptive management strategies (change to grazing duration or intensity) would increase the rate of recovery over current conditions, and help move concern sites with deep soils on north facing slopes toward desired conditions. Refer to Chapter 2 and section on adaptive management strategies common to Action Alternatives C, D and E above).

Current management would continue in the Cow Creek Rhodes Creek, and Lone Pine Allotments. Site specific actions for the Toomey Allotment would include 1) the creation of a new pasture (Big Pine) from a portion of the Lower Spain Saddle pasture allowing a rotation schedule where each pasture would be rested every other year, 2) and the implementation of adaptive management strategies for the Johnson Canyon and Toomey pastures. Reducing

either the duration or intensity of grazing in these pastures would benefit biocrusts by reducing livestock pressure (trampling or crushing) where they occur.

A rest rotation grazing system where Big Pine and Lower Spain Saddle pastures in the Toomey Allotment where grazing occurs year one, and is the same pasture rested year two, would decrease the frequency of direct trampling and crushing of biocrust. The Hell's Canyon National Recreation Area Comprehensive Management Plan (2003) management direction specific to biocrust would be met under Alternative C. In addition, a continued upward trend in overall biocrust conditions from current conditions is expected under Alternative C, particularly in Big Pine, Lower Spain Saddle, Jonson Canyon and Toomey pastures.

Alternative D

Direct and Indirect Effects

The effects of livestock grazing on soils are well documented, and would be similar to those described for Alternatives C (Proposed Action). However, Alternative D represents the greatest change from current management. Proposed activities under Alternative D would allow the greatest rate of recovery and movement toward desired biological soil biocrust conditions of pastures with resource concerns of all the Action Alternatives.

As with all Action Alternatives, Alternative D proposes to assess soil resource and biological soil biocrust concerns with long and short term soil condition monitoring with point intercept transect method. Management would be designed to meet and maintain desired conditions and to provide for further protection of the soil resources if warranted.

Alternative D proposes to incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations to allow for additional opportunities for rest, and deferment of pastures within all four allotments. The proposed actions to change current management on the four LIRA allotments are thoroughly described in Chapter 2. Effects of proposed activities to biocrust would mirror those described for the soil resources (refer to Soil Resources section). Biocrust density and diversity is limited to protected sites, resting pastures a deferred rotation would promote recovery of the biological soil biocrust in grazed areas and slow expansion of the populations may be realized.

Alternative E

Direct and Indirect Effects

The effects of livestock grazing on soils and biocrust would be similar to those described for Alternative C for the Cow Creek, Rhodes Creek, and Toomey Allotments. The effects to livestock grazing on soils and biocrust would be similar to those described for Alternative D for the Lone Pine Allotment. Alternative E proposes to use the Lone Pine Allotment as a Forage Reserve through a Temporary Grazing Permit for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. Alternative E proposes that the Lone Pine Allotment receive rest at least once in every four years.

There would be minimal change in current biological biocrust conditions resulting from the proposed use of the Lone Pine Allotment as a forage reserve or the proposed additional head months as a result of this proposal. As with all Action Alternatives, under Alternative E soil and biocrust conditions would be assessed through long and short term soil condition monitoring by point intercept transect method. Management would be designed to meet or maintain desired biological soil biocrust conditions and to provide for protection if warranted.

The CMP management direction specific to biocrusts would be met under Alternative E.

Cumulative Effects

The effects from Alternative B are expected to only minimally overlap with effects from past and ongoing activities. Few to no impacts are expected from outfitting, hunting, camping and mining. Grazing activities within the LIRA area are expected to continue into the future on both private and NFS lands. Landscape changes associated with these continued activities would be similar to those described in the Soils Resources section. Effects of future actions would be evaluated as they are permitted or planned. Wildfire is an unknown entity. If and when wildfire occurs in a LIRA allotment, decisions would be made to continue or restrict grazing on the allotment depending on resource needs. Monitoring and mitigations have been proposed under the Alternative B to reduce grazing effects on soil resources and biocrust.

Recovery would be realized at an increased rate under Alternative C and E than Alternative B due to a reduction of direct impacts from cattle grazing as a result changes in management to include rest rotation, change of season, and increased active management. Recovery would be realized at an increased rate under Alternative D than Alternative B or C due to a reduction of direct impacts from cattle grazing as a result changes in management to include rest rotation, deferment, in combination with increased active management.

Cumulative effects from these activities would allow compliance with the CMP management direction specific to biocrust (Biological Soil Crust report Appendix E). Long and short term utilization monitoring and soil condition monitoring by point intercept method would assess biological soil biocrust conditions. Cumulative impacts to biocrusts would be addressed through changes in management needed to move biocrusts toward desired conditions. Cumulative effect benefits of Alternative E also includes improved biological soil biocrust conditions within adjacent Allotments in the Imnaha River Canyon, or other summer grazed allotments with resource concerns that are provided rest through Temporary Grazing Permits.

Summary of Direct and Indirect Effects Across Alternatives

Within the LIRA, benefits to the biocrust and the soil resources will be realized through management strategies to help to manage cattle grazing patterns and season of use.

Table BC-2. Degree of Grazing Effects on biocrusts by Alternative Compared to Existing Conditions

Key Biocrust Indicator	Alternative A (No Grazing)	Alternative B (Current Activity)	Alternative C (Proposed Action)	Alternative D	Alternative E
Biocrust Percent Cover and biodiversity	Least effect, no cattle hoof shear or direct trampling would occur. Elk grazing effects would continue.	No change to slightly less risk from the existing condition due to mitigations, monitoring and other elements of livestock management changes in the AOI.	Moderate amount of change to areas with current resource concerns due to mitigation measures, monitoring and other elements of livestock management changes in the AOI under this Alternative.	Highest decrease in risk of effects than under current management due to livestock management changes in the AOI. Greatest change in risk specifically to areas identified with resource concerns and site with deep soils on steep north facing slopes.	Similar to risks as described under Alternative C. Moderate amount of change to areas with current resource concerns due to mitigation measures, monitoring and other elements of livestock management changes in the AOI under this Alternative

Implementing additional adaptive management strategies under Alternative C would provide further benefits to biocrust on sites with deep soils on steep north facing slopes (significant issue number 2). Table BC-3 summarizes cattle grazing effects on deep soils on steep north facing slopes by Alternative.

Table BC-3. Relative rate of recovery of biocrust on Deep soils on steep north facing slopes by Alternative within the LIRA area (+ indicates positive measure)

Key Soil Indicator (Soil compaction, displacement and accelerated soil erosion)	Alt A	Alt B	Alt C	Alt D	Alt E
Relative rate of recovery towards desired future conditions	+++++	+	+++	++++	+++

Compliance with the Forest Plan and Other Direction

All Action Alternatives (B, C, D and E)

Management of the LIRA allotments under Alternatives A, B, C, D and E are consistent with both the Wallowa-Whitman Forest Plan (1990) and the Hells Canyon National Recreation Area CMP (2003) because of the application of project design criteria, mitigation measures and monitoring of management goals and objectives. Action Alternatives B, C, D and E would meet Forest Plan and HCNRA CMP goals, desired future conditions and objectives because livestock would be managed on the allotments while implementing protection utilization measures, monitoring (long and short term) and adaptive management strategies (Alternative D), to address any site-specific concerns as they are identified. Action Alternatives include long and short term monitoring that would assess compliance with CMP direction.

Other Required Disclosures

Best Available Science

This soil effects analysis meets the advice for incorporating “best available science” in specialist reports for NEPA projects as given in the May 2, 2007 advice letter, (Advice on Documenting “Best Available Science”) and the clarification letter dated June 20, 2007, (Clarification of May 2, 2007, Advice on Documenting “Best Available Science”), issued by the Acting Director and Director for Ecosystem Management Coordination, respectively.

This analysis of effects was based on a combination of peer reviewed papers published in scientific journals, publications produce by Forest Service research, and resource professionals, as well as field surveys.

Probable Adverse Environmental Effects Which Cannot Be Avoided

Grazing may result in potential adverse environmental effects that cannot be mitigated or avoided. Under the proposed action there would be impacts to upland soils through herbivory and hoof action by both wildlife and livestock. These effects would be reduced to an acceptable level by utilizing grazing guidance as well as adaptive management and monitoring. It is recognized that recovery of degraded biocrust can occur under proper grazing management, though at a slower rate compared to recovery without the presence of livestock grazing. The potential for greatest impacts generally occur during hot and dry years when there is less re-growth following grazing. This is due to the reduced resiliency of ecosystems during unfavorable growing conditions.

Noxious Weeds

Introduction

Non-native, invasive plants, and designated noxious weeds, will be referred to collectively as noxious weeds throughout this section. Noxious weed sites mentioned in the Lower Imnaha Range Analysis (LIRA) area are based off the most recent Forest Service (FS) inventories and treatments. Sites have been documented through treatment and monitoring records by noxious weed specialists, spanning the years since initial discovery and inventory of the noxious weed site.

The Lower Imnaha is part of a Cooperative Weed Management Area (CWMA) called the Wallowa Canyonlands Partnership (WCP), created in 2005 which includes the canyon grasslands of the Snake, Imnaha, and Lower Grande Ronde River watersheds. The landscape the WCP covers is rugged country with steep terrain and the focus is on the river corridors because rivers easily transport weed seeds. WCP is a group of various individuals, agencies, and organizations working together to manage noxious weeds. Entities involved with the WCP are the Forest Service, Oregon Department of Agriculture, Tri-County CWMA, Wallowa County Vegetation Department, Wallowa Resources, The Nature Conservancy, and private landowners. Priorities are set, maps are created, treatments are monitored, and on-the-ground-weed control is implemented. Together, a more concentrated effort in integrated weed management has occurred. Prior to the formation of the WCP, inventories and treatments were being conducted but on a smaller scale and did not always allow for “seamless” management across land boundaries. With the assistance of WCP, inventories have been thorough and accurate which reflect as current noxious weed sites throughout the project area. These established infestations are inventoried and managed under appropriate integrated weed management practices based on funding availability and on site-specific objectives and priorities set by the Forest as guided by the WWNF 2010 ROD and the PNW 2005 ROD. It is possible that more infestations exist and/or have spread but have not yet been detected by annual inventory and mapping efforts.

Within the LIRA area, many noxious weed patches have likely been around for a long time, though historically these occurrences remained small, widely scattered and poorly recognized. Forest and transportation management programs were very active through the 1980s, probably spreading and increasing the occurrences of noxious weeds at the same time that awareness of their threat was awakening. According to district noxious weed records, the majority of the current documented sites were discovered in the 1980s. The initial noxious weed documentations came with implementation of forest management and range management activities. Inventory, monitoring and treatment strategies were developed and implemented through the end of the 1990s. Inventories and treatments have been ongoing and more consistent over the past five years. Treatment methods have included hand pulling, release of biological control agents, and spraying with herbicides. Monitoring indicates that in most areas

where treatment has occurred, density of noxious weeds is decreasing. This is most apparent in those areas receiving herbicide treatments.

Most of the noxious weeds found in the Lower Imnaha area are native to Europe and Asia. How these weeds spread into these areas is not recorded, but suspected to be spread by feed, vehicles, animals, recreationists, wind, and water. The current vegetation throughout the allotments is a result of natural and human activities occurring over hundreds of years. Activities such as homesteading, ranching, and farming have altered species composition from the introduction of non-native plants, thus increasing threats to the native vegetation. The success of weeds in this landscape is attributed to a combination of favorable climate, rugged terrain, disturbance created from recreationists, and frequent fires, all of which create prime conditions for weed seed germination and spread. Due to the low elevation and warm climate, weed seeds are the first to germinate before native vegetation. When ground is exposed, the invasion of weeds is a possibility as these species are opportunists and tend to take advantage of any unoccupied space. For this reason, with grazing, both wild and domestic can increase chances of weed spread by creating open sites with hoof shear, trailing, loafing areas, overgrazing, and use around salt or water sites. Further, if weeds are already located on a site that has experienced ground disturbance, then the chances of further weed establishment are increased.

The rugged terrain of the HCNRA makes detection of invasive plants difficult. Weed seeds spread more in high use areas via vehicles, animals, clothing, and disturbances, such as camping and traveling off road from recreationists. The frequency of fires in the area has led to accelerated weed germination baring the ground of all other competition, allowing weeds to out-compete native vegetation. As a result of these factors, the Lower Imnaha Canyon has been recognized as a high priority for weed managers. Current management consists of inventories, treatments of previously inventoried sites followed by restoration to restore native plant communities.

In addition to the already existing noxious weed infestations, several large parcels of private land, containing additional noxious weeds within the project area, were acquired by The Nature Conservancy. These parcels were then purchased by the FS in 2011. During the Nature Conservancy ownership of these private lands, integrated weed management and intensive weed inventories, treatments, and restoration efforts were completed. The FS and partners have since taken over treatment projects on these lands.

Currently, the FS and WCP have a noxious weed program to routinely inventory and treat existing infestations. This program reduces the cumulative effects of the potential to spread noxious weeds regardless of the source action. Any treatment of noxious weeds that is done in this project area is implemented as part of the noxious weed Management Program's annual program of work. Some infestations have been eradicated, some contained, so that only new germinations from the seed bed need to be treated, and a few are continuing to spread. In this analysis area, most of the documented sites have received some level of treatment to contain and control the infestations since the early 1990's.

Regulatory Environment, Forest Plan and Other Direction

Forest Plan

The current sites within LIRA are managed and will continue to be managed in accordance with the Wallowa Whitman Land and Resource Management Plan, 1990 (LRMP) as amended by the Pacific Northwest Record of Decision, 2005 (PNW ROD).

Furthermore, direction for site-specific treatment activities is covered under the WWNF Noxious Weed Treatment Project Environmental EIS, 2010. A Record of Decision (ROD) was completed, providing direction for a site-specific program to contain, control, and eradicate new and existing noxious weeds found on forest land.[1]

Other Direction

The Pacific Northwest Record of Decision, 2005 (PNW ROD) includes the following prevention standards that are applicable to the LIRA area. For a full list see the ROD Table NW-5 – Prevention and Restoration Standards:

- Prevention of invasive plant introduction, establishment and spread will be addressed …grazing allotment management plans… and other land management plans and assessments.
- Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment prior to entering NFS lands.
- Use only pelletized or certified weed free feed on all NFS lands.
- Retain native vegetation consistent with site capability and integrated resource management objectives to suppress invasive plants and prevent their establishment and growth.
- Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder.

Effects Analysis Methodology

Specific Methodology

The term noxious weed is any plant designated by a federal, state, or county government to be injurious to public health, agriculture, recreation, wildlife, or any public or private property. Wallowa Whitman National Forest (WWNF) noxious weed managers work cooperatively with

[1] Currently the 2010 WWNF Invasive Plant Treatment Project is partially vacated, but treatments during litigation will continue in accordance with the Court Order of approved sites from the 2010 ROD as well as noxious weed sites mentioned in the 1992-1994 EA's.

County, State, and local Cooperative Weed Management Areas to help the district decide which target noxious weed species are to receive priority treatments. The Wallowa County Weed Board developed a prioritization process to determine the invasive potential of listed weeds and which will receive priority treatments. This list is the Wallowa County Noxious Weed Control Rating System found in the 2013 Wallowa County Integrated Weed Management Plan (WC IWMP). Noxious weeds are classified as either "A", "B", "T" for Target, or placed on the "Watch List", with "T" listed weeds receiving priority for control efforts. These species designations are based on environmental risks to a particular county as well as criteria that include potential level of detrimental effects, plant reproduction methods, current range of distribution, and expected control difficulty.

Affected Environment/Environmental Consequences

Affected Environment

LIRA is home to 21 different noxious weed species resulting in 988 noxious weed sites totaling 1,022 infested acres. These are infestations found throughout the 4 allotments and corresponding pastures of LIRA. (Refer to Table AR-1 and AR-2). Out of the 21 species, 13 have a "T" designation. As defined by the Wallowa County Weed Board Noxious Weed Control Rating System (2013), "T" listed noxious weeds are those selected from either the "A" or "B" or "Watch" list. The recommended action for infestations of "T" weeds are subject to eradication or intensive control, according to the Wallowa County Management Plan, when and where found. A "T" designation is defined as a priority noxious weed designated by the Wallowa County Weed Board as a priority for which the county will develop and implement a county wide management plan (WC IWMP 2013). "A" designation is defined as a weed of known economic importance which occurs in the county in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring counties make future occurrence in Wallowa County seem eminent (WC IWMP 2013). Infestations with "A" designation are subject to eradication or intensive control when and where found (WC IWMP 2013). "B" listed noxious weeds are defined by Wallowa County as a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. Recommended action is limited to intensive control at the state, county or regional level as determined on a site specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method (WC IWMP 2013). "B" listed species Canada thistle, Diffuse knapweed, Dalmation toadflax, and Field Bindweed, are currently hosts to active biological agents within the LIRA project area.

Table NW-1: Weeds documented in LIRA along with County priority rating

Weed	Infested Acres	County Priority Rating
Canada Thistle	2.02	B
Common Bugloss	.27	T
Common Crupina	6.31	B
Dalmation Toadflax	2.61	B
Diffuse Knapweed	18.79	B
Field Bindweed	1.41	B
Himalayan Blackberry	24.66	B
Italian Thistle	6.48	T
Japanese Knotweed	2.68	A
Jointed Goatgrass	.18	T
Medusahead Rye	56.84	T
Perennial Pepperweed	.62	T
Puncturevine	24.6	T
Purple Loosestrife	.75	A
Rush Skeletonweed	10.8	T
Scotch Thistle	93.03	T
Spotted Knapweed	93.9	T
Sulfur Cinquefoil	116.17	T
Tansy Ragwort	1.99	T
Whitetop	104.54	T
Yellow Starthistle	453.3	T

Table NW-2: Acres of noxious weeds by allotment and pasture in LIRA

Allotment	Pasture	Weed Species	Infested acres
Lone Pine	Little Deep	Yellow Starthistle	13.25
		Whitetop	16.35
	Closed Areas	Japanese Knotweed	0.18
	Dug Creek	Rush Skeletonweed	0.87
		Tansy Ragwort	1.99
		Scotch Thistle	0.94
		Yellow Starthistle	29.01
		Whitetop	0.92
		Sulfur Cinquefoil	50.57
	Hospital	Purple Loosestrife	0.75
		Yellow Starthistle	24.07
		Rush Skeletonweed	0.03
		Medusahead Rye	0.24
		Scotch Thistle	9.85

Allotment	Pasture	Weed Species	Infested acres
		Whitetop	1.18
		Common Crupina	6.31
	Birch Creek	Yellow Starthistle	1.88
		Puncturevine	2.3
		Whitetop	0.92
	Big Canyon	Yellow Starthistle	10.63
		Diffuse Knapweed	7.44
		Scotch Thistle	6.74
		Rush Skeletonweed	0.3
		Medusahead Rye	1.62
		Italian Thistle	0.08
	Dug Bar Airstrip	Sulfur Cinquefoil	4.81
		Whitetop	1.74
Cow Creek	Deer Creek	Sulfur Cinquefoil	18.76
	Upper Fingerboard	NONE	0
	Fingerboard	Scotch Thistle	7.07
		Yellow Starthistle	3.19
		Sulfur Cinquefoil	0.03
		Whitetop	0.07
	Upper Salt Gulch	NONE	0
	Salt Gulch	Sulfur Cinquefoil	3.22
		Scotch Thistle	7.48
	Upper Schleur	NONE	0
	Schleur	Whitetop	10.06
		Scotch Thistle	20.16
	West Cow Creek	Rush Skeletonweed	0.91
		Scotch Thistle	0.49
		Whitetop	3.58
	Rowley	Sulfur Cinquefoil	6.1
		Scotch Thistle	15.87
		Rush Skeletonweed	0.2
	Upper Rowley	NONE	0
Rhodes Creek	West Side Cow	Whitetop	0.008
		Medusahead Rye	0.009
		Yellow Starthistle	0.05
	Foster	Spotted Knapweed	0.31
		Yellow Starthistle	4.01
		Dalmation Toadflax	2.61

Allotment	Pasture	Weed Species	Infested acres
		Whitetop	1.99
	Holmes	Whitetop	5.97
		Medusahead Rye	2.54
		Puncturevine	4.6
		Yellow Starthistle	7.12
		Scotch Thistle	0.08
		Rush Skeletonweed	0.05
		Italian Thistle	4.08
	Willow Springs	Yellow Starthistle	21.97
		Medusahead Rye	18.98
		Puncturevine	3.9
		Rush Skeletonweed	0.42
		Scotch Thistle	2.22
		Whitetop	3.68
		Jointed Goatgrass	0.18
	West Bench Lightning	Whitetop	49.45
		Sulfur Cinquefoil	0.52
	East Bench Lightning	Spotted Knapweed	93.28
		Yellow Starthistle	1.88
		Puncturevine	8.6
		Himalayan Blackberry	16.75
		Scotch Thistle	19.06
		Whitetop	0.11
		Rush Skeletonweed	1.05
		Common Bugloss	0.27
		Sulfur Cinquefoil	15.88
		Diffuse Knapweed	0.61
	Bull	Sulfur Cinquefoil	2.6
		Whitetop	2.68
	North Roy	Sulfur Cinquefoil	0.09
	South Roy	NONE	0
	Lightning Creek	Diffuse Knapweed	3.49
		Field Bindweed	1.41
	Rhodes Creek	NONE	0
	Butcherknife	NONE	0
	Sleepy Breaks	NONE	0
	Lightning Hangover	Whitetop	0.09
	Tulley	Yellow Starthistle	142.65

Allotment	Pasture	Weed Species	Infested acres
		Canada Thistle	2.02
	Private Land	Japanese Knotweed	2.43
Toomey	Spring Gulch	Medusahead Rye	2.14
		Whitetop	1.5
	Johnsen Canyon	Medusahead Rye	30.96
		Puncturevine	5.2
		Diffuse Knapweed	7.25
		Spotted Knapweed	0.31
		Yellow Starthistle	3.58
		Whitetop	4.24
		Perennial Pepperweed	0.62
		Rush Skeletonweed	6.97
	Upper Spain Saddle	Yellow Starthistle	51
	Lower Spain Saddle	Yellow Starthistle	103.78
	Toomey	Yellow Starthistle	11.3
		Sulfur Cinquefoil	0.3
		Scotch Thistle	0.59
	Tulley Creek	Yellow Starthistle	24
		Scotch Thistle	2.48
		Himalayan Blackberry	4.68
		Medusahead Rye	0.35
		Sulfur Cinquefoil	13.29
		Italian Thistle	2.32
	Closed Area	Himalayan Blackberry	3.23
		Japanese Knotweed	.073

Environmental Consequences

Alternative A – No-action Alternative (No grazing)

Direct and Indirect Effects of No Action:

For the Alternative A discussion, all allotments within LIRA would be affected similarly and will not be discussed in detail. With the selection of Alternative A, the no-grazing alternative, noxious weeds would continue to spread through ongoing land management activities and permitted actions, recreational users, and wildlife. In the absence of grazing activities there would be fewer disturbances and less opportunity for weeds to spread or new species move into and within the LIRA area, thus allowing time for treatments to take place without the disturbance of grazing. With no livestock removing vegetation, exposing soil, and acting as a vector for

weed spread, risk for introduction and spread of noxious weeds would be the lowest among the alternatives.

The vessels responsible for weed spread in the absence of grazing would be human activities, wind, water, and wildlife. Most human activities would be confined to travel corridors making weed detection and treatment feasible. There is the potential for wildlife to spread noxious weed seed in the project area, but this is not measureable. The FS has no control over the numbers or movement of wildlife. Any influence this project has on the movement and foraging behavior of highly mobile wildlife is not expected to be measurably different with respect to their potential to intersect the known noxious weed patches.

Vegetation not exposed to grazing poses both benefits and detriments to existing vegetation. The nongrazing period in the cycle provides opportunity of the forage plant following defoliation to rebuild photosynthetic area, replenish carbohydrate reserves used in the early stages of regrowth, and maintain a vigorous root system (Vallentine, 2001). This would allow native vegetation the opportunity to out-compete or compete favorably with invasive plants. However, vegetation not grazed would result in excess litter accumulation. Litter accumulation from noxious weeds may reduce native grass seed germination and seedling establishment (Sheley and Petroff, 2003). In the absence of grazing within the LIRA area, vegetation would mainly be controlled by unpredicted wildfire. In between fires, greater litter accumulation would lead to higher intensity fires that expose ground surfaces, reduce shade, and increase light, and create a flush of nutrients. Creating these conditions can result in the rapid growth and expansion of noxious weeds. However, weed survival is also expected after low intensity fires. Many noxious weeds have below-ground root crowns or rhizomes, which are protected from the damaging effects of fire. Noxious weeds such as Canada thistle, Dalmation toadflax, Field bindweed, Rush skeletonweed, Sulfur cinquefoil, Japanese knotweed, and Whitetop are rhizomatous and spread vegetatively. When above ground weed growth is removed by fire or other methods, such as grazing, it stimulates the production of new shoots from the vegetative root buds. Because of nutrient reserves in the roots, these new shoots are immediately aggressive and highly competitive.

The no-grazing alternative allows for improved treatment opportunities. Treatments of noxious weeds wouldn't be timed to grazing rotations and would be performed during optimum treatment windows instead of when pastures or allotments are vacant. Treatment of a weed site takes more than just a year to treat. Depending on the patch size and the type of weed, it may take 3-5 years before a noxious weed patch is eradicated or contained. Disturbances from livestock would increase that time frame and more effort would go into controlling the weed site. The Lone Pine Allotment which has not been actively grazed for the past almost 10 years has been the most successful in terms of weed treatments. Treatments have been consistent during these 10 years and weeds sites have shown very little spread off-site. Fewer "new" weed sites have been detected throughout the Lone Pine Allotment, in contrast to the other three allotments of LIRA where new sites are detected annually. It is speculated that this is due to the movement of cows. Wildlife, recreationists, and natural dissemination methods (ie. wind, water) are the only contributors to weed spread in the Lone Pine allotment. Most noxious weed sites in the Lone Pine Allotment are contained and several have been eradicated and this is believed to be successful due to the absence of grazing animals.

There are no cumulative effects under Alternative A because there would be no proposed activities to overlap with ongoing activities in time and space.

Common to All Action Alternatives (Alternatives B, C, D, and E)

Direct and Indirect Effects across Alternatives B, C, D, and E:

Before going into the discussion on each action alternative, it is pointed out here how the selection of an action alternative would affect noxious weeds in all allotments and pastures in LIRA. Regardless of the selection of an action alternative, all action alternatives would involve the grazing of LIRA in which the majority of the noxious weed sites would be affected. While livestock can reduce the spread of some weeds, livestock grazing can reduce the competition for weeds due to the selection of more palatable grasses by cattle. Most information indicates that the risk for introduction and spread of noxious weeds can increase with livestock use. Though livestock can be used to control weeds, the weed sites present within the LIRA project area are not normally controlled and impractical to control using cattle.

All allotments under all action alternatives are considered at risk for further spread and introduction of noxious weeds due to the existing presence of noxious weeds. There is an increased potential for introduction and spread of noxious weeds amongst all action alternatives since all grazing and project activities are proposed within and near existing infestations. Cattle would continue to impact noxious weed sites occupied by species vulnerable to spread by livestock, which is the majority of the noxious weeds found throughout LIRA. Livestock can spread noxious weeds over a wide range when seeds become attached to hair or when they remain intact after passing through the digestive system (DiTomaso, 2013). Noxious weeds that spread easily attaching to hair and hooves include Common bugloss, Common crupina, Diffuse and Spotted knapweed, Italian thistle, Jointed goatgrass, Medusahead rye, Rush skeletonweed, Scotch thistle, Sulfur cinquefoil, and Yellow starthistle (Yellowstar).

The overall movement of cows through pastures in LIRA would affect noxious weed sites, regardless the time cattle are moved. The movement of cattle in the spring would disturb the soil and weeds that spread vegetatively, while the movement of cattle in the fall would risk moving through infestations that have gone to seed spreading weed seeds in coats. Disturbances from animals could be a good thing with bringing seeds to the surface in order for them to germinate and receive treatment; however, seeds can get trapped in the mud between hooves and transported to other areas throughout the pasture or allotment. This is more likely to happen during the early months when soil is moist and easily compacted. In addition, moderate soil disturbance can increase populations by dispersing root stalks in some perennials such as Rush skeletonweed.

Trailing cows through pastures to reach other pastures greatly increases the risk of spreading noxious weeds into what might be a relatively weed-free area. Cows originating from private land and trailed to prospective allotments and pastures could be transporting weed seeds. The private land may have noxious weed infestations that are not treated, or weed free feed was not used to feed cows in the interim while not grazing on National Forest (NF) system lands. There is the chance that cattle coming off of private land could be introducing new or additional weeds

onto NF system lands. This could be an even greater risk with the selection of Alternative E. Cattle may be coming from a different part of the Forest where noxious weed species vary with what is already present in LIRA.

Most noxious weeds found throughout LIRA allotments and pastures are not palatable or preferred to livestock. Medusahead rye is one of the only weeds that would be considered an option for biological control by grazing, but this is only ideal if favorable plants are absent. The silica content is more than twice that of downy brome and is believed to contribute to avoidance by livestock (Duncan-Clark, 2005). Medusahead may be palatable but it generally is not preferred (Smith, et al., 2012). There are reports that medusahead is palatable for a 3-5 week period of time in the spring, but again, the animals would have to be confined to this area to target medusahead. To make this a possible option, fences would have to be constructed in order to keep grazing animals confined to the infestation with no option of grazing anything else. The only other weed that might be considered for grazing is Yellow starthistle, during rosette stage when it is palatable, but again, not preferred by cattle. Yellow starthistle is scattered through the area and is not targeted by grazing animals. These are both examples of annual weeds. All perennial invasive plants found in the LIRA project area are not preferred by cattle. In some cases, grazing can select for a particular weed or group of weeds, particularly poisonous plants or plants armed with spines or prickles (DiTomaso, 2013). Light utilization may occur on some noxious weeds, but there are other more palatable alternatives to be found. If grazing does occur on perennial invasive plants, it would aid in the reduction of seed production, but would not affect the roots of the plant and regrowth occurs quickly. Biological control by grazing is not universally effective; it requires the right combination of plant composition, animal acceptance of the offending plants, season, intensity, and duration of grazing. The availability of the targeted plant may also influence how much of the plant is grazed (Vallentine, 2001). To be most effective, biological control by grazing must often be combined with integrated weed control using conventional bio-control, herbicides, or mechanical or fire treatments.

It is reasonable to say that grazing animals, such as cattle, if given the choice would utilize flat open ground. It is apparent throughout the LIRA project area that most open flat benches are the most heavily used locations by cattle. Since these areas are used more intensely, the site is more disturbed, thus creating niches for noxious weeds. Many of the noxious weeds are found on these open flat benches. Grazing animals tend to graze heavily on the same herbaceous perennial plants they have utilized the year before (Vallentine, 2001). Conversely, plants of the same species not grazed one year are less likely to be grazed the next year because of robust growth and the accumulation of remnant flower stalks and old growth (Vallentine, 2001). In some cases, grazing can select for a particular weed or group of weeds, particularly those that are unpalatable. Plants grazed less severely, capable of re-growing rapidly following defoliation, or possessing a combination of these resistance components realize a competitive advantage within the plant community (Vallentine, 2001). This situation supports that heavily grazed areas, home to invasive plants would always remain at higher risks for weed invasion on and off-site, allowing for an expansion of the population if left untreated.

In addition to grazing, several projects would be taking place that add to the risk of noxious weed introduction and spread. Activities proposed for all action alternatives include fence

removal, gate construction, water development construction, use of a stock driveway, fence re-construction, spring re-development, and the use of a government facility. Refer to Table NW-4 in for how these activities contribute to the added risk of noxious weed introduction and spread by allotment and alternative. Any ground disturbing activity, such as creating a spring development increases the risk for noxious weed introduction and spread. Sites that appear noxious weed free, if disturbed, may have seeds that germinate from the disturbance. Equipment used to accomplish these projects also pose a risk if equipment is not clean of weed seeds prior to starting the project or if equipment is not cleaned thoroughly before moving onto another project.

Identified as PDCs in Chapter 2, or in the Forest Plan or Regional direction, ground disturbance can be mitigated by: locating routes and sites out of weed infestations, if possible treat all weeds prior to seed set, and monitor weed areas. Also, salt on areas that are rocky or hardened sites such as old roadbeds as these areas are less prone to weed infestations. With other ground disturbing activities associated with livestock management, such as building fence and creating water developments, consider washing equipment, using weed free gravel source, and inspecting tools, boots, 4-wheelers, and vehicles. Coordination would occur with invasive species specialists for exceptions for low risk spread areas due to treatment success.

Alternative B – Current Management

Direct and Indirect Effects of Alternative B:

Refer to Table NW-3 throughout the B, C, D, and E Alternatives discussion. Table NW-3 refers to the current noxious weed environment for each allotment and pasture and what current management is based from. Noxious weed sites and acres shown are based from the most recent Forest Service inventories and treatments. It is with this information that predictions can be made on how the current noxious weed sites would change in relation to all action alternatives. This serves as baseline of information in which further risks can be analyzed in departure from the current noxious weed data in this table.

Table NW-3: Summary of current noxious weed sites by allotment and pasture.

Allotment/Pasture	# of weed sites	Infested Acres	Pasture Acres	% Infested Land
Lone Pine	60	194.97	11,138	1.75%
Little Deep	4	29.6	4392	
Dug Creek	12	84.3	2809	
Hospital	14	42.43	185	
Birch Creek	7	11.65	1299	
Closed Area	5	0.186		
Big Canyon	18	26.81	1946	
Cow Creek	22	97.19	5,824	1.66%
Deer Creek	1	18.76	1993	

Allotment/Pasture	# of weed sites	Infested Acres	Pasture Acres	% Infested Land
Upper Fingerboard	0	0	152	
Fingerboard	6	10.36	304	
Upper Salt Gulch	0	0	300	
Salt Gulch	2	10.7	278	
Upper Schleur	0	0	309	
Schleur	2	30.22	107	
West Cow Creek	7	4.98	655	
Rowley	4	22.17	1292	
Upper Rowley	0	0	433	
Rhodes Creek	71	449.74	22,660	1.98%
West Side Cow	3	0.06	755	
Foster	5	8.92	1006	
Holmes	13	24.44	768	
Willow Springs	24	51.4	1967	
West Bench Lightning	4	49.97	1186	
East Bench Lightning	15	157.49	3305	
Private Land	1	2.43		
Bull	2	5.28	724	
Homestead	0	0	58	
North Roy	1	0.09	199	
South Roy	0	0	366	
Lightning Creek	2	4.9	2665	
Rhodes Creek	0	0	2122	
Butcherknife	0	0	827	
Sleepy Breaks	0	0	2803	
Lightning Hangover	1	0.09	2510	
Tulley	2	144.67	1014	
Toomey	45	280.16	4,276	6.55%
Closed Area	4	3.3		
Spring Gulch	5	3.64	509	
Johnsen Canyon	23	59.13	993	
Upper Spain Saddle	1	51	508	
Lower Spain Saddle	1	103.78	499	
Toomey	5	12.19	1070	
Tulley Creek	6	47.12	389	

Under Alternative B, current management, noxious weed threat and management would not change considerably from the existing conditions and the way LIRA is currently managed. The current rotation schedule of cattle into, out, and through the allotments are during times when weed spread would be at the lowest risk; however, Scotch thistle, Yellowstar, Medusahead, Puncturevine, and Rush skeletonweed (Skeletonweed) may still have the capability of being spread if cattle are trailed through existing infestations. Also, disturbances from hooves when soils are moist can create favorable conditions for weed seed germination or weeds able to spread vegetatively, such as Whitetop and Skeletonweed. The management of cattle in the LIRA allotment fall under Standard 4, stating that weed free feed is required on NF lands. However, this does not cover adjacent private land where cows may not be fed weed free feed. The FS has no control over the type of feed fed on private land. This is not only common to current management, but also to all action alternatives.

Cow Creek Allotment:

Proposed for the Cow Creek Allotment is the removal of fence lines and combining the 10 pastures making up the allotment into 2 separate pastures. Fences serve the purpose of keeping cows distributed and keeping them from going back onto already grazed portions of the allotment or pasture. It is noted that fences are in poor condition and removal of these fences would not affect distribution or further the risk of spreading noxious weeds.

There is the low expectation that the movement of cattle within this allotment contribute to the further spread or introduction of noxious weeds. The noxious weed sites are dispersed enough throughout the allotment that these sites can be avoided when moving cattle on, off, or through allotment. To reduce this potential for spread from known noxious weed sites, these occurrences would be depicted as Areas-To-Avoid. Permittees would be provided location maps of known noxious weed infestations and encouraged to report new sightings. The main stock drive way for accessing the pastures of Cow Creek is a hard packed road surface that would aid to minimize the risk of noxious weed establishment and avoid existing infestations. There is an increased risk of transporting noxious weed seeds from private land onto FS land, in which the cows are trailed through to access this allotment.

Prior to moving cows out of the allotment, cattle are gathered at the Litch Place which is a small fenced pasture. Due to the confinement and high concentration of cattle, ground disturbances are currently high, creating favorable conditions for noxious weeds to invade and deposition of any weed seeds that cattle may have had in hooves or on coats.

Lone Pine Allotment:

This allotment has been vacant for almost the past ten years. Stocking this allotment would follow the same treatment/inventory regime as the other 3 allotments. Treatments of existing infestations would be in accordance with the grazing rotations set up. There is an increased risk of noxious weed spread and introduction resulting in more vehicle traffic on the Dug Bar Road for the maintenance of the cattle and the allotment, but early detection rapid response (EDRR) would be implemented. Refer to the 2010 WWNF Invasive Plant Treatment Project for a more detailed description of EDRR. Puncturevine exists on both in the road and on the roadside and

is a noxious weed that spreads primarily by vehicles, but can also get stuck in hooves or shoes. The strong spines of this plant penetrate rubber and can be carried off site.

The main stock drive way for accessing the Lone Pine Allotment is a hard packed road surface that minimizes the risk of noxious weed establishment and avoids off-road existing infestations. This road continues on throughout the allotment, and then transfers to a system trail with known noxious weed infestations to access the Dug Creek and Little Deep Pastures. There is not really any way to avoid traveling through these infestations; however, permittees would be given a map of known infestations in which measures would be taken to avoid these areas if possible. Timing of trailing is such that weed spread is minimized, but still possible. Little Deep Creek Pasture has the fewest number of noxious weed sites in Lone Pine Allotment and is the largest pasture in the entire LIRA area. Cattle would primarily calve in this pasture. Cows close to calving become less mobile and would concentrate on flatter ground posing a risk to noxious weed invasion to what is almost a relatively weed-free pasture of the Lone Pine Allotment. The risk of introducing new weeds into this area is high, since cattle are trailed through existing infestations. Detection of noxious weeds is difficult, due to the remoteness of the pasture, and access is difficult to treat any detected noxious weeds.

The facilities located at Dug Bar are available for use by the permittee. Due to the confinement and high concentration of cattle, ground disturbances are high, creating favorable conditions for noxious weeds to invade and deposition of any weed seeds that cattle may have had in hooves or on coats. These areas are considered a high use area would be a priority for weed treatments upon the arrival and departure of the cattle

Another area of concern within the Lone Pine Allotment is the Hospital Pasture. Almost a quarter (23%) of the land in this pasture is infested with noxious weeds. If this pasture is stocked, noxious weed treatments would be difficult due to the disturbances and potential spread created on existing infestations. Staying on top of treatments would be difficult. Approximately 6 acres of this pasture is infested with Common crupina. It is the only documented site in the LIRA project area. Seeds of Common crupina adhere very well to hair and can be transported long distances. The Hospital area would receive limited livestock use. No more than 10% of the Lone Pine herd would be allowed to graze this pasture at one time, therefore the potential for spread of noxious weeds would be minimal.

<u>Rhodes Creek:</u>

Rhodes creek has the most noxious weed infested acres than any other allotment, but it is also the largest allotment. It is the second highest infested allotment in terms of noxious weed acres with almost 2% of the land within the allotment boundary infested with weeds (Table NW-3). However, it does contain pastures that are free of noxious weeds due to the remoteness and topography of the pasture (Rhodes Creek, Butcherknife, and Sleepy Breaks).

Cattle within this allotment rotation have the opportunity to move across 3 allotments, thus adding to the risk of noxious weed spread not only within the allotment, but to others as well. Access to the allotment pastures is by way of good roads and would minimize the risk of noxious weed introduction and spread if cattle can stay confined to roads while moved by

permittees. There is an increased risk of transporting noxious weed seeds from private land onto FS land, in which the cows are trailed through to access certain pastures within this allotment.

One concern regarding the movement of cows into and out of this allotment is the Tulley Creek stock driveway. The driveway trails cows through a large Yellowstar and Italian thistle site. As cows move into the Rhodes Creek allotment from Chesnimnus, not associated with LIRA, the risk for new weed introduction from Chesnimnus into Rhodes Creek Allotment is high. There is also the opportunity for cows to spread the Yellowstar and Italian thistles further up the trail and into the Chesnimnus allotment. Again, timing of trailing is such that weed spread is minimized, but still possible.

Toomey

Because of its small size, 6% of this allotment is infested with noxious weeds. This is the highest concentration of weeds amongst all 4 allotments in LIRA. Upper and Lower Spain Saddle Pastures have the largest Yellowstar infestations in LIRA. Even though timing of grazing and moving cows is such that disturbances and risk to noxious weed introduction are minimized, there is still the chance that noxious weed seeds be present on Yellowstar, Rush skeletonweed, and Medusahead. Soil disturbance in these pastures could result in early germination of Yellowstar and Italian thistle, as well as initiation of Skeletonweed growth.

Once again, there is an increased risk of transporting noxious weed seeds from private land onto FS land, in which the cows are trailed through to access this allotment. Cattle moving into this allotment are originating from Rhodes Creek, which again, has the highest number of noxious weed sites. There are species that exist in the Rhodes Creek allotment that don't exist in Toomey. Minimizing the chance for introducing new noxious weed species into Toomey is important, and would be done by utilizing an existing driveway which is a more confined area that is traveled on a regular basis lending to early detection of new noxious weed species

Johnsen Canyon pasture is an area of concern within the Toomey allotment. The largest Medusahead infestation lies within this pasture. Fifteen acres of this infestation were treated in the spring of 2013. It is currently a restoration site that is to be seeded in 2014. Further management of this area would be coordinated with the Range Program and permittee for that allotment, including seeding protection from livestock grazing until the seeding is established

Alternative C – Proposed Action

Direct and Indirect Effects of Alternative C:

The Toomey Allotment is the only allotment in Alternative C with proposed changes that would further affect the risk of noxious weed introduction and spread. The management of Cow Creek, Lone Pine, and Rhodes Creek are the same in Alternative C as they are for B (Current management). See Alternative B for the discussion on these allotments.

Actions proposed for the Toomey Allotment include the addition of a pasture, the redevelopment of Tips Spring, and an adjusted grazing schedule. A new pasture would be created in Toomey allotment from the lower portion of Lower Spain Saddle Pasture called the Big Pine Pasture. The only added risk to noxious weed introduction or spread other than what has been discussed so far in this document is the construction of a new fence line. There are no current noxious weed infestations directly at the construction site, but there are infestations in the vicinity of the project. These would be mapped and shared with whoever is constructing fence as areas to avoid. The redevelopment of Tips Spring would result in some ground disturbance also, that has the potential to increase the risk of noxious weed introduction and spread. Prevention and Treatment restoration standards as covered in 2005 PNW ROD would be followed during fence construction as well as the development of the spring. All equipment used for maintenance of range and permit improvements must be cleaned thoroughly to reduce the chance of introduction from noxious weeds. This must occur prior to entering NF lands. If possible, these sites would be treated for noxious weeds prior to starting project as well as follow up treatments upon completion to minimize chance of spread. With these measures in place, the risk of spread of noxious weeds would be minimal.

Johnsen Canyon Pasture would be used in a two-year deferred rotation grazing schedule where one year the pasture would be grazed in the fall and the following year in the spring. Every other year, the spring and fall grazing pastures would be rested. Spring grazing would occur in the timeframe of February 15 – May 15, while fall grazing would take place in November 1 to December 31st. As mentioned in Alternative B, the largest medusahead infestation lies within this pasture. Fifteen acres of this infestation were treated in the spring of 2013. It is currently a restoration site that is planned for seeding in 2014. Treatments would take place in the month of March followed by seeding in October or November. Grazing could be planned such so that the restoration site not be overly disturbed. Grazing could occur in Feb and March, with treatments in March. Since fall would be rested this grazing season, seeding could take place in October and November and seedlings would have time to establish the next spring. Out-year maintenance of this project may involve fencing off the restoration area until desired conditions are met. This would be in coordination with the district Range Program personel and permittee for this allotment.

Alternative D

Direct and Indirect Effects of Alternative D:

Under Alternative D, all pastures and allotments would still be used, but some would have periods of rest. Refer to Alternative B on the effects of grazing to each allotment. LIRA allotments would have rested pastures in each allotment on a 3-year rotation. Not all pastures within all the allotments would be rested. Areas with rest from grazing 1 year in every 3 years includes the entire Toomey allotment, Rowley Pasture, East and West Lightning Bench pastures, and the entire Lone Pine allotment.

The advantage that this alternative offers is providing allotments and pastures with an opportunity to rest from the impacts of grazing. This would allow the weed program to successfully treat noxious weed infestations without the interference of grazing. Weeds during

this time of rest would have the opportunity to grow and be detected and treated, maximizing treatment efficacy. Depending on the length of rest, it would help plant communities improve to where they can compete better with invasive plant species and less time would be spent chemically treating these sites. This would allow native vegetation the opportunity to out-compete or compete favorably with invasive plants. Natural recovery from the invasion of noxious weeds would be the ultimate goal.

One activity that this alternative includes is the trailing of cattle out of the Lone Pine allotment. Cattle exiting the Lone Pine allotment would be trailed out of Little Deep Creek over Summit Ridge to the Cow Creek drainage. This alternative would be introducing a re-use of a historical stock driveway into LIRA. The existing stock driveway is utilizing the Dug Bar Road, a hardened, already disturbed surface designated for stock travel. Using the Summit Ridge driveway would introduce a high concentration of cows in a relatively weed free area. Cows would be traveling through weed free areas of Wilderness, thus increasing the chance for noxious weed spread. Noxious weeds would also take advantage of the disturbed trail system and may establish on ridge tops. Wildlife and wind would then have the opportunity to further spread noxious weeds to other sites in Hells Canyon Wilderness.

Alternative E

Direct and Indirect Effects of Alternative E:

The Lone Pine Allotment is the only allotment in Alternative E with proposed changes that would further affect the risk of noxious weed introduction and spread. The management of Cow Creek, Toomey, and Rhodes Creek are the same in Alternative C as they are for B (Current management). See items common to all action alternatives and Alternative B for these allotments.

The Lone Pine Allotment would be utilized as a forage reserve through a temporary grazing permit for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. The potential for the introduction of new plants is very high under this alternative. Cattle have the possibility of bringing weeds from another area within the county, on or off private land. Cattle brought in from other parts of the county, whether they are on private or public land, have the potential to bring with them noxious weeds not found in LIRA, thus contributing to the already existing weed difficulties.

This alternative would also provide rest to adjacent allotments in the Imnaha River Canyon. This would allow for an opportunity for the weed program to successfully treat weed infestations without the interference of grazing. Weeds during this time of rest would have the opportunity to grow and be detected and treated, maximizing treatment efficacy. Depending on the length of rest, plant communities would naturally recover to where they could compete better with invasive plant species, resulting in less time spent chemically treating these sites.

Summary of Effects Analysis Across Alternatives

Direct and Indirect Effects

Since noxious weed sites are abundant in the LIRA area, and the number of head grazing each allotment and pasture at any one time varies, it is difficult to determine the risk involved with introducing and spreading noxious weeds. It is assumed that every allotment and pasture would be grazed under the four action alternatives. One variable used to help anticipate the potential for weed spread is the number of activities proposed for each allotment. Each proposed activity would be given a number value of 1. Proposed activities include grazing, fence removal, facility use, stock driveways, gate construction, fence construction, and water development improvement or construction. Proposed activities by allotment are added up and displayed in Table NW-4. The total number represents the number of activities that would take place given the alternative as well as the anticipated risk of spreading or introducing noxious weeds into the area. The greater the number the greater likelihood of noxious weed spread and introduction from the corresponding activity and alternative.

Table NW-4: Added risk of weed introduction and spread to current conditions with LIRA

Allotment	Alt A Added Risk	Alt B Added Risk	Alt C Added Risk	Alt D Added Risk	Alt E Added Risk
Cow Creek	0	2	2	2	2
Lone Pine	0	2	2	3	2
Rhodes Creek	0	3	3	3	3
Toomey	0	4	5	4	4
Totals	0	11	12	12	11

Table NW-4 represents additional risk for noxious weed introduction and spread to the already existing weed populations found throughout LIRA. New infestations and spread are likely in the analysis area, regardless of the alternative chosen, including the No Action. The No Action Alternative shows zero because there is not the added risk to the existing noxious weed situation in LIRA, since there are no activities or actions proposed that would increase the chances of weed introduction and spread.

Cattle would continue to act as a vector of noxious weed introduction and spread under all action alternatives. Livestock presence on the landscape would result in an increased risk of noxious weed introduction and spread into areas free of noxious weeds.

Referring to Table NW-4, conclusions are as follows: All action alternatives do not vary much from each other in respect to the added activities that would increase noxious weed spread potential. Alternatives C and D vary slightly in relation to B and E in that there are more on-the-ground activities proposed. Alternative A shows zero added risk because by taking away grazing, no activities would occur, meaning no added risk to the current noxious weed situation. Both Alternative B and C introduce the greatest number of activities to the entire LIRA project area.

With or without grazing, noxious weed populations are still estimated to increase because not all weed sites can be detected and treated each year. Eliminating grazing under the no action alternative would reduce the added potential for introduction and spread of noxious weeds. Native vegetation would also have a chance to recover from grazing effects, making vegetation more competitive in regards to noxious weeds.

The Toomey allotment, due to its small size and abundance of noxious weed sites, would most benefit from alternatives considering rest as part of the grazing schedule. In this case Alternatives A, B or C would allow some or all pastures to rest, thus creating optimal treatment windows for noxious weeds. Alternative C, does however, introduce the most activities out of any other alternative for Toomey which would increase the risk for the establishment of noxious weeds.

Cumulative Effects Summary

The cumulative effects analysis area for noxious weeds is the LIRA project area, and neighboring Chesnimnus Allotment. The LIRA area serves many uses other than grazing. Roads would continue to provide dispersal and establishment sites for noxious weeds. Recreational use would likely increase the potential for new noxious weed infestations. The cumulative effects of present and foreseeable activities indicate a high risk for the introduction and spread of noxious weeds. Weeds would continue to be introduced and spread by: vehicles, equipment, the recreating public, water, wind, wildlife and other sources. The majority of other activities including off road vehicle use and use of non-weed free feed on NF lands are not permitted, and contribute to lowering the risk of noxious weed introduction and spread.

All of the effects of activities on noxious weed introduction, establishment, and spread addressed above, when added to the effect of the same from the LIRA project, add up to an even greater potential of weed spread and establishment than what was addressed individually with each proposed alternative. This means that noxious weed sites would be difficult to detect and control if new establishments are constantly added to the project area. Not all these potential noxious weed sites can be detected and treated each year, in which these would become larger in size and continue to spread off-site, displacing native and desirable vegetation and reducing biodiversity.

The LIRA area isn't the only area affected by the potential spread and introduction of noxious weeds by cattle. The same cattle that graze the LIRA area move into another allotment separate from LIRA. The Chesnimnus allotment has considerably fewer noxious weeds any allotment in LIRA. The species of noxious weeds are different and have the potential to spread back into the LIRA project area, as well as species moving into the Chesnimnus allotment from LIRA.

In 2010, the WWNF approved the Invasive Plants Treatment Project Environmental Impact Statement, with a signed Record of Decision, which supersedes past documents and is the guiding direction for the WWNF Invasive Plants Program. This resulted in additional approved treatment locations, as well as additional treatment tools. More extensive treatment options of certain species that previously had limited available treatment options are now exercised.

Future Federal actions would continue to undergo site-specific analysis, design, and mitigation for avoidance, detection, or treatment of noxious weeds. Prevention techniques included as design elements for non-project activities would help reduce risks associated with other reasonably foreseeable future activities. Increased flexibility and treatment options as part of the WWNF Invasive Plant EIS would increase the effectiveness of on-going treatment and mitigate many of the effects of project activities. Specific project design criteria within this project and the WWNF EIS would also help reduce the rate and risk of introduction of non-native species. The partially vacated 2010 WWNF Invasive Plant Treatment Project has placed some constraints as to what sites and species of noxious weeds can be treated, for example, no chemical treatment of new found sites. These sites would still be inventoried and monitored for when treatments can resume under the 2010 WWNF ROD.

Compliance with the Forest Plan and Other Direction

Noxious weed sites are managed and would continue to be managed in accordance with the Wallowa Whitman Land and Resource Management Plan, 1990 (LRMP) as amended by the Pacific Northwest Record of Decision, 2005 (PNW ROD). Furthermore, directions for site-specific treatment activities are covered under the 2010 WWNF noxious weed Treatment Project Environmental EIS. A Record of Decision (ROD) was completed providing direction for site-specific program to contain, control, and to eradicate new and existing noxious weeds when found on forest land. New infestations would be inventoried and managed as rapidly as possible under early detection rapid response (EDRR) guidelines upon approval of the final EIS.

The current management of LIRA allotments and pastures are covered under the Prevention Standards 1-6 (See Table NW-5) from the R-6 2005 Invasive Plants EIS page 10. This management direction includes invasive plant prevention and treatment/restoration standards intended to help decrease the rate of spread of noxious weeds.

Table NW-5: Prevention and Restoration Standards addressed in LIRA

Prevention Standard	Description of Standard	Measures addressed in LIRA
1	Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis; fire and fuels…grazing allotment management plans, recreation management plans, vegetation management plans, and other land management assessments.	The addition of the invasive plants section in the 2005 Pacific Northwest LRMP.
2	Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment prior to entering NF System lands.	Off-road maintenance of water developments, springs, and fence construction would be implemented.

Prevention Standard	Description of Standard	Measures addressed in LIRA
3	Use weed-free straw and mulch for all projects conducted or authorized by the FS on NF System lands.	Standard does not apply to LIRA
4	Use only pelletized or certified weed free feed on all NF System lands.	Gathering of cows on NF Lands. Feeding of cattle in hospital pastures. Storing hay on NF Lands.
5	Retain native vegetation consistent with site capability and integrated resource management objectives to suppress invasive plants and prevent their establishment and growth.	Known noxious weed sites would be depicted as areas-to-avoid for ground disturbance or congregating activities including: salting, bedding, eating developments, unloading, gathering, and stock driveways. Establishment of priority treatment areas of noxious weeds.
6	Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder.	Incorporate flexibility into the grazing rotation systems with regards to known noxious weed infestations.
Restoration Standard	Description	Measures addressed in LIRA
13	Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur.	Restoration of spring and water developments and fence construction/destruction.

Recreation and Wilderness Resources

Introduction

This section for the Lower Imnaha Rangeland Analysis (LIRA) will discuss the current condition and compare the effects of the proposed action and corresponding alternatives of this action as it pertains to recreation resources within the project area. The scope of this analysis includes activities related to: developed sites, dispersed recreation, trails, and recreational permitted uses within the project area.

Wilderness Act of 1964

The 1964 Wilderness Act defines wilderness and appropriates uses within wilderness areas. The following direction is specific to grazing:

Water resources and grazing. (4) Within wilderness areas in the national forests designated by this Act … (2) the grazing of livestock, where established prior to September 3, 1964, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture.

The Cow Creek, Rhodes Creek, and Lone Pine allotments were established prior to September 3, 1964. Therefore, grazing is an appropriate use for those portions of the allotments included in wilderness boundary.

Hells Canyon National Recreation Act of 1975

The HCNRA was established in 1975, including the Hells Canyon Wilderness and the Wild and Scenic Rapid and Snake River. A Comprehensive Management Plan for the HCNRA was approved in 1982, and incorporated into the Plan in 1990.

In the Act of 1975, Section 7 has two parts related to the LIRA project area; (6) preservation and restoration of historic sites associated with and typifying the economic and social history of the region and American west; and (7) such management, utilization, and disposal of natural resources on federally owned lands, including, but not limited to, …..and grazing and the continuation of such existing uses and developments are compatible with the provisions of this Act.

Forest Direction

Resource management direction related to recreation is provided by the Wallowa-Whitman National Forest Land and Resource Management Plan (Forest Plan), as amended which incorporates the Hells Canyon National Recreation Area Comprehensive Management Plan (CMP) and includes:

- “Manage outdoor recreation to ensure that recreational and ecological values and public enjoyment of the area are enhanced and compatible with the objectives of the HCNRA Act.”
- “Preserve the Hells Canyon Wilderness for the use and enjoyment of the American people in such a manner as would leave it unimpaired for future use and enjoyment as wilderness, and so as to provide for its protection and preservation of its natural conditions and unique character.”
- “Manage the transportation system (roads, trails, airstrips, and waterways) to meet the primary objectives for which the HCNRA was established (sections 1 and 7 of the HCNRA Act) and to provide a range of recreation experience opportunities. Favor primitive and semi-primitive experiences over roaded natural and rural experiences.”

- "Manage wild and scenic rivers within the HCNRA in a manner compatible with protecting and enhancing the values for which the river was designated."
- These areas will be managed in accordance with the Wilderness Act of 1964, P.L 94-199 (establishing the Hells Canyon Wilderness), the Oregon Wilderness Act of 1984, and the 2320 section of the Forest Service Manual.

Hells Canyon National Recreation Area Comprehensive Management Plan: Objectives, Standards & Guidelines (2003)

The Hells Canyon National Recreation Area CMP provides management direction for the Recreation Opportunity Spectrum (ROS) setting indicator. The indicators that may be affected by the LIRA project are Natural/Visual Quality (addressed under the scenery section of this EIS), Social Encounters, Visitor Management, and Facilities. See Figure R-1 for ROS settings found in the project area.

The CMP does not directly address grazing and recreation interactions, though it does refer to allowing "facilities or structures that are historically important to the area or experience", which could include structures related to range improvements, within the Wilderness ROS zones.

Grazing cattle where established prior to the classification of Wilderness (pursuant to section 4(d)(4) of the Wilderness Act) would continue to the extent it is consistent with the maintenance of the wilderness resource (Wil-S9, CMP).

Effects Analysis Methodology

Specific Assumptions

- Findings in The Visitor Perceptions About Grazing on a Forest Service Cattle Allotment research paper by Wallace, Mitchell, and Wells (RM-RP-321, 1995) are representative of visitor perceptions within the project area.
- Livestock and grazing use within the project area would occur as directed in allotment management plans.

Affected Environment/Environmental Consequences

Affected Environment

The 'Hells Canyon' is characterized in the Wallowa-Whitman National Forest recreation niche statement as - *a combination of river corridors, scenic byways, viewpoints, and access into upland areas/wilderness, and cultural sites.* Major activities identified in the 'Hells Canyon' setting include; river rafting, jet boating, viewing scenery & wildlife, horseback riding and packing, hiking, interpretation & education of cultural resources, and fishing. Generally most portions of the project area can be accessed most of the year, but recreation pursuits in the LIRA project area are very seasonally dependent. The lack of shade and extreme heat during summer months detracts most recreationalists, and winter use is limited due to snow and mud covered road conditions. The majority of recreation use occurs in the spring and fall.

Social Values

It is assumed that the majority of users come to Hells Canyon National Recreation Area to enjoy its vastness and solitude, and for its undeveloped character (CMP).

Types and Amount of Use

A specific recreation use study was not completed for LIRA, however inferences can be made to the typical types of activities that occur in the project area based on recreation visitor use surveys collected on the Wallowa-Whitman National Forest in 2008. Overall, recreation use in the LIRA is relatively low, except along the Snake River in the summer, and from hunting activities in the uplands during the fall (WWNF 2009).

Developed Recreation

The CMP defines developed recreation as recreation that requires facilities that in turn result in concentrated use of an area (CMP).

The Imnaha River Bridge is accessed via the Lower Imnaha River/Dug Bar Road (FR 4260), and is the most popular travel route within the project area. This road is one of the few vehicle access routes to the area. Some private landowners occasionally grant permission to the public to travel some other routes that pass through private land. The Imnaha River Road becomes the Dug Bar Road (FR 4260) and provides access to the Snake River and facilities at Dug Bar. Most camping occurs on the limited public land along the road, and on private land near the Imnaha River Bridge. Camping areas are not developed and are dispersed in nature. There are noticeable recreation impacts in this area due to long-term camping and lack of low-impact camping techniques. This area is the location of the Cow Creek/Lower Imnaha trailhead, and is the launching point for hikers using trail # 1713 to access Eureka Bar and the Snake River. The Forest Service cleans and maintains one toilet at this location.

Dug bar is located along the Scenic portion of the Snake River. This site is accessed via the Dug Bar Road **(**FR 4260), and is one of the few vehicle access routes to the Snake River corridor in Oregon, making it popular for visitors seeking a sight-seeing experience. Dug Bar is the trailhead for the Western Rim National Recreation Trail #1774, and the terminus for the Nee-Mee-Poo National Historic Trail #1727. This site contains a small concrete boat ramp adjacent to the Snake River that is used to launch and take-out small watercraft. Due to the often rough conditions of the Dug Bar Road, larger boats do not use this site to launch or take-out. One float outfitter uses this site extensively in their summer use operations. The Forest Service cleans and maintains one toilet at Dug Bar on an irregular basis. Float boater and power boaters often stop to utilize the restroom at this site. An interpretive kiosk is located adjacent to the boat ramp. Dug Bar is the location of the Nez Perce Crossing and the Nez Perce National Historic Park. There are no additional public facilities at this site except for a backcountry airstrip, although a small cluster of buildings owned by the Forest Service exist in an increasing state of disrepair. The backcountry airstrip is mostly unimproved with the exception of a wind sock and painted rocks marking the boundaries of the strip. The airstrip is used occasionally by private pilots and one outfitter. One upland outfitter, who leads primarily

big game hunts in the area, uses this site as a base before and after guided trips. This outfitter uses a small area designated in their special use permit for grazing pack stock. Dispersed camping areas exist in the vicinity of the boat ramp and restroom.

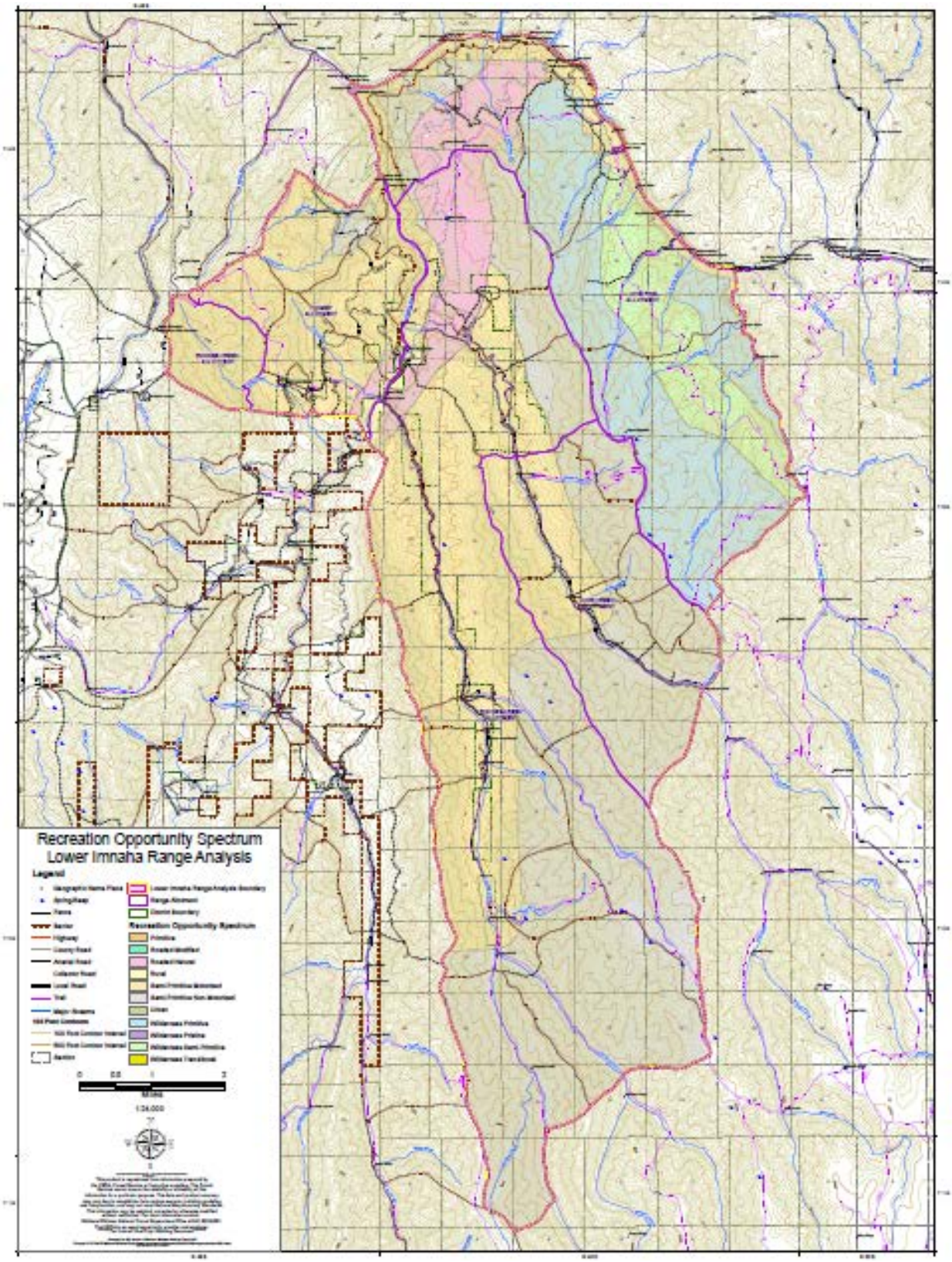

Figure R-1 ROS Designations for the LIRA Project Area

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Dispersed Recreation

Visitors participating in dispersed recreation activities do not primarily use or rely upon developed sites such as campgrounds, or picnic areas to conduct their activity.

Dispersed camping is a popular activity for overnight users who do not camp in a developed campground. Dispersed campsites in the LIRA project area receive low to moderate use during the summer months, and show the heaviest use during the spring and fall. The increased use in the spring and fall are typically tied to fishing and hunting (especially at the Imnaha River Bridge, Imnaha River Trail, and Dug Bar). Campsites are identified by user-created rock fire rings, disturbed vegetation, and compacted soil. Campsites are primarily located in flat areas off main transportation systems. These sites are generally located along the Lower Imnaha Road, and Dug Bar. Camp sizes vary but the average ones can accommodate 2-3 vehicles, with larger sites (Dug Bar) fitting 6-10 vehicles.

Water recreation is popular in the project area. The Snake River features world-class whitewater for both motorized and non-motorized use. Skilled kayakers occasionally float the lower portion of the Imnaha River to its confluence with the Snake River. Both rivers are also very popular fisheries. The Imnaha and Snake Rivers are congressionally designated Wild and Scenic Rivers, and recreation use will be discussed in further detail in a separate section of this EIS.

Developed Trails

The spring is the busiest time at Dug Bar and the Imnaha River trail areas for hikers, trail bike riders, bicycle riders and backpackers. Most overnight backpackers will hike to Eureka Bar from the Imnaha River Bridge, or upriver from Dug Bar. Camping and travel in the Lone Pine unit and in other portions of the project area are limited by access to water and peoples' willingness to travel through thick poison ivy near the trails that follow river corridors. Portions of the Hells Canyon Wilderness are located within the LIRA project area. Most wilderness use is overnight by either stock users or backpackers. Recreation use in wilderness areas is considerably less compared to roaded areas or developed sites in large part because of the requirement for greater physical fitness, specialized equipment, and livestock.

Day use is also popular on trails located in the LIRA project area. There are several trails that can be accessed from this area, although some travel through private land and require either a steep climb or a car shuttle. Some people will access the area by hiking down the trails from Buckhorn Overlook or from Cherry Creek, or on occasion, riding them by bicycle and arranging for a car shuttle. The Nee-Mee-Poo Trail, a designated National Historic Trail, passes through the project area and receives infrequent day use since it is possible to drive to its terminus at Dug Bar. The Western Rim National Recreation Trail drops into the Dug Bar area from Summit Ridge and the section from Dug Bar to trail #1707 are estimated to be the most frequently traveled trail from Dug Bar itself. Other trails are sometimes difficult to find on the ground or are a challenge to navigate due to vegetation.

Use of the Lightning Creek and Cow Creek drainages is mainly for hunting and horseback riding, and access generally occurs from the Hat Point road, outside of the project area, unless landowner permission is obtained from the private holders along the Imnaha River Road. A limited amount of overnight use occurs in the two drainages. Most of the system trails were under contract for trail maintenance in 2010 and 2011. Other trails in the project area are maintained by Forest Service crews or by volunteers as time and funding allows.

Table R1- Developed Trails

Allotment	Trail #	Trail Name	Miles	Total Miles for Allotment
Cow Creek	1699	Cow Creek	5.09	9.55
	1722	Rowley Gulch	3.32	
	1774	Western Rim NRT	1.12	
	1790	Upper Cow Creek	.03	
Lone Pine	1707	Deep Creek Bench	5.66	20.26
	1726	Snake River	1.84	
	1727	Nee-Mee-Poo	2.67	
	1728	Mountain Chief	.08	
	1734	Palace	2.79	
	1774	Western Rim NRT	7.22	
Rhodes Creek	1694	Butcher Knife	3.90	29.79
	1699	Cow Creek	2.51	
	1713	Imnaha	.06	
	1716	Hass Ridge	.14	
	1717	Lighting Creek	12.63	
	1727	Nee-Mee-Poo	.96	
	1732	Eureka Creek	.35	
	1772	Jakey Ridge	2.61	
	1782	Windy Ridge	6.64	
Toomey	1713	Imnaha	2.76	8.78
	1724	Tulley Creek	3.99	
	1732	Eureka Creek	2.03	
			Total miles	**68.39 mi.**

Permitted Uses

Some recreational activities are managed under permits which allow recreationists or operators to conduct certain activities under the terms of the permits.

There are two big game outfitters that lead hunts in the project area. These outfitters operate under a special use permit issued by the Forest Service. Their hunting areas are exclusive to them, though unguided parties can also hunt in the same area. They operate out of a few assigned campsites scattered through their hunting areas, and also set up one-time, dispersed camps for their clients. They offer both fully guided or drop type camp situations. The permit

holders are held to standards and guidelines for low-impact use, amount of use, and type of use authorized. Steen's Wilderness Adventures uses the Dug Bar area extensively in the spring and fall. Steen's have the authorization to graze pack and saddle stock that is being used in their commercial operations including trips made to set up camps. The authorization to graze stock under this permit is on a temporary basis and such does not establish future priority of the range. Currently, the Steen's are authorized for 16-20 head of stock in the Dug Bar site and only stock used in support of active operations are allowed. There have been inquiries from prospective outfitters regarding potential permits for riverboat fishing and backpacking in the project area, however no special use permits have been authorized.

The LIRA project area lies within the Snake River, Chesnimnus, and Imnaha Big Game Management Units. The area is popular during big game bow and rifle seasons in late summer and fall, and bear and turkey hunting in the late fall and early spring. Oregon Department of Fish and Wildlife will continue to offer hunting opportunities in this area as part of their management of big game.

Wilderness, Inventoried Roadless Areas and Areas Included in the Potential Wilderness Inventory

The recreational value of wilderness and IRAs is to offer outstanding opportunities for solitude or primitive and unconfined recreation (Section 2 of the Wilderness Act). Users of the area are seeking an experience isolated from sights, sounds, and the presence of others. Additionally, users wish to feel a part of nature, to have vastness of scale, and a degree of challenge and risk while using outdoor skills. The landscape is typically void of developments and the evidence of humans. The primary forms of recreation within this analysis area are hiking and hunting with camping at dispersed camp sites.

The trail system within the Hells Canyon Wilderness is a result of past ranching activity (Forest Plan). This system provides access, but the rugged nature of the wilderness provides numerous opportunities for solitude and primitive recreation. After May, hiking in the canyon is very difficult due to heat with average summer temperatures in the mid to upper 80's. In the summer, the temperature in the Lone Pine allotment often reaches temperatures of over 100 degrees Fahrenheit. Although higher in elevation and generally cooler, the areas of the Cow Creek and Rhodes Creek Allotments that are within the wilderness area (Summit Ridge) are hard to access without hiking long distances through rough terrain in hot temperatures.

A total of 16,858 acres, or 38% of the allotments, are within the Hells Canyon Wilderness. The majority Lone Pine allotment lies within the wilderness. The wilderness acres within the Cow Creek and Rhodes Creek Allotment are the higher elevations of the pastures along Summit Ridge and receive little livestock use due to steep topography. See Table R-2.

There are approximately 26,090 acres or 59% of the LIRA allotments that are within four IRAs named Buckhorn, Lord Flat Somers Point, Mountain Sheep, and Snake River. See Table R-3

Table R-2. LIRA Allotments and Pastures that have acres within Hells Canyon Wilderness

Allotment/Pasture	Hells Canyon Wilderness Acres within Allotment/Pasture
Cow Creek	**2,486**
Rowley	1,292
Upper Fingerboard	152
Upper Rowley	433
Upper Salt Gulch	300
Upper Schluer	309
Lone Pine	**10,631**
Big Canyon	1,946
Birch Creek	1,299
Dug Creek	2,809
Hospital Area	185
Little Deep Creek	4,392
Rhodes Creek	**3,741**
Foster	1,006
Holmes	768
Willow Springs	1,967
Grand Total	**16,858**

Table R-3. LIRA Allotments and Pastures that have acres within an IRA

Allotment/Pasture	Inventoried Roadless Area Name				
	Buckhorn	Lord Flat Somers Point	Mountain Sheep	Snake River	Total
Cow Creek Allotment		**2,146**		**2,794**	**4,940**
Deer Creek		1,400		419	1,819
Fingerboard		304			304
Rowley				862	862
Salt Gulch		118		128	246
Schleur				67	67
Upper Fingerboard		152			152
Upper Rowley				427	427
Upper Salt Gulch		172		126	299
Upper Schleur				305	305
West Cow Creek				460	460
Lone Pine Allotment	**380**	**0**	**197**	**240**	**817**
Big Canyon	331		140	226	697
Birch Creek				2	2
Closed Area	49		57		106
Dug Creek				2	2
Little Deep Creek		0		10	10

Allotment/Pasture	Inventoried Roadless Area Name				
	Buckhorn	**Lord Flat Somers Point**	**Mountain Sheep**	**Snake River**	**Total**
Bull Pasture				610	610
Butcher Knife		827			827
Eastbench Lightning		502		1,981	2,483
Foster				617	617
Holmes				360	360
Homestead		3		12	15
Lightning Cr./Hangover		2,510			2,510
Lightning Creek		2,355		0	2,355
North Roy Canyon				134	134
Rhodes Creek		2,122			2,122
Sleepy Breaks		2,803			2,803
South Roy Canyon		122		186	308
Tulley	932				932
Westbench Lightning				719	719
Westside Cow				121	121
Willow Springs	219			1,242	1,461
Toomey Allotment	**1,956**				**1,956**
Closed Area	113				113
Johnsen Canyon	260				260
Lower Spain Saddle	346				346
Spring Gulch	19				19
Toomey	814				814
Tulley Creek	92				92
Upper Spain Saddle	312				312
Total Acres	**3,487**	**13,391**	**197**	**9,016**	**26,090**

Environmental Consequences

Effects of Cattle Grazing on Recreation Opportunities

Visitor perceptions about grazing can be just as individual as their connection to a certain place. Conditions related to cattle grazing can detract from visitor experience, or could add to the experience, and to some it may be neutral.

One Forest Service study (USDA RM-RP-321, 1995), found that visitors in dispersed campsites tended to be more critical of grazing than those in developed sites, and that interactions with grazing were a primary negative effect on their recreation experience, along with weather, insects and other people. Overall, about one-third of the recreationist surveyed indicated range

livestock enhanced their experience and about one-third stated interactions with cattle had a negative effect.

If livestock are kept out of developed campgrounds and riparian areas used for fishing and dispersed camping, especially during high recreation demand times, visitors to those areas would be less disturbed by livestock on nearby rangelands than those in dispersed camp sites (USDA RM-RP-321 1995). Most visitors were neutral about facilities associated with livestock management on rangelands like corrals, cattle guards, watering tanks, salt blocks, and fences. Visitors were not overly impacted by the presence of facilities themselves, but they were influenced by cattle in large numbers or located too close to their activity areas.

Project Design Criteria Common to All Grazing Alternatives Applicable to Recreation

- Manage livestock to reduce time spent near campsites and trailheads, minimize the time they spend in riparian areas, keep them dispersed, schedule pasture rotation to minimize the livestock recreationist's interactions.
- Plan for coordination between recreation and allotment management to avoid conflicts. Include items such as time and location of activities (recreation and livestock); location of facilities and their influence on high use areas; and communication between resource managers, permittees, and visitors.
- Salt would not be placed in ephemeral draws. When available, salt would be placed on already hardened surfaces like roadbeds or rock outcrops, one-quarter mile away from draws, streams, rivers or TES plant occurrences, unless site-specific conditions warrant an Area Manager approved salting location within one of the zones listed above. Additionally, salt would not be placed in areas next to open roads, campsites or trails. Salt would be used as a tool to improve cattle distribution.
- Every reasonable effort would be made when designing and constructing range improvements within the HCNRA portion of the allotment to insure a "rustic" appearance, when those improvements may impact the recreational experience of the public (WWNF 2003).

Allotment Specific Project Design Criteria Applicable to Recreation

<u>Lone Pine Allotment</u>

- Minimize physical impacts to the recreational trail systems by avoiding cattle trailing during times when the soils are saturated.

<u>Toomey Allotment</u>

- If possible, livestock shall be moved up or down the Tulley stock driveway when soil is dry or frozen.

Alternative A (No Grazing)

Direct and Indirect Effects of No Grazing:

This alternative would have an overall positive effect to recreation opportunities and experiences within the LIRA project area by eliminating interactions between permitted cattle grazing operations and recreational visitors, although there would be no opportunities to view traditional cattle grazing activities, which some visitors have stated can enhance their experience.

Social Values**:** ROS setting designations for the areas within LIRA would not change. As discussed above in affected environment, an attraction to an area may be linked to a visitors 'connection to place'. A change in landscape characteristics such as the exclusion of a rangeland scene (cattle grazing in the distance, cow with calf, and stockmen working livestock are example of a rangeland scene) could evoke different responses in visitors. A visitor's connection to place includes attachments to external factors like landscape characteristics. For some visitors a rangeland scene is considered a desirable recreation experience, in which case this alternative may discourage certain types of recreation such as driving for pleasure or sight-seeing. In other areas eliminating grazing may encourage new recreational activities not available under the previous landscape.

Developed Recreation: Visitors in developed areas tend to be less critical of cattle grazing compared to those who prefer dispersed recreation (USDA RM-RP-321, 1995). Even though visitors of more developed sites were not overly impacted by the presence of grazing operations, they were influenced by cattle in large numbers or located too close to their activity areas (USDA RM-RP-321, 1995). In situations where cattle may be congregated (such as gathering for transport or calving) there is the potential to adversely affect the recreation experience of visitors. With the absence of permitted grazing there would be no diminished recreation experience due to the congregation of cattle, or proximity to grazing operations. Most developed recreation within the LIRA project area is within the Roaded Natural ROS setting, where driving for pleasure and sight-seeing are common activities. Rangeland scenes, i.e., cattle in distance, cowboys herding stock, and calves with their mothers add to the recreational experience for some. Rangeland scenes would no longer occur within the project area. This part of the recreation experience would be absent from the project area.

Dispersed Recreation**:** With the elimination of permitted livestock from the Primitive (wilderness) setting, conflicts between recreationists and permitted cattle would be eliminated, though there may still be interactions between visitors in the Lone Pine Allotment and cattle grazed under tribal treaty rights. Vegetation would increase in some of the sites used heavily by livestock. The open meadows and areas around water sources would resume natural vegetative conditions typical of the wilderness. However some problems would continue to exist because of recreation livestock. Direction within the CMP standards and guidelines for wilderness would promote the elimination of the problem.
Areas in the Primitive Settings (Semi-Primitive Non-Motorized and Motorized) would have reduced livestock use around the popular fishing and camping locations along the Snake River and Imnaha River, springs, riparian areas, and along trails. Problems with livestock compacting

vegetation and creating odor problems which attracts flies would occur less than other alternatives which allow for grazing. The areas presently used as salt grounds would re-vegetate, and no longer be a source of odor and flies.

Developed Trails**:** Removal of permitted livestock would greatly reduce conflicts between recreationists and livestock. Some livestock interaction would still take place because of the use of recreational stock users on recreation trails. Recreation trail users would be able to hike without watching where they step, and problems with livestock creating odor problems and attracts flies would not occur. Access to trailheads located in the Lone Pine allotment would not be delayed on the few days during which cows would have been pushed along the Dug Bar road under the action alternatives.

Permitted Uses: Most of the permitted use that occurs in the project area is recreation centered through outfitter and guide operations. Outfitter and guides would continue to have opportunities to serve visitors in all alternatives. Outfitter and guide operations are tied to road and trail access, and occur in similar areas as the recreating public. These permit holders would be affected, or not affected in the same ways as the recreating public as mentioned above (i.e. there would be a positive effect through the elimination of interactions with permitted livestock, less site disturbance, and no reduction in access to trailheads, but would impact certain landscape characteristics such as the presence of a rangeland scene).

Wilderness, IRAs, and Areas included in the Potential Wilderness Inventory: Livestock grazing is considered evidence of human use. The effects to visitors engaged in the recreation within the allotments include direct encounters with livestock and permittees, and visual evidence of the presence of humans (range improvements, evidence of domestic cattle such as trampled soil and manure). Wilderness areas within the allotment are used primarily by hunters for big game and upland birds. Some hikers use the trails along the Snake River early in the spring but high temperatures in the summer discourage use. The IRAs are generally undeveloped and difficult to access, and receive low amounts of recreation use other than during hunting season.

Under this alternative, no livestock grazing would occur. This would eliminate evidence of human use from grazing, therefore would have no effect on wilderness values.

Alternative B, C, D, and E

Direct and Indirect Effects Common to Grazing Alternatives B, C, D, and E

These alternatives would have an overall neutral effect to recreation opportunities and experiences within the LIRA project area. The proposed project design criteria for all grazing alternatives would, limit impacts to riparian areas, areas along rivers and streams which are popular among recreationists, popular campsites, trails, and limited interactions between permitted cattle grazing operations and recreational visitors.

Social Values: As discussed above in affected environment, an attraction to an area may be linked to a visitors ‘connection to place’. A visitor’s connection to place includes attachments to external factors like landscape characteristics. A change in landscape characteristics such as

the inclusion of a rangeland scene (cattle grazing in the distance, cow with calf, and permittees working livestock are example of a rangeland scene) could evoke different responses in visitors. For some visitors a rangeland scene may be considered a desirable recreation experience, and could encourage new recreational activities such as driving for pleasure, sight-seeing. In more primitive settings visitors may perceive encounters and visible evidence of grazing as less desirable. Through project design criteria and management practices, ROS setting designations for the areas within the LIRA project would not change.

Developed Recreation**:** These areas are located adjacent to major roads accessible by vehicles. The major dispersed camping sites within the project area, such as those found near Lower Imnaha Bridge and Dug Bar, are included in this developed section because of the presence of structures such as, restrooms, boat ramps, informational kiosks, and trailheads. Visitors in developed areas tend to be less critical of cattle grazing compared to those who prefer dispersed recreation (USDA RM-RP-321, 1995). In situations where cattle may be congregated (such as gathering for transport or calving) there is the potential to adversely affect the recreation experience of visitors. If livestock are managed through pasture rotation, kept from congregating near developed recreation sites, and managed in order to minimize time spent near riparian areas, interactions with visitors would be reduced and would be less likely to negatively affect a visitor's experience. In order to minimize interactions between visitors and livestock, cattle rotations will be managed to reduce impacts to popular areas during heavy use seasons (Dug Bar during spring break). Some interaction between recreational visitors and livestock would occur. Livestock grazing in the distance and permittees working with livestock could present a positive recreation experience for visitors in the developed setting. Recreation experiences for the Roaded-Natural and Semi-Primitive Motorized ROS settings would be congruent with standards and guidelines listed in the CMP.

Dispersed Recreation**:** Because of topography, available water and vegetation characteristics of the HCNRA, livestock use is concentrated in areas common to areas popular to recreationists. This is true within the various recreation settings within the LIRA project area (primitive, semi-primitive non-motorized and motorized, and roaded natural). Both livestock and recreationists gather around water and in cool shady areas, which can result in loss of ground cover and vegetation, and exposed soil. As described in project design criteria, livestock will be managed through pasture rotation, kept from congregating near popular recreation sites, and managed in order to minimize time spent near riparian areas, therefore interactions with visitors would be reduced and would be less likely to negatively affect a visitor's experience. This would also prevent livestock from bunching up in the same areas for long periods of time, resulting in the loss of vegetation, and reduced odor and flies. Conflicts could arise between livestock and recreationists near river and streams locations where the water attracts both users as it provides water for drinking and shade for comfort. Dispersed campsites along the Snake River are an example of popular recreation areas that have potential to see negative impacts of the two uses. These areas, like those discussed above, could become void of vegetation. Flies are attracted to the areas by cattle and reduce the quality of the recreation experience. However, through project design criteria such as managing livestock to keep them away from campsites and trailheads, minimize the time they spend in riparian areas (including areas along rivers), keeping them dispersed, scheduling pasture rotation to minimize livestock and recreationists interactions, all HCNRA CMP standards and guidelines would be met.

Developed Trails**:** Many of the trails in the HCNRA were developed by stockmen to move their stock from area to area. These trails are also the major travel routes for recreationists. Since stockmen would continue to use the trails, conflicts could arise due to the loss of vegetation, disturbed trail tread, and the smell associated with livestock. This would occur near springs along the trails as well. The springs or streams are major destination points for livestock and recreationists, so they become locations where conflicts may occur. In addition to the project design criteria listed above, not placing salt locations along trails, and by avoiding cattle trailing during times when the soils are saturated would minimize physical impacts to the recreational trail systems and reduce the conflict between the two uses. These actions will insure forest standards and guidelines are met.

Permitted Uses: Outfitter and guides would continue to have opportunities to serve visitors in all alternatives. Most of the permitted use that occurs in the project area is recreation-centered through outfitter and guide operations. The outfitter and guide operations are tied to road and trail access, and occur in similar areas as the recreating public. Permitted uses would be affected by grazing activities in similar ways as mentioned above (social values, developed recreation, dispersed recreation, and trails), although outfitter use in the project area tends to be focused on dispersed recreation activities such as hunting, dispersed camping, and trail use. Some use may occur in developed areas such as the Lower Imnaha Bridge and Dug Bar, but these areas are used as staging areas to support their activities elsewhere. The outfitter who operates from the Dug Bar area would continue to have the ability to graze pack stock in accordance to the terms and conditions of their special use permit. Deer and elk populations would not be affected by proposed grazing activities (refer to the Wildlife section of this document for further details concerning effects to wildlife populations), and would have no adverse impacts to this outfitters hunting activities. Standards and guidelines pertaining to outfitter and guide permitted use within the project area would be met.

Wilderness, IRAs and Areas included in the Potential Wilderness Inventory: The Act which designated the Hells Canyon National Recreation Area and the Hells Canyon Wilderness area (P.L. 94-199, 1975) states that grazing and preservation and restoration of historic sites associated with and typifying the economic and social history of the region and American West is compatible with the provisions of the act.

Table R-4: Wilderness Attributes and Effects from Alternatives B, C, D and E

Wilderness Attributes (FSH 1909.12, Ch. 70(72))	**Alternatives B, C, D and E Effects**
Natural– Are the area's ecological systems substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature. Consider: a) presence of non-native species that alter the composition of natural plant and animal communities b) developments that degrade the free flowing condition of rivers and streams c) presence of light pollution that degrades night sky quality and night sky quality related values d) presence of pollutants that degrade water quality e) health of ecosystems, plant communities, and plant species that are rare or at risk	The grazing in the Lone Pine Allotment, and portions of Cow Creek and Rhodes Creek Allotments and the adjacent vacant allotments in the wilderness would not change the Natural attributes of the wilderness. The action alternatives would retain the characteristics of an area that is free from the effects of modern civilization.

Wilderness Attributes (FSH 1909.12, Ch. 70(72))	**Alternatives B, C, D and E Effects**
Undeveloped – The degree to which an area is without permanent improvements or human habitation. Consider level of human occupation and modification.	The action alternatives would retain the undeveloped wilderness attribute with minimal evidence of human development. Structural range improvements will continue under the proposal. These would not be considered permanent features, if removed would show no evidence of existence.
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation – An area's capability of providing solitude or primitive and unconfined types of recreation. Solitude is isolation from sights, sounds, and the presence of others and evidence of humans; consider size of area, presence of screening, distance from impacts, and degree of permanent intrusions. Opportunity to feel a part of nature; to have a vastness of scale; a degree of challenge & risk while using outdoor skills are measures of primitive and unconfined recreation	Localized conflict with some wilderness visitors over the location and timing of permitted livestock presence within the allotment may continue; the presence of cows may negatively affect some wilderness visitors' experiences and enhance others. However, this portion of the wilderness receives a relatively low amount of visitor use for a short period of time in the spring and fall which should minimize the effect on the opportunities for solitude or primitive and unconfined recreation. The action alternatives would reduce the potential of recreation and livestock interaction through project design criteria, mitigations, and adaptive management.
Untrammeled - The wilderness is essentially unhindered and free from modern human control or manipulation.	The authorized grazing and unlikely event of unauthorized grazing in the wilderness from adjacent vacant allotments would not change the Untrammeled attributes of the wilderness. The action alternatives would reduce the potential of recreation and livestock interaction through project design criteria, mitigations, and adaptive management, thereby retaining the characteristic of an area that is unhindered and free from modern human control or manipulation.

IRAs

Livestock grazing within IRAs would have similar effects as described for all other areas within the analysis area. The requirements set forth in the final ruling described in 36 CFR 294 prohibit the construction of new roads within IRAs. The proposed action in this analysis does not propose the construction of any roads or trails in IRAs, therefore, there would be no effect on IRAs under any alternatives.

Areas included in the Potential Wilderness Inventory

The proposed action also conforms to the requirements in Forest Service Handbook 1909.12 CH. 70- Wilderness evaluation. This portion of the handbook described range management activities which do not alter an area's potential inclusion as wilderness.

FSH 1902.12 Ch.71.11- Criteria for Including Improvements:

7. Minor structural range improvements (FSM 2240.5) such as fences or water troughs. Exclude areas where non-structural range improvements are readily visible and apparent. Areas with spray or burning projects are permissible if there is little or no evidence of the project.

The proposed action meets the above criteria and does not include activities which would result in the inability to include any area within the project area as wilderness in the future.

Direct and Indirect Effects Specific to Alternative B and C

Alternatives B and C allow for less rest and deferment between allotments compared to Alternative D and E. Alternatives B and C would authorize stocking similar to past levels that have been authorized through term grazing permits. Alternatives B and C would have no rest or deferment in the Lone Pine Allotment where the majority of the effects between livestock and recreationists occur. The effects of grazing to the recreation resources within the project area would be slightly greater with alternatives B and C compared to alternatives D and E, because of the increased potential for cattle and recreationalist interactions and site disturbance. Given the project design criteria, standards and guidelines would still be met.

Cumulative Effects

Alternative A (No Grazing)

Under this alternative no actions are being proposed that would affect recreation opportunities within the project area, and thus there would be no cumulative effects

Common to Proposed Grazing Activities (Alternatives B, C, D, E)

Effects of several past, present and future activities that may affect recreation resources overlap the LIRA project area. Included in these activities are the creation of the Chinese Massacre Memorial site located at Deep Creek, Dug Bar Interpretive project located on the Nez Perce National Historic Park, and Nez Perce tribal grazing within the Lone Pine allotment. With the exception of tribal grazing, which is allowed through tribal treaty rights, all projects implemented within the project area have been evaluated using the NEPA analysis process to determine their impact on recreation resources.

Mitigation measures and project design criteria are recommended for all projects to ensure that all recreation opportunities are maintained and standards and guidelines are met.

There are two recreation destinations in the LIRA: the Chinese Massacre Memorial site and the Dug Bar Interpretive site. Concentrated visitors use is expected in these areas, though overall, recreation use in the LIRA is still relatively low, and use is unlikely to contribute to the effects of proposed grazing alternatives because these actions do not overlap in time. The majority of use that would occur at these sites is associated with the peak season tour boat operations on the Snake River which occur between June-September. The third activity, Nez Perce tribal grazing that is currently occurring on the Lone pine allotment, would not contribute to the cumulative effects of proposed grazing alternatives as listed above, because potential future stocking would not exceed the amount that was already analyzed through Alternatives B, C, D, and E. There

would be no additional cumulative effects to proposed grazing alternatives that were not addressed through direct and indirect effects listed above.

Summary of Effects Analysis Across Alternatives

Direct and Indirect Effects

The no grazing alternative (alternative A) would have an overall positive effect to recreation opportunities and experiences within the LIRA project area by eliminating interactions between permitted cattle grazing operations and recreational visitors. The grazing alternatives (alternatives B, C, D, and E) would have an overall neutral effect to recreation opportunities and experiences within the LIRA project area. There is potential for alternatives B and C to have greater impacts to recreation opportunities compared to alternatives D and E because there is less rest and deferment being proposed, thus increasing the potential for interactions between livestock and visitors within developed, dispersed, trail, and permitted uses. The proposed project design criteria for all grazing alternatives would limit impacts to riparian areas, areas along rivers and streams which are popular among recreationists, popular campsites, trails, and limit interactions between permitted cattle grazing operations and recreational visitors. Recreation opportunities would be maintained and standards and guidelines are met in all alternatives.

Cumulative Effects Summary

Under the no grazing alternative there are no actions being proposed that would affect recreation opportunities within the project area, and would have no cumulative effects. There are three activities occurring within the project area during the analyzed timeframe. Of the three activities, two would either not overlap in time, or were determined not likely to contribute additional effects to actions proposed in the grazing alternatives. The third activity occurring within the project area is tribal grazing, which is allowed through tribal treaty rights. The Nez Perce tribal grazing that is currently occurring on the Lone pine allotment would not contribute to the cumulative effects of proposed grazing alternatives because potential future stocking would not exceed the amount that was already analyzed through Alternatives B, C, D, and E. There would be no additional cumulative effects to proposed grazing alternatives that were not addressed through direct and indirect effects. Project design criteria ensure that all recreation opportunities are maintained and standards and guidelines are met in all alternatives.

Compliance with the Forest Plan and Other Direction

A review was made of the project proposal for all action alternatives for compliance with relevant management plans and policies. The LIRA project activities are within these objectives. There are no irreversible and irretrievable commitments to the recreation resource associated with any of the alternatives analyzed. The number, available types and use capacity for social values, developed recreation, dispersed recreation, trail use, and permitted use activities would not be changed by the project proposal.

The LIRA project would meet the goals, objectives, standards, and guidelines of the Forest Plan and the HCCMP because a variety of high quality recreation opportunities would still be available to all segments of the public during and after project implementation. The project does not change the emphasis on the more primitive and semi-primitive settings already existing in the area. The elimination of any recreation opportunity is not included in the project alternatives. All action alternatives would meet the visual quality objectives as directed in the Forest Plan (See Visuals/Scenery Resource section).

Wild and Scenic River

Introduction

This interdisciplinary team specialist report for the Lower Imnaha Range Analysis (LIRA) area project will cover the Recreation Resource activities related to: dispersed recreation, developed sites, trails, and recreational permitted uses *which are inside* of designated Imnaha and Snake Wild and Scenic River corridors (WSR). The Imnaha WSR runs from the southern end of project area about ½ mile above Vance Draw to the Snake River WSR, and the Snake WSR runs on the Oregon-side from Deep Creek down to the confluence with the Imnaha River. There is a separate Recreation Resource section for the project area outside of the Imnaha and Snake WSR corridor titled 'Recreation and Wilderness'.

The majority of recreation activities within the LIRA project area are predominately dispersed in nature, with other uses occurring in developed sites, on trails and as part of special use permitted activities. Although the Imnaha WSR is typical of other wild and scenic rivers on the Wallowa-Whitman National Forest (WWNF) for the number of facilities, development scale of the recreation sites, and common recreation uses, the Snake WSR has more dispersed uses and special use permit activities.

The goal for the Recreation resource is to "…*provide a wide variety of recreation opportunities in an attractive setting, and make those opportunities available to all segments of society"* (Forest Plan, 1990).

Forest Plan Direction

The goal for the Recreation resource is to "…*provide a wide variety of recreation opportunities in an attractive setting, and make those opportunities to all segments of society"* (Forest Plan, 1990).

Desired Future Conditions

The Forest Plan also describes a desired future condition (DFC) in 10 and 50 years. The following summarizes the 10 year DFCs that apply to LIRA;

- Providing as increased emphasis of recreational opportunities for users
- Retaining the range of current recreation uses yet recognizing there will be changes in the amount and location of some opportunities

- Some semi-primitive opportunities will be lost to development, but quality semi-primitive areas will remain to meet demands
- Opportunities for trail-related recreation within other management areas will be available
- Dispersed recreation sites will retain their desired character although surrounding lands will often change significantly due to management activities

Recreation Opportunity Spectrum

To guide project activities and ensure that this Forest Plan goal is being followed, the Forest Plan uses the recreation opportunity spectrum (ROS) framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. There are three ROS classes within the Wild and Scenic River corridors, rural (210 acres within Imnaha corridor), roaded natural, (212 acres within the Imnaha corridor) and semi-primitive motorized (2178 acres within both the Snake and Imnaha river corridors).

Standards and Guidelines

Other General Forest Plan Recreation Standards and Guidelines that apply to the proposed activities in LIRA include:

14. Special Areas. Protect special places on the Wallowa-Whitman National Forest: e.g. dispersed recreation sites, water features, rock or unique landform features, areas of unique vegetation, historic sites, or other places which are special to Forest users commensurate with other Forest management Objectives.

The following direction is found in the Imnaha River Plan and the Snake River Plan for applicable DFCs and Recreation Standards and Guidelines.

Imnaha Wild and Scenic River

The Imnaha Wild and Scenic River was designated under the national wild and scenic river system in 1988 with the Omnibus Oregon Wild and Scenic Rivers Act (Public Law 100-557 and amended the Wild and Scenic River Act P.L 90-542). The Imnaha WSR is managed under direction from the 1993 Imnaha River Wild and Scenic River Management Plan (Imnaha River Plan; WWNF, 1993). The Imnaha River Plan provides direction for the designated river corridor including the 1497 acres and 4.7 miles of river within the project area. This WSR is to be managed for the identified outstanding remarkable values (ORV) which include: scenic, recreation, fisheries, wildlife, historic/prehistoric, vegetation/botanical, and traditional value/lifestyle adaptation. Recreation Opportunity Spectrum (ROS) classes in the project are cited below in Table WSR 1.

The general DFCs from the Imnaha River Plan which are applicable to LIRA are to;

- Protect the river's ORVs

- Maintain and enhance the numerous plant species and plant communities, with emphasis placed on endangered, threatened, sensitive or unique plants and communities
- Reduce or eliminate non-native species
- Move towards implementation of the ROS classes along the river

Table WSR 1- River Classification and ROS Classes

River Classification & Acres	ROS Class & Acres
Recreation (422 acres)	Rural (210 acres)
	Roaded Natural (212 acres)
Scenic (1,075 acres)	Semi-Primitive Motorized (1075 acres)
Total WSR acres & % of LIRA =	*1497 acres (3.4% of LIRA)*

Imnaha River Plan Standards and Guidelines

Recreation and ORV related Standards and Guidelines that apply to the proposed activities in LIRA include:

4. The water quality of the Imnaha River is above State standards. The standards for which water quality will be measured are the water quality at the time of the Act (1998) or best estimate. See “Management Activities” in Chapter IV for additional information.

5. No human caused action may be undertaken which will result in a reduction of existing water quality or in not meeting State of Oregon water quality standards.

12. Range. Permit domestic livestock grazing to continue if it is: consistent with the objectives of the individual river segments, protects and enhances the Outstandingly Remarkable Values, and protects water quality. Forest Plan Standards and Guidelines for range management are acceptable within the river corridor. Any adverse impacts to OR values, water quality, or free flow, even though within Forest Plan Standards and Guidelines, will have immediate action taken to correct impact.

13. If livestock grazing is inconsistent with the objectives of the individual river segments, not protecting and enhancing the Outstanding Remarkable Values, or not protecting water quality, modify grazing practices to meet these requirements.

14. Make range management structures visually compatible with the Forest Service visual classifications of retention or preservation.

Snake Wild and Scenic River

The Snake Wild and Scenic River was designated 1975 under the Hells Canyon National Recreation Act (P.L. PL 94-199). It is managed under direction from the 1994 (revised 1999) Wild and Scenic Snake River Recreation Management Plan (Snake River Plan; WWNF, 1999), and provides direction for the designated river corridor including the 1105 acres and 4.4 miles of

river within the project area. The scenic section of the river in the project area goes from Deep Creek down to the confluence with the Imnaha River. This WSR is to be managed for the identified outstanding remarkable values (ORV) which include: Scenic, Recreation, Geologic, Fisheries, Wildlife, Vegetation/Botanical, Ecological, and Prehistoric/Historic Cultural Resources. Recreation Opportunity Spectrum (ROS) classes in the project are cited below in Table WSR 2.

The general Desired Future Conditions from the Snake River Plan which are applicable to LIRA are to;

- Protect the river's ORVs
- Provide horse packing and backpacking in a remote river settings
- Provide a diversity of sightseeing and wildlife viewing opportunities

Table WSR 2- River Classification and ROS Classes

River Classification & Acres	ROS Class & Acres
Scenic (1105 acres)	Semi-Primitive Motorized (1105 acres) and 2.5 % of LIRA

Snake River Plan Management Direction

Recreation and ORV related Snake River Plan Direction that applies to the proposed activities in LIRA include:

Range: Livestock grazing will be permitted to the extent that it is compatible with range and river management objectives.
Fish and Widlife: In addition to the S&Gs of this River Plan, apply Forest Plan S&Gs and BMPs (best management practices) to the activities to reduce, alter, or eliminate potential adverse effects on threatened and endangered fisheries

The Existing Condition, Desired Future Conditions and effects analyses for the individual River ORVs will be discussed in the Visual/Scenery, Fisheries, Wildlife and Vegetation/Range Cultural Resource Specialist Reports.

Wild and Scenic River Section 7 Analysis

The criteria to conduct a Wild and Scenic River Act Section 7 analysis includes a proposal for a water resource project or the construction of a development which would affect the free-flowing, scenic or natural values within the bed and banks of the designated river, or one that is above, below or in a side tributary to the river. A project may also be evaluated if it proposes to invade the designated river, or diminish the scenic, recreational, fish or wildlife values.
Since no water resource projects are proposed for LIRA, a Section 7 Analysis is not needed.

Existing Conditions for Recreation Activities

Although no specific recreation use studies were completed for LIRA, inferences can be made to the typical types of activities that occur in the project area based on a national recreation survey (NVUM, 2008).Using the information from the NVUM survey and from local manager's observations assumptions are made on what attracts visitors to the project area (discussed in the following sections).

Dispersed Recreation

Dispersed recreation activities are defined as not being attached to or using a developed recreation site. In the WSR sections of the project area, dispersed activities include uses such as viewing wildlife and natural features, boating, hunting, horseback riding, hiking, fishing, dispersed camping, hunting and driving for pleasure. There are however some distinct differences in the two rivers due to their size and flow. Predominant dispersed activities in the Snake WSR are rafting, power boating, camping at the 9 riverside dispersed campsites, driving for pleasure to view the historic Dug Bar crossing, and fishing. In the less navigable Imnaha WSR the popular year-round activities are driving for pleasure, fishing, or camping at the 2 dispersed sites. Due to relatively snow free conditions these activities occur year-round. The dispersed campsites offer flat easily accessible areas that usually accommodate 1-2 vehicles or boats and have been used for decades with some sites showing soil compaction and a loss of vegetation.

Due to the restrictions for the HCNRA found in 36 Code of Federal Regulations 292.44, motor-vehicle use is limited to designated to Forest Service roads, trails and airstrips. In the WSR corridors this includes 6.5 miles of road, 6.1 miles of trails and the Dug Bar airstrip. Overall motor-vehicle use in the area is light with the exception of seasonal moderate-heavy use on the Dug Bar road (Forest Service 4260) and Imnaha Trail #1713 that allows motorcycle use.

Developed Recreation

Developed recreation sites have constructed features such as toilets, tables, firerings, and information boards. There are three developed recreation sites in the wild and scenic river corridor – Dug Bar Boat Launch and Trailhead, Lower Cow Creek Trailhead (TH), and Mountain Chief Mine Tunnel Interpretive site. The two trailheads are very rustic and have toilets but very few other amenities, and the interpretive site has two small information panels. District Recreation Managers report that use at the sites varies seasonally: Dug Bar Boat Launch and TH (moderate year-round), Lower Cow Creek TH (light fall through spring, and Mountain Chief Mine Tunnel Interpretive site (light year-round)

Table WSR 3 – Developed Recreation Sites

Recreation Site	Type	PAOTS	Site Development Scale	River Section
Dug Bar Boat Launch & TH	Boat Launch & TH	50	3	Scenic - Snake
Lower Cow Creek TH	TH	30	3	Scenic - Imnaha
Mtn Chief Mine Tunnel	Interpretation	10	2	Scenic - Snake

PAOTS – 'People At One Time' site capacity. Estimating an average of 5 people per campsite, and 3-4 people per trailhead parking site

Development Scale 2 = Minimum site modification: Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the user

Development Scale 3 = Moderate site modification: Facilities about equal for protection of natural site and comfort of users (USDA-FS 2006)

Developed Trails

Within the WSR corridors there are 7 trails or segments which extend beyond the corridor and in some cases outside of the project area. Two of the trails have national designations. The Nez Perce (or Nee Mee Poo) Trail is a national historic trail commemorating the 1877 flight of the Nez Perce Indians from their homelands. The Western Rim National Recreation Trail was designated for its location along the western edge of the Snake River and Hells Canyon uplands. The trails are listed below in Table WSR 7 and have light to moderate use (spring through fall). Most of the trails are non-motorized however the Imnaha Trail permits motorcycle use.

Table WSR 4 – Developed Trails

Trail Name and Number	**Scenic (mi)**	**Recreation (mi)**	**Total WSR miles**	**Trail Class**
Nez Perce National Historic #1727	0.29	--	0.29	2
Western Rim National Recreation #1774	0.37	--	0.37	3
Snake River # 1726	1.09	--	1.09	3
Imnaha #1713	2.82	--	2.82	3
Tulley Creek #1724	--	0.35	0.35	2
Lightning Creek #1717	--	1.12	1.12	2
Mountain Chief #1728		0.04	0.04	2
Project Area Totals =	**4.57**	**1.51**	**6.08**	

Trail classes: 2 – moderately developed, 3- developed

Permitted Uses

Some recreational activities are managed under permits or licenses which allow recreationists or operators to conduct authorized activities under the terms of the permits. The permitted uses can be commercial such as outfitters and guides, or private permits for uses such as gathering firewood or hunting.

The Snake River and uplands around the Snake and Imnaha Rivers have many Forest Service commercial outfitter and guide permits. On the Snake River there are 13 floatboat river outfitters, 19 jet boat outfitters, and in the uplands there are 2 active hunting and packing outfitter and guides. All of these permitted uses are managed under the direction of the *Hells Canyon NRA Comprehensive Management Plan*, and/or Wild and *Scenic Snake River Recreation Management Plan.*

Due to the lower elevation of the WSR no firewood or forest products permits are suspected of being used in the area.

The State of Oregon also permits recreational activities for harvesting fish and wildlife species. Hunting within the Chesnimnus (58) and Snake River (59) Big Game Management Units, and fishing on the Snake and Imnaha Rivers are prevalent year-round activities. Oregon Department of Fish and Wildlife will continue to offer hunting and fishing opportunities in this area as part of their management of big game, upland bird and fisheries programs.

Environmental Consequences

The environmental effects will be discussed in different timeframes. For all effects, a short term for recreational visitors is viewed as occurring within one year or a single visitation season from the beginning of the implementation activity (i.e. visitation during grazing use and after a pasture rotation). Long term is viewed as a period of time ranging from two to ten years after the initial implementation activity (i.e. observable vegetation changes, removal of range improvements).

The effects analysis is limited to the WSR corridors in the LIRA project area. This includes the Lone Pine, Rhodes Creek, and Toomey Allotment but does not include the Cow Creek Allotment which is not within the WSR corridors.

Project Design Criteria and Mitigation Measures

Project Design Criteria (PDC) and mitigation measures are found in Chapter 2 of the LIRA FEIS.

Indices of Measure

The indices of measure for potential direct/indirect and cumulative effects to the Recreation resource are any change in the;

Quality of Recreational Experience – due to

- Grazing use- Amount of vegetative use or soil disturbance
- Interaction between recreationist and livestock (e.g. livestock distribution, season of use, noise, dust) and/or allotment management activities (e.g. herding or trailing of livestock)
- Visitor's 'sense of place' or value for range allotments with associated livestock, improvements and management activities

The determination of direct/indirect and cumulative effects on recreation resources for the quality of recreational experience is however *subjective* for each visitor. For example, what one visitor enjoys may not be appreciated by another visitors. Some visitors may enjoy photographing livestock being herded across a ridge while others may view it as a disturbance to the deer hunt they had planned on the same ridge. This subjectivity is a result of visitor expectations and site conditions such as;

- Pre-travel expectations of the recreationist
- Flexibility in timing of the visit
- Past experiences and number of visits to the area
- Tolerance to other activities, changes in the landscape and site accommodations
- Non-site related factors like; attitude, proper equipment, weather, party composition

Focus of Effects Analyzed

Although the project will not be analyzed in accordance with Section 7 of the Wild and Scenic Rivers Act, (P.L. 90-542), Section 10 (a) of the act provides direction for this analysis. Section 10 (a) states that "*Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area."*

The other effects upon the free-flow condition, water quality and the river's ORVs – scenery/visuals, fisheries, wildlife, historic/prehistoric, and vegetation/botanical are found in the individual Resource Specialist reports.

Direct and Indirect Effects for Alternative A- No Grazing

Under this alternative, grazing would not be reauthorized and the current permit holders would be notified that their term grazing permits would be cancelled after two years, the range developments (e.g. fences, water troughs) would be abandoned unless needed for wildlife management, and maintenance of unassigned allotment boundary fences would be assigned to the adjacent permittee. Direct and indirect effects upon the quality of the recreational experience would include a reduction in interactions with livestock and range management operations. Although many visitors may see this as a positive effect to their recreational experience (e.g. removal of non-native animals in the area, retention of more forage plants, removal of range improvements), other visitors may see it as a negative effect to their experience with the loss of

iconic images of livestock, cattle operations and range developments that reinforce their 'sense of place" of the wild and scenic rivers in Hells Canyon. Overall however, no change is anticipated in the number of visitors or frequency or season of use. Recreational visits within the project area would remain near the same levels as previous years and under this alternative traditional use patterns and recreational opportunities would not be impacted. Use at developed sites, dispersed recreation activity levels and participation in permitted uses is expected to remain unchanged.

Direct and Indirect Effects Common to Alternative B, C, D, and E

Alternatives B through E have many common direct and indirect effects upon the Recreation resource. Following is a summary of how they will comply with these management plans.

Forest Plan

For the DFCs:

- The project alternatives do not propose to decrease any recreational opportunities for users.
- The project alternatives will retain the range of current recreation uses however depending on personal recreational choices some changes in use patterns or preferred locations may occur.
- The project alternatives do not provide for any changes in ROS opportunities, and acres for existing ROS for Rural, Roaded Natural and Semi-primitive Motorized will be retained.
- Opportunities for trail-related recreation within other management areas will be still be available.
- Dispersed recreation sites will still retain their desired character although surrounding lands will be subject to some changes due to grazing management activities.

For Standard and Guidelines

- The Project Design Criteria (PDC) and mitigation measures are designed to protect special places in the WSR corridors such as dispersed recreation sites, and historic sites.
- The project alternatives do not provide for any changes in road, trail, and area closures and off-road vehicle use.

Imnaha and Snake River Plans

For the DFCs;

- The PDC and mitigation measures are designed to protect the river's ORVs, and the endangered, threatened, sensitive or unique plants and communities.

- The “Invasive Plant” section of the PDC has actions to reduce or eliminate non-native species.
- The project alternatives do not provide for any changes in ROS opportunities.

The project alternatives have individual actions such as different scheduled grazing periods that may not affect horse packing, backpacking or the diversity of sightseeing and wildlife viewing opportunities.

For Standard and Guidelines, or Management Direction

- The PDC and mitigation measures provide for maintaining water quality of the Imnaha River.
- The livestock grazing alternatives will be consistent with the objectives of the individual river segments, protects and enhances the Outstandingly Remarkable Values.
- The PDC and mitigation measures provide for maintaining and constructing range management structures which are visually compatible with the Forest Service visual classifications of retention or preservation.
- The project proposal does not propose any changes in road, trail, and area closures and off-road vehicle use.
- The PDC and mitigation measures were developed to reduce the potential adverse effects on threatened and endangered fisheries.

A description of elements common to Alternatives B-E is found in Chapter 2 of the FEIS.

Recreation ORV

Interactions with livestock and associated allotment activities will still be present in Rhodes Creek, Toomey and Lone Pine Allotments. As stated previously the quality of the recreationist’s experience is subjective and can vary depending on their expectations and tolerance. These experiences or the value placed on the direct and indirect effects can range from negative to postive.

Table WSR 5 – Direct/Indirect Effects – Alternatives B-E

Negative Effects – Lower Quality of a Recreation Experience	Positive Effects - Higher Quality of a Recreation Experience
Grazing Use • Amount of vegetative use or removal • Amount of soil disturbance	
Interaction between recreationist and livestock • Scheduled season of use or pasture rotation schedule (e.g. Visitor activity is displaced due to livestock in a pasture) • Presence of livestock and associated noise, dust or manure (e.g. Livestock congregate around hunting camp) Allotment management activities • Herding, or trailing of livestock (e.g. Visitor hike on developed trail delayed due to livestock trailing to another pasture) • Construction/maintenance of range improvements (e.g. Visitors use is displaced due repair of water development near their hunting camp)	Interaction between recreationist and livestock • Scheduled season of use or pasture rotation schedule (e.g. Visitors plan big game hunt in ungrazed pasture) • Presence of livestock and associated noise, dust or manure (e.g. Visitors return to traditional hunting camp that is near water development) Allotment management activities • Herding, or trailing of livestock (e.g. Visitor photograph 'western' cattle drive) • Construction/maintenance of range improvements (e.g. Upland bird hunters plan hunts to remote water developments)
Visitor's 'sense of place' impacted due to the associated livestock, improvements and management activities (e.g. Visitor's 'picture" or have expectations that Hells Canyon is a pristine area with minimal human activities and only native animal species)	Visitor's 'sense of place' enhanced due to the associated livestock, improvements and management activities (e.g. Visitor 'picture" or have expectations that Hells Canyon is a remote area with iconic western images of livestock and allotment management activities)

There are also some direct/indirect effects from the "Mitigation Measures Common to All Action Alternatives". Some range improvements like fences will be removed, yet recreationist could encounter other fences that may hamper their cross-country travels, or water developments that concentrate livestock use in the watering areas. This will lead to small areas of impacted soil and vegetation around the developments and effect visuals. The new gate near the Cow Creek Trailhead along the #1713 trail will restrict livestock use along 2.82 miles of the trail and thereby reducing livestock and recreationist interactions along this section of the trail. The Tulley stock driveway which includes part of the #1724 trail will still be used to move livestock between allotments. Since the bottom 0.35 miles of the #1724 trail and driveway is in the Imnaha WSR, recreationist would encounter increased interactions with livestock and associate operations during the allotment move periods (up to one week as cattle move down and another week as they move back out). The restriction of livestock during key spring recreational periods near Dug Bar in the Lone Pine Allotment will reduce conflicts and interactions.

Several Project Design Criteria (PDC) and mitigation measures were developed to reduce impacts to the Recreation resource. These are;

- Prohibiting the watering of livestock at the Nez Perce National Historic Park and fencing the site.

- Prohibiting watering in the Snake River (or after 3 years of monitoring may have option to fence off livestock access to the river).
- Prohibiting salting within the Imnaha and Snake WSR corridors, within ¼ mile of developed campsites, on roads, and on recreation trails #1726, 1727 and 1707.
- Minimizing livestock trailing on the Nee-Me-Poo National Historical Trail (#1727) when the trail is wet and muddy and not using the Lone Pine Saddle as a herding area for livestock.
- Minimizing trailing of livestock on recreation trails in Lone Pine allotment during less saturated soils conditions, and on Tulley stock driveway when soil is dry or frozen.
- On Lone Pine Allotment grazing will be scheduled to reduce interactions at campsites and trailheads, and with limited use in the Hospital Unit.
- Improving communications between resource managers, permittees, and visitors when recreationist and livestock conflicts are anticipated or occur.
- Pre-approving trailing down the Dug Bar road.

The PDC will also improve visuals by;

- Designing and reconstructing range improvements like fences with a rustic appearance, or paint/repaint water troughs with more natural colors.

Direct and Indirect Effects for Alternative B – Current Management

With similar numbers of livestock as in past years, and managed under an elevationally-determined rotational grazing system, recreationist would not significantly notice any additional interactions with livestock or proposed management activities. The direct/indirect effects summarized in Table WSR 8 would apply to this alternative. Use at developed sites, dispersed recreation activity levels and participation in permitted uses is expected to remain unchanged with no noticeable changes in the quality of the recreational experience.

Direct and Indirect Effects for Alternative C – Proposed Action

The details for Alternative C are found in Chapter 2 of the FEIS. This alternative is similar to current management described in Alternative B for Rhodes Creek, Cow Creek and Lone Pine allotments however there are several site-specific changes to management in the Toomey Allotment.

Effects described above in Table WSR 8 would be the same for the new Big Pine pasture and the addition of the Tulley pasture to the Toomey Allotment. The development of Tips Springs would also have the same effects for the construction of range improvements found in above Table. The proposed actions in the timing and grazing rotation adjustments to benefit the Spalding's Catchfly would enhance the recreational experience (and ORV) for those wishing to see or photograph the plant as part of the unique plants and communities in Hells Canyon.

Direct and Indirect Effects for Alternative D – Proposed Action

Overall, this alternative is aimed at reducing livestock impact to Spalding's catchfly and soil disturbance by livestock when soils are not dry or frozen, and eventually improving range. The specified rest periods such as 1 year in every 3 years of rest in certain pastures in the Rhodes and the 1 in 3 rest for the entire, Toomey and Lone Pine Allotment can result in the same the direct/indirect effects summarized in Table WSR 8.

Direct and Indirect Effects of Alternative E – Proposed Action

In Alternative E the same management proposed in Alternative C would apply to the Toomey Creek and Rhodes Creek. Effects described above in Table WSR 8 would be the same for these two allotments. The alternatives proposes use of the Lone Pine Allotment as a Forage Reserve through a Temporary Grazing Permit for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. This type of periodic use would enhance the quality of the recreational experience for visitor's who view livestock interactions and grazing as a negative experience, and diminish this quality for visitor's who view livestock interactions and management activities as benefiting to their recreation experience. These experiences are based on some of the direct/indirect effects summarized in Table WSR 8.

Cumulative Effects

This cumulative effects analysis considers effects to recreation resources from all past, present and reasonably foreseeable future actions in the LIRA project area when added to any effects from the proposed livestock grazing proposal. The same time frame and area discussed in the 'Spatial and Temporal Context for Effects Analysis' section will also apply.

Management Actions Considered

The following past, present and reasonably foreseeable management actions may overlap in space and time with LIRA grazing project and potentially affect the quality of recreation experience. The following management actions categories are a consolidation of the specific projects and activities anticipated to occur.

Wildlife and Fisheries Habitat Improvements: Habitat improvements for wildlife and fish species include construction of riparian fences, water developments, planting of hardwoods along stream banks, development of fish passages under roads and other similar projects. These improvement projects can occur in the HCNRA and are usually limited to a few acres in size. Associated activities include; vehicle access to the project site, use of heavy equipment or power tools, removal of some vegetation, and development of a structures. The presence of the habitat and improvement structures and the associated activities tend to significantly influence the Recreation resource. Any contributing cumulative effects from a livestock grazing program would be insignificant to the quality of the recreational experience.

Non-Recreation Special Use Permits: These include activities such as authorizations of new transmission power lines, irrigation ditches and private land fences. Most of the non-recreational SUPs are limited in size (average 2-5 acres) and have associated activities like vehicle access to the site, construction of new structures, maintenance of existing structures and buildings. The presence of the SUP structures and the associated activities tend to influence the recreation resource and visitor use. For example visitors tend not to disperse camp or picnic under a transmission power line, but may pass under it if the hiking trail intersects it. Any contributing cumulative effects from a livestock grazing program would non-significant to the quality of the recreational visitor's experience.

In summary, most of the above management actions categories tend to have more of an influence upon the Recreation resource however when associated with a livestock grazing program they may have a non-significant cumulative effect since recreation use and experiences are very subjective.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies, and Plans

The project proposals for all alternatives are in full compliance with the Forest Plan and River Plan Recreation Goal, Desired Future Conditions, Management Area Standards and Guidelines and ROS. The alternatives will also meet all relevant laws, regulations, policies and plans.

Irreversible and Irretrievable Commitments of Resources

Since there are no proposed actions in any alternatives to remove or reduce any recreation opportunities, no irreversible and irretrievable commitments to the recreation resource associated will occur. The number, available types and use capacity for developed, dispersed and trail recreation activities in the wild and scenic river corridors will not be changed by the project proposal.

Scenery Resources

Introduction

Scenery, just as any other resource, must be cared for and managed for future generations. Scenery provides the setting for all activities experienced by forest visitors. Each setting is comprised of scenic attributes that are derived by the environmental context of topography, geology and climate. These underlying factors are expressed and highlighted by the scenic attributes that they support. The activities proposed by the Lower Imnaha Range Analysis (LIRA) potentially affect the current and future condition of these valued scenic resources. Managing scenery resources involves the process of analyzing effects and implementing scenic conservation design features to achieve the Wallowa-Whitman National Forest Plan Desired Conditions and direction for scenery resources.

Regulatory Environment, Forest Plan and Other Direction

Federal Laws

The National Environmental Policy Act of 1969 (NEPA) states that it is the "continuing responsibility of the Federal Government to use all practicable means to assure for all Americans, aesthetically and culturally pleasing surroundings." NEPA also requires "A systematic and interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts into planning and decision-making which may have an impact on man's environment." To accomplish this, numerous federal laws require all Federal land management agencies to consider scenery and aesthetic resources in land management planning, resource planning, project design, implementation, and monitoring.

Several USDA handbooks have been developed to establish a framework for management of visual resources including but not limited to: National Forest Landscape Management Volume 2, Chapter 1 the Visual Management System; Agriculture Handbook 462 (USDA Forest Service 1974) and Landscape Aesthetics, A Handbook for Scenery Management; Agriculture Handbook 701 (USDA Forest Service 1995).

This evaluation applies current National Forest Scenery Management methodology in conjunction with existing Wallowa-Whitman Natural Resource Management Plan and Hells Canyon NRA Comprehensive Management Plan (HCNRA CMP FEIS) direction. The HCNRA CMP FEIS utilizes the best science (Landscape Aesthetics, SMS Handbook) for scenery resource management, therefore compliance for this analysis is based on the CMP and the scenic integrity objectives assigned by said document. It relies on field studies and photography from viewpoints and other views from roads, well used trails and the navigable Snake River, as well as coordination with project interdisciplinary team members, and consideration of public preferences for scenic quality. Cumulative scenic quality was within the visible geographic scope of roadways, trails and navigable rivers within and adjacent to the project area.

Integration of this scenery analysis assures that LIRA is consistent with scenery-related Wallowa-Whitman National Forest and Hells Canyon NRA direction, USFS policies, and applicable elements of USFS Visual Management and Scenery Management systems. Refer to Appendix B of the Scenery Management System Handbook #701 for a complete list of references requiring Forest Service management of scenery and aesthetics.

Forest Direction

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The Forest wide standards and guides for visual resources are written with timber management in mind and therefore are not directly applicable to a range analysis where no timber is being removed or regenerated. The one standard that does apply specifies the handbook utilized to meet visual quality objectives.

1. VQO's. Meet visual quality objective through management techniques described in National Forest Landscape Management, Volumes 1 and 2. Visual quality objectives are met by maintaining or restoring the positive attributes of the desired landscape character. Treatments or activities should not create features of form, line, texture, or color that detracts from the desired character. Facilities needed for range management should not appear out of character with the historic facilities that are currently part of the historic character or the area.

Hells Canyon National Recreation Area CMP: Standards & Guidelines (1995)

The Comprehensive Management Plan has two standards and one guideline that apply:

Sce-S1: Manage vegetation to achieve ecological integrity levels that sustain desired landscape character and in a manner compatible with scenic integrity levels. Refer to Table C-3a and C-3b: Recreation Management Direction by Alternative for scenic integrity objectives.

Sce-G2: Consider the acceptable level of alteration when implementing site-specific projects and management strategies, using the rating aspects of scenic impact to landscape character described in Table C-4: Criteria for Rating Human-caused Impacts to Landscape Character.

Sce-G4: Consider the acceptable level of alteration when implementing management strategies; using the following scenic integrity objectives:

Very High	Less than 1% impact
High	Less than 5% impact
Moderate High	Less than 10% impact
Moderate Low	Less than 15% impact
Low	Less than 20% impact
Unacceptably Low	20% impact or more

The assumption used here is that the percentage relates to the area viewed from any one particular viewpoint along a road or trail in which the impact is visible.

Effects Analysis Methodology

Specific Assumptions

Table SR-1. Visual Quality Objectives and Perceived Alteration

Scenic Quality Objectives	Scenic Integrity as people perceive it
Very High	Unaltered , visually complete or intact
High	Unnoticeably altered
Moderate High	Slightly altered
Moderate Low	Moderately altered
Very Low	Heavily altered
Unacceptable Low	Unacceptably altered

Rating Criteria:

The criteria used for rating human –caused impacts are defined in the Hells Canyon National Recreation Area (HCNRA) Comprehensive Management Plan FEIS. Criteria identified for Range Management are the following:

- Corrals and Handling Facilities
- Concentrated Impacts such as hospital areas
- Storage structures
- Water/Feeding Facilities

Table SR-2. Criteria for Rating Human Caused Impacts to Landscape Character

Human-caused Deviations	Very High	High	Moderate	Low	Very Low	Unaccept. Low
Corrals and Handling Facilities	None	Corrals: Wood, less than 150 sq. ft per 100 acres	Corrals: Metal, no paint 150 to 300 sq ft per 100 acres	Corrals:Metal, no paint, 300 to 600 square fee per 100 acres	Corrals:Metal, no paint, 600 to 1200 square fee per 100 acres	Corrals:Metal, no paint 1200+ square fee per 100 acres
Concentrated Impacts	None	150 sq.feet per 100 acres	150 to 300 sq. ft per 100 acres	300 to 600 sq. ft per 100 acres	600 to 1200 sq ft per 100 acres	1200+ square fee per 100 acres
Storage Structures	None	Rustic appearance, no contrasting colors, wood	Rustic appearance, no contrasting colors, wood/ metal roofing	Steel siding, roofing contrasting colors	Steel siding, roofing contrasting colors, high profile	Steel siding, roofing contrasting colors, high profile, numerous
Watering/Feeding	None	Facility blends w/ natural elements	Facility is evident but does not contrast	Facility contrasts in color	Facility is prominent, contrasts in color	Facility block views of value attributes, is prominent, contrasts in color

The acres identified in this table are the visible areas from a given viewpoint from which the human-caused deviation can be seen. So if the deviation is visible from an open road or trail, then the size is compared to the number of acres also visible from that section of road or trail.

Scenery Resource Methodology

Scenic integrity is a measure of the deviations from or alterations of the existing landscape character that is valued for its aesthetic appeal (Agricultural Handbook #701, pg. 2-3). The approach considers positive cultural elements that contribute to the understanding and

appreciation for historical context. In this case, the historical ranching and homestead features are positive historic attributes of the area.

Deviations to the valued landscape character may include features such as linear features that stand out, unnaturally shaped openings or patches, and/or contrasts in color related to vegetation or soils treatments.

Data utilized for this analysis consisted of field visits, photographs, and google earth images and aerial photos. A seen area analysis was also completed to determine what areas were visible from the Snake River, the Dug Bar Rd, and the Nee-Me-Poo National Historic Trail. These are the highest used travel routes in the project area. GIS data layers were also used in the analysis. Other trails considered in this analysis are the Western Rim Trail #1774, a section of the River Trail #1726, a connector trail from the Western Rim Trail to the River trail section #1702 and the Cow Creek to Eureka Bar Trail #1713. Views were also considered from the Buckhorn Lookout area.

Desired Scenic Character

The desired scenic character of the project area is a composition of steep canyon lands, dramatic in the vastness of scale and depth. The canyons stretch for miles from sheer basalt rims to grassland slopes that sweep from one rim down to the narrow ribbons of brush and cottonwood at the edges of small streams and ephemeral draws. At first glance, the broad view is ruggedly grand, in some ways raw and untamed, and yet in others refined in its undulating grassland blanket that drapes across a harsh, steep framework just below the steep rims and then lies gently on the rolling benches, and then dip down to meet the riparian edges that trace along the bottom of the draws. This landscape is characterized by the topography that is not hidden by a thick forest layer, but accentuated by grasslands, timbered stringers and steep basalt rims. The benches and bars have visible remnants of the homestead years and even the Native American usage. These remnants of farm and ranch equipment, old barns and rustic homes provide a glimpse of the past when families made their living farming or ranching in remote locations. Remnants of the Nez Perce pit houses can be found along the river noting the presence of the tribes and their cultural traditions. These pieces of history add to the depth and complexity of the scenery resource, by adding the human experience within the context of this remote, rugged landscape.

Scenic Integrity Indicator: Scenic integrity is a measure of the intactness of the scenic character. This indicator takes into account any impacts that appear unnatural or uncharacteristic in form, line, color, texture and scale. This indicator uses a descriptive or qualitative scale from preservation, which is entirely intact; to maximum modification which is grossly impacted and dominated by an unnatural or uncharacteristic feature on the landscape.

Short-term timeframe**:** A short-term time frame is determined to be one year after the project is implemented, which coincides with a one year growing cycle on the grassland/rangeland landscape that can often restore the intactness of character of minimal effects.

Long-term timeframe: The long-term time frame is determined to be 10 years after the project is implemented, which is a timeframe for when effects begin to seem permanent in the minds of reoccurring viewers.

Spatial Boundary: The spatial boundary is the boundary of the project area which is broad enough to encompass most viewers' experience as a viewshed, rather than separate viewshed that would have a different scenic character.

Affected Environment

The scenic condition of the project area is largely intact. This landscape has very few unnatural or uncharacteristic elements that dominate or even draw the eye of the view from the natural landscape. Trails, fences and homesteads are characteristic of the historic use of the area and are consistent with the scale of features historically evident. One element that detracts from the natural landscape is the transmission line and the associated access roads that are linear features that are uncharacteristically geometric and industrial in character. Where the transmission line is visible, the viewshed is compromised to a scenic integrity level of partial retention to maximum modification, depending on the distance from which it is viewed, the angle of view and the scope of the view in relation to the contextual landscape.

Environmental Consequences

Impacts to Scenery Across all Action Alternatives

The proposed grazing activities at Dug Bar would increase from current usage since the Lone Pine allotment is currently minimally utilized by the tribe. The Dug Bar site serves the area as a trailhead, a boat launch and a dispersed camping area. The Dug Bar Rd provides the only Snake River access point in Oregon between Heller Bar and Hells Canyon Creek Launch to the south at Hells Canyon Dam. The Dug Bar site is a homesteaded site which still has high scenic integrity as a homestead with a house, barn, smaller sheds and corrals. There is a vault toilet and information boards associated with the boat launch area. In the field adjacent to the boat launch area; there is a native grass airstrip with rocks delineating the strip and a windsock.

There are no proposed actions to build additional fences or structures at this site. The additional use would be cattle gathered primarily within the hospital pasture which would be visible from the Dug Bar Rd but not visible from the river. Views from the boat launch area are limited and at a distance of 300 to 500 yards. It is not expected that the use at this site would create effects that would degrade the scenic integrity.

The management strategy proposed for the Robinson Gulch area is designed to keep cattle away from Robinson Bar and recreationists at the site. Herding or fencing would be used to ensure that cattle would not enter this popular dispersed campsite, and the views from this area would be maintained. Therefore the scenic integrity would be maintained.

Trailing cattle from one pasture to another would be done when the ground is dry or frozen on the trails that are visible from roads or trails. When traversing wet ground, cows would be trailed

on existing road beds or existing routes. Trailing cows can cause a significant visual impact when the ground is wet. By avoiding these conditions, the scenic integrity is maintained where trails are visible from travel routes. Therefore, the scenic integrity would be maintained.

Alternative A – No-grazing Alternative

Direct and Indirect Effects of No Grazing:

The no-grazing alternative would cause no direct effects to the project area, however it is expected that there would be indirect effects. The indirect effects expected are those associated with the weed patches that often grow in areas that have been previously grazed and then are not grazed. The removal of weed seed by the grazing is suddenly left to reproduce and the weed seed begins to proliferate. These weed patches create an uncharacteristic visual feature in foreground views from trails, roads, and developed recreation sites as well as dispersed sites along the rivers. These weed patches are expected to be small pockets not significantly affecting the scenic integrity of any given viewshed, and mitigation measures would be applied to address the weed patches.

The No-grazing Alternative would comply with Forest standards and guidelines and CMP standards and guides because the scenic integrity levels would not be diminished.

Alternative B – Current Management

Direct and Indirect Effects of Current Management (Alternative B)

The current management activities of grazing cattle in the allotments are primarily consistent with the historic use of the project area and have not created any features or effects that dominate or detract from the natural landscape for the last 20 or more years. The view of grazing cattle on open hillsides is characteristic of the homesteaded west. Visitors have seen cattle in the past from all viewpoints available and are usually aware of the homesteading history of the canyon lands. The barns, cattle pens, and pasture fences are rustic in character which is expected in this remote environment. Water troughs that are green in color and located in areas visible from roads or trails seem out of place, drawing the eye of the viewer to its bright green paint color. Troughs can reduce the scenic character to partial retention if viewed from a foreground distance (300 feet) from a road, trail or campsite. There is one green trough along the Dug Bar Rd, which does not fit with the retention visual quality objective (VQO). Painting troughs a color to blend in with the cured vegetation is a project design criteria (PDC) proposed to meet the VQO.

Alternative B would comply with Forest Plan standards and guidelines and CMP standards and guides because scenic integrity would not be reduced.

Cumulative Effects of Current Management (Alternative B)

There are no expected cumulative effects identified with the Current Management alternative. The ongoing activities in the project are those related to transmission line maintenance and

recreation management. There are no foreseeable future projects within or adjacent to the project area that would impact scenic qualities.

Grazing activities have occurred in the project area for decades, and no measurable scenery effects have occurred. The activities proposed in Alternative B would have direct/indirect effect on scenic qualities because scenic integrity objectives would be met, therefore there would be no cumulative effects.

Long-term timeframe: 10- 15 years because forest planning period is a period of 10- 15 years and the desired future condition is to maintain grazing practices with an improving trend of grassland health.

Spatial Boundary: The spatial boundary is the project area because the impacts associated with the project are not expected to be visually discernible at a greater distance.

Direct and Indirect Effects of Alternative C

Alternative C is not expected to create any negative effects to scenery resources. The alternative proposes an additional pasture and a grazing rotation that would maintain or decrease the pressure on the grasslands, and therefore potentially create positive indirect effects to the scenery resource by improving the health and stability of the native bunchgrass. The reconstructed and additional water improvements should help utilize the pastures more effectively and reduce pressure on areas where water is available and the locations of these water improvements are not within view of the available viewpoints along the travel routes. There are no new uses proposed that would create contrasts, linear features, unnaturally shaped openings or patches that would remain beyond a typical growing season. There are no proposed facilities that could create visual impacts. The scenic integrity would remain the same as it is currently, meeting the CMP and Forest plan standards and guidelines.

Alternative C would comply with Forest Plan standards and guidelines and CMP standards and guides because scenic integrity would not be reduced.

Cumulative Effects of Alternative C

The cumulative effects are the same as described for Alternative B.

Direct and Indirect Effects Alternative D

The addition of the Lone Pine allotment into the rotation would provide additional rest and deferment which is beneficial to the health and vigor of the native bunchgrasses. This alternative is not expected to create any direct effects to the scenery resource. As in alternative C there are no new facilities proposed that would create any detraction from the desired landscape character. The grazing activities would not create any features of unnatural appearance. Indirectly, there are only positive impacts expected related to potential improvements to the bunchgrass health. The scenic integrity would remain at current levels.

Alternative D would comply with Forest standards and guidelines and CMP standards and guides because the scenic integrity would not be reduced.

Cumulative Effects of Alternative D

The cumulative effects are the same as described for Alternative B.

Direct and Indirect Effects of Alternative E

Alternative E utilizes the Lone Pine allotment for a forage reserve in the event of fire or for relief from grazing impacts on other allotments. This alternative acts somewhat like a fail-safe for the permittees, allowing them to find grazing resources if their allotment is not available, and for the resource managers, giving them an additional area to utilize if grazing pressures become problematic in other areas. It therefore, is also a fail-safe for scenery resources in a sense. Although grazing pressure is not expected to cause any scenery resource impacts, this alternative provides a means for addressing such an event. As in Alternative B, C, and D this alternative would not create any direct or indirect impacts to scenery since the proposed activities would not create distracting visual effects, nor are any facilities proposed that would detract from the natural and historic setting. Therefore this alternative would comply with Forest Plan standards and guidelines and CMP standards and guidelines because the scenic integrity would not be reduced.

Cumulative Effects of Alternative E

The cumulative effects are the same as described for Alternative B.

Direct and Indirect Effects of Mitigation, Monitoring and BMPs

The mitigation measures are all helpful in maintaining scenic integrity. Adaptive management practices of building in decreased season of use and decreased stock numbers helps protect grassland health which ensures the desired future condition for this grassland scenery.

Limiting the use of the hospital area to 10% of the herd (30) head reduces the risk that the area would be denuded, causing potential weed issues and unnatural contrasts at the fence line between the hospital area and the adjacent pasture. The restricted period between March 20th and April 10th reduces the visibility of the hospital area by avoiding the time when recreation use is the highest. The hospital area is not visible from most river views so the only visitors viewing that area would be those driving into Dug Bar on the Dug Bar Rd.

Locating salt licks 100 yards from trails would be beneficial in maintaining scenic integrity by keeping the immediate foreground views intact. Viewing the salt lick and the associated increased hoof traffic at a distance greater than 100 yards minimizes the visual detraction the salt lick might have to the view thus mitigating potential effects to the scenery resource. Many viewers may not even notice that it is there.

By limiting cattle trailing on the Nee-Me-Poo trail during wet and muddy periods, the trail would not become more apparent on the landscape, thus maintaining scenic integrity.

The removal of any dead livestock near recreation sites and 300 feet from the river would protect the view from the majority of key viewpoints, helping to maintain the scenic integrity.

There are no monitoring activities or BMPs that would directly affect scenery resources. However, the vegetation monitoring practices improve the probability of quality grasslands in the project area, which is critical to the long term scenic quality; therefore there would be an indirect benefit to scenery resources.

Cumulative Effects of Mitigation, Monitoring and BMPs

There are no expected cumulative effects related to mitigation, monitoring or BMPs because there would be no direct/indirect effect from them.

Summary of Effects Analysis Across Alternatives

Direct and Indirect Effects

The alternatives do not propose differing activities that affect scenery resources in any measurable way. Therefore, in comparison, the effects or lack of effects are the same across all alternatives.

Cumulative Effects Summary

There would be no cumulative effects for any of the alternatives.

Compliance with the Forest Plan and Other Direction

All the alternatives comply with the Forest Plan and the Hells Canyon National Recreation Area Comprehensive Management Plan. Scenic integrity would not be reduced, in any of the alternatives; therefore all the scenic integrity objectives would be met.

Wildlife Resource Section

Introduction

A biological evaluation/assessment (BE/BA) has been completed and is included in the project record, and includes details on the existing conditions and predicted effects of the LIRA project on wildlife species that are associated with old growth, and snags and downed wood, are considered neotropical migratory birds, or management indicator species (MIS), or are species listed under the Endangered Species Act (ESA), and species listed as sensitive in Region 6 of the Forest Service. There were No Effects predicted to ESA listed species that have habitat in

the project area (Canada lynx and North American wolverine), so there was no need for further consultation with US Fish and Wildlife Service on potential impacts.

The wildlife species discussed in the EIS include only those for which there were predicted relevant interactions between the species or habitat and the proposed grazing activity, and for which there may be a predicted effect from those interactions:

- Snags and downed wood associated species, MIS
- Rocky Mountain elk, MIS
- Neotropical migratory birds (grassland species)
- Big horn sheep
- Gray wolf

Relevant Direction

Imnaha (1993) and Snake (1994/1999) Wild and Scenic River Management Plans

Both of the Imnaha and Snake Wild and Scenic River plans had identified wildlife as an outstanding remarkable value for the respective river corridors. The direction would be to protect habitat conditions for wildlife in the corridor, in particular for bighorn sheep

Wallowa-Whitman Land and Resource Management Plan (1990)

The Forest Plan provides standards and guidelines to protect and enhance habitat for existing native and desired non-native vertebrate and invertebrate wildlife species. Applicable direction includes management guidelines for threatened, endangered and sensitive species, snag management, dead and down material, raptor nest sites, pileated woodpecker feeding areas, and livestock grazing. (4-24, 4-44 — 4-46, 4-51-52, 4-71, 4-79)

This Forest Plan direct and indirect or indirect and indirection has been incorporated into the LIRA. Consistent with this direct and indirect or indirect and indirection, satisfactory range conditions will be maintained and timber stringers will be maintained as old-growth for dependent wildlife species associated with these habitat ecologies.

Hells Canyon National Recreation Area Comprehensive Management Plan FEIS

The FEIS for the Hells Canyon National Recreation Area Comprehensive Management Plan amended the Forest Plan in 2003 with programmatic management direction including goals and objectives for the Hells Canyon National Recreation Area (HCNRA). Applicable standards and guidelines address protection, enhancement and management of wildlife habitat including specifically for elk and big horn sheep.

In addition, the Hells Canyon National Recreation Area Act, section 7, which established the area, also recognizes the importance of protecting and maintaining fish habitat in the NRA.

Recreational Hunting:

The Oregon Department of Fish and Wildlife regulates hunting in the Snake River and Chesnimnus Wildlife Management Units through controlled hunts which require hunting tag purchase.

This analysis of effects to species habitat, including riparian and upland habitat, and aquatic species with special management status, was based on a combination of peer reviewed papers published in scientific journals, publications produce by Forest Service Research Laboratories and field surveys.

Affected Environment

Snags and Down Wood Associated Management Indicator Species:

Management indicator species (MIS) are identified in the Forest Plan (1990) and serve as indicators of the effects of management activities by representing a broad range of other wildlife species. Management indicator species are indicators of the quality and distribution of the type of habitat, viable populations, and adequate habitat also provided for other species that share similar habitat requirements. The MIS species that may be affected for the proposed action or alternatives in LIRA are those associated with snags and downed wood, and Rocky Mountain elk.

Snags are scattered throughout the LIRA un-harvested forest stands in singles or groups are currently near the 100 percent population density especially in areas that have been burned by wildfire. Down logs in all decay stages area scattered throughout the LIRA in the forest stands. Habitat for primary cavity excavators in the LIRA is in un-harvested forest stands with snags and down woody habitat. Primary cavity excavator species that utilize this area are at natural population levels.

Rocky Mountain Elk:

Table WL-1. Acres and percent of total area for Rocky Mountain Elk Habitat within LIRA

Type of Habitat	Acres (% of LIRA)
Rocky Mountain Elk Summer Range	28,112 (64%)
Rocky Mountain Elk Winter Range	12,213 (28%)

The Lower Imnaha Rangeland analysis area is within the Snake River and Chesnimnus Wildlife Management Units (WMU). The LIRA analysis area provides important summer and transitional range, and important winter range for elk, bighorn sheep and mule deer. Mild winters may find higher densities of big game wintering in the LIRA analysis area.

Typical measures for assessing elk habitat, including habitat effectiveness, cover to forage ratios, road densities, and hiding and thermal cover, are mostly associated with forested landscapes and not well designed for measuring habitat quality in open rangeland conditions that make up the majority of the LIRA project area.

In the LIRA, the most relevant habitat conditions relate to amount and quality of forage, and general security. There is little hiding cover for elk in LIRA to use to escape predation or security from predators or other disturbances. However, wide-open landscapes also reduce the ability for predators to use cover while stocking elk, thus reducing the security risks for elk. Higher road densities may also reduce elk security. High quality security areas for elk are defined in the LIRA project as those blocks of cover/forage matrix that are at least 1 mile from a potential source of disturbance from motorized vehicles (open roads, areas open to cross country motorized travel). The LIRA analysis area has very few roads and thus moderate to high security areas. Security areas influence the distribution of elk across available habitat that consists of forage areas, and escape routes and hiding cover used to avoid predation and harassment.

Forage include conifer stands with < 40% canopy closure and non-forested shrublands, grasslands, meadows, and riparian areas where grasses, sedges, forbs, and shrubs grow. Elk also consume lichen, leaves, and bark from trees especially during winter months. Forage quantity and quality are crucial to body condition of elk, determining their winter survival and capacity to successfully bear young. The LIRA analysis area has approximately 88% non-forested habitat areas that include grasslands, rockylands and shrublands.

The dominant forage of cattle and elk includes shrubs, forbs and grasses (Findholt *et al.* 2005). The time of year and the order in which species (cattle, elk or deer) graze determines what resource is utilized (Coe *et al.*2005). Cattle will utilize more grasses and sedges than forbs and shrubs in pastures not previously grazed by cattle (Findholt *et al.* 2005). Elk will utilize more resources and more evenly than deer and cattle (Findholt *et al.* 2005). Elk responded to a decline in available lichens by increasing their consumption of grasses and sedges which may increase the competition between cattle and elk (Findholt *et al.* 2005). The competition between elk and cattle may increase during the late summer (Findholt *et al.* 2005). The Cactus Mountain Fire burned 8.350 acres of the LIRA area in 2011 creating a mosaic of habitat and forage for elk, deer, bighorn and livestock. Deer and elk alike select different resources when cattle are present and may also move out of pastures where cattle had been released (Coe *et al.*2005). Coe *et al.*2005 found that estimating animal unit equivalents cannot be based strictly on body weight but on two basic factors; distribution overlap and dietary overlap of wild and domestic ungulates. There is estimated to be ample forage in LIRA to accommodate both the current elk and cattle populations.

Viability Determination – NFMA (1976) requires that habitat exist to provide for viable populations of all native and desired non-native vertebrates. The actions proposed under the LIRA are not expected to affect the viability of Rocky Mountain elk.

Neotropical Migratory Birds:

The LIRA analysis area has approximately 12% or 4,738 acres of forested areas found in riparian areas, north facing slopes, and gentle plateaus with minor amounts of Mesic Mixed Conifer forest (restricted to riparian areas) conditions as defined in the Landbird Conservation Plan. These focal species were selected based in part on their conservation need and degree of association with important habitat attributes in coniferous forests in the Blue Mountains. Due to the predominance of Non-Forested biophysical types in this project area and the fact that this project will occur in the Non-Forested biophysical types, the following analysis will focus on grassland and riparian types within this analysis area. The Vesper sparrow is abundant in the LIRA area. Small birds such as Vesper sparrows are sensitive to changes from overgrazing but will utilize lightly grazed areas, which provide cover from predation, nesting and foraging substrate. Less than 1% or approximately 252 acres of the LIRA project area is riparian areas.

Rocky Mountain Bighorn Sheep:

Rocky Mountain bighorn sheep are addressed in the Hells Canyon National Recreation Area CMP as a species of interest. Bighorn sheep (BHS) were extirpated from much of their range by 1940s due to diseases from domestic livestock and unregulated hunting. Many of the factors that contributed to the decline of large wild ungulates in the past do not exist today. ODFW controls hunter numbers through a lottery drawing for BHS tags. The BHS herd that inhabits the LIRA project area is the Lower Imnaha BHS herd. The Lower Imnaha BHS herd is part of a meta-population in the Hells Canyon/Snake River area that includes 15 other herds. All these BHS herds interact between each other (Hells Canyon Initiative 2007). In 2011 the number of individuals in the Lower Imnaha herd was approximately 140 BHS (ODFW 2011). This is down from 2005 by about 4 percent and from 2006 by about 25 percent. The Lower Imnaha herd populations have fluxed over time but have steadily increased from the original 15 that were released in 1978. In the fall/early winter of 2011 more BHS were released in the Wallowa-Whitman National Forest and Hells Canyon National Recreation Area. The BHS releases included pregnant ewes and young rams. The LIRA allotments are all cattle allotments. Dassanayake *et al.* 2009 documents that microbial pathogens present in healthy cattle can result in respiratory disease in BHS but not in domestic sheep. No contact between BHS and cattle is expected because BHS will avoid and move away from cattle, and cattle usually prefer gentle slopes (Krausman *et al.*1996; Schommer and Woolever 2001; Wolfe *et al.* 2010). For an infection to occur three things are necessary: 1.) pathogen usually carried by a vector; 2.) host; and 3.) exposure (intensity and duration of exposure to the pathogen and susceptibility of host).There is the pathogen and host but only minimal exposure when it comes to cattle and BHS in grazing rangelands. Because of the lack of inherent attraction between cattle and BHS there is rarely a management concern for cattle and BHS intermingling as there would be between domestic sheep and BHS.

Gray Wolf*:*

On May 5, 2011 the gray wolf was delisted under the Federal Endangered Species Act east of Oregon State Highway 395, which includes the LIRA area, but remains listed west of highway 395. Gray wolves current status is USFS Region 6 sensitive east of highway 395. Historically,

wolves occupied all habitats on this Forest. In 1999, a radio-collared wolf (B-45-F) from the experimental, non-essential Idaho population traveled to the Malheur, Wallowa-Whitman, and Umatilla National Forests and stayed until it was captured and returned to Idaho. Now there are an estimated 60 wolves residing in Oregon, in a total of 8 packs. 4 of these packs occupy territory on the Wallowa-Whitman National Forest, and 2 occupy territory in the Imnaha and Snake River areas (2014).

Gray wolves in both the Imnaha and Snake River packs have been documented killing cattle. Under Oregon's Wolf Conservation and Management Plan (Amended July 2013) the first response to depredation of livestock by wolves is to use non-lethal deterrents. Once chronic depredation of livestock occurs then lethal methods to control wolves may be initiated after four qualifying depredations as described in the Wolf Lethal Take Rules in Oregon (September 2013).

Environmental Consequences

The immediate project area was assessed for known occurrences of any ESA, sensitive species, and MIS species (via prior survey/site observation data) and for habitat type which could support any of the ESA, sensitive species, and MIS species.

The presence of wildlife species and habitat in the analysis area was determined by field surveys, review of records from past projects, and by relating wildlife habitat to plant associations which occur in the analysis area. Species were identified by sight, sound, and scat during field reconnaissance. Field surveys by wildlife biologist and technicians have been completed on the district for many of these species (Anderson, Knox, Weatherford, Penninger, Miller, Hohman and Johnson). Alternate information included information gathered from research scientists at the Pacific Northwest Forestry and Range Sciences Laboratory and others.

Past, Present and Foreseeable Future Effects

The activities in Table WL-2 constitute the past, present, and foreseeable future actions that are considered within the LIRA project area.

Table WL-2. Past, Present, and Foreseeable Future Actions and Effects for Lower Imnaha Rangeland Analysis project area.

Project or Action (Date of NEPA Decision)	Overlap		Action/Effect	Rational
	Time	Space		
Transmission Line (reauthorized 2009)	Ongoing	Along transmission line	Disturbance of species along transmission line.	Some disturbance localized in vicinity of maintenance.
Fish Weir at bridge crossing Imnaha River on Dug Bar Road	Ongoing	Imnaha River	None	Localized at the site on the Imnaha River.
Road Maintenance	Ongoing	Roads within the LIRA area	Disturbance during maintenance.	Localized to area of maintenance.
Trail Use and Maintenance	Ongoing	Along trails	Disturbance of species along trails	Localized to area of maintenance.
Dispersed and Developed Recreation	Ongoing	Overlap of LIRA	Hikers, horses and dogs	Localized along trails
Big-game hunting	Annual	Overlap of LIRA	Disturbance of wildlife	Major disturbance during fall and spring hunting seasons by vehicles, dogs and people
Historic Ranches, Homesteads and Admin Sites	Ongoing	Located in all four allotments	Disturbance of species around sites.	Localized to ranches, homesteads and sites during periods of use.
Large Fires and Wildfire Suppression	Ongoing	Overlap of LIRA area	Yes	Suppression around historical locations and forested areas during wildfires. Historically prescribed fire management from Native Americans. Improve forage for big game species and livestock.
Nez Perce Tribe use	Historical	Overlap of LIRA area	Grazing and gardening	The LIRA project area was utilized for winter grazing of horses and cattle, gardening, fishing and hunting, and villages. These activities affected vegetation composition that has continued with Euro-American use.
Euro-American use	1877-early 20th Century	Overlap of LIRA area	Grazing and cultivation	Extensive homesteading, mining, over grazing by cattle and domestic sheep and cultivation have left long lasting impacts on vegetation, soils, and hydrology after crop production. These impacts are still present within the LIRA analysis area.
Euro-American use	Early 20th Century—present	Overlap of LIRA area	Grazing and cultivation	Road and bridge construction and maintenance, decrease in cattle, domestic sheep, and horse grazing in the 1960s, monitoring of carrying capacity and rangeland conditions began. Domestic sheep are no longer grazed in the LIRA area because of disease effects to bighorn sheep.

Project or Action (Date of NEPA Decision)	Overlap		Action/Effect	Rational
	Time	Space		
				Ecological conditions have improved from the reduced grazing pressure.
Current stocking rates	Ongoing	Overlap of LIRA area	Grazing increases competition for but will also improve forage. Disturbance from human activity from herding and moving livestock.	Current stocking rates of cattle and horses on Toomey, Cow Creek and Rhodes Creek Allotments have been reduced to numbers of livestock allocated for the Rhodes Creek Allotment. This decision was made by the current permittee family. A member of the Nez Perce tribe currently stocks 50 head of cattle on the Lone Pine Allotment. Affects species and habitat in varying degrees depending on how species utilize the area.
Private Land Grazing	Ongoing	Overlap of LIRA area	Yes	Grazing is in conjunction with privately owned land within Toomey, Cow Creek and Rhodes Creek Allotments. USDA FA purchase of private land (2012) in the Toomey and Cow Creek Allotments increased acres of grazing but no increase of livestock numbers. Private land will remain private and will be used in conjunction of associated allotments.
C&T Monitoring	Ongoing	Overlap of LIRA area	No	C&T Monitoring indicates an improvement in upland range condition as perennial native vegetation species and other desirable vegetation is increasing within the project area. Some areas have altered vegetation from historical use that would require an extensive and expensive restoration program.
Invasive weed management	Ongoing	Overlap of LIRA area	Untreated weed patches can alter wildlife habitat and forage	Treatments may be effective at slowing or preventing spread of weeds
Riparian Conditions	Ongoing	Overlap of LIRA area	Yes	Riparian conditions are improving and this project will not modify this trend.
Climate Change	Ongoing	Overlap of LIRA area	Projected to affect all wildlife and wildlife habitat. Decrease water reserves and water availability throughout the year. Increase stress on vegetation during hot, dry summers. Increase likelihood of fire and invasive insects and plants.	Unfortunately, at this time there is limited information on the amount of time and effect climate change will actually have, and inventories and analysis are beyond the scope of this project. At this time, the climate change projection for the Pacific Northwest is less snow pack during the winter season and hot, dry summer.

Snag and Down Wood

Alternative A Direct and indirect Effects:

Under Alternative A all grazing permits in the LIRA would not be renewed after they expire. There would be no direct and indirect effects on primary cavity excavators or their habitat because livestock would not be present on the grazing allotments.

Alternative B, C, D and E Direct and indirect Effects:

Under Alternative B, C, D and E there would not be any direct or indirect effects to snag and down wood associated species such as, primary cavity excavators, because primary cavity excavators utilize cavities in trees and snags for foraging, nesting and roosting.

Cumulative Effects:

In conclusion the cumulative effects of the current and ongoing, past activities and the activities of the action alternatives (B, C, D, and E) include disturbance from recreational activities, hunting, firewood cutting, trail and road maintenance, transmission line maintenance, mining, cultivation, and livestock grazing. There are no cumulative effects for Alternative A because there would be no livestock grazing or accompanying human activities.

In the event of a natural disaster such as wildfire, the action alternatives would lessen the effects of fire on primary cavity excavator habitat by decreasing the buildup of understory grasses, forbs, and shrubs more evenly across the allotments. Low severity fires would produce a mosaic of habitat throughout the burned area. Vegetation growth after a fire would produce highly nutritious and palatable forage, and cover for prey species. High severity fires would result in the least amount of habitat and prey species for primary cavity excavators. Sever fires could burn snags and trees utilized by primary cavity excavators for nesting. Livestock grazing would be deferred depending on the severity of the fire.

Neotropical Migratory Birds

Alternative A Direct and indirect Effects:

Under Alternative A all grazing permits in the LIRA would not be renewed after they expire. There would be an increase in habitat for nesting, foraging and stopover during migration for NTMBs that utilize shrubs and grasses in and outside of riparian areas (Wales 2001; Marshall 2003). The discontinuation of grazing would provide an increase in habitat for Chipping sparrow, Loggerhead shrike, Savannah sparrow, Vesper sparrow, and Willow flycatcher which utilize shrubs, grasses, loose soil, litter or understory.

Alternative B, C, D, and E Direct and indirect Effects:

The direct and indirect effects are similar between Alternatives B, C, D and E but differ slightly in the potential, degree, and time period for habitat recovery. The removal of old sheep fencing in

pastures, decrease in duration of grazing within pastures, water developments, rest and deferred rotation grazing in all the allotments would help protect riparian and upland areas by utilization of forage more evenly across the allotments. Species that utilize shrubs, grasses, loose soil, litter or understory, such as the Chipping sparrow, Loggerhead shrike, Savannah sparrow, Vesper sparrow, and Willow flycatcher, could be negatively affected by livestock trampling of nests, and degradation of vegetation and soils as they move through the area. Livestock grazing would not affect species that utilize canopy or cavities in snags or live trees. These species populations would remain the same or they would increase with grazing.

Cumulative Effects:

In conclusion the cumulative effects of the current and ongoing, past activities and the activities of the action alternatives (B, C, D, and E) include disturbance from recreational activities, hunting, firewood cutting, trail and road maintenance, transmission line maintenance, mining, cultivation, and livestock grazing. There are no cumulative effects for Alternative A because there would be no livestock grazing or accompanying human activities.

In the event of a natural disaster such as wildfire, the action alternatives would lessen the effects of fire on Neotropical migratory bird's habitat by decreasing the buildup of understory grasses, forbs, and shrubs more evenly across the allotments. Low severity fires would produce a mosaic of habitat throughout the burned area. Vegetation growth after a fire would produce highly nutritious and palatable forage, and cover for prey species. High severity fires would result in the least amount of habitat and prey species for Neotropical migratory birds. Trees, snags, understory grasses, forbs and shrubs utilized by Neotropical migratory birds would burn during a sever fire decreasing nesting substrate. Livestock grazing would be deferred depending on the severity of the fire.

Rocky Mountain Elk

Alternative A Direct and indirect Effects:

If Alternative A were implemented, all grazing permits in the LIRA would not be renewed after they expire. The direct or indirect effects of the no-grazing alternative would result in an increase in forage and thermal cover in riparian and upland areas and a decrease in competition for forage. Old fencing is also a hazard to wildlife and livestock which can cause injury and death. Under this alternative, the range improvements such as removal of interior fencing in the pastures would not occur.

Alternative B Direct and indirect Effects:

Direct and indirect effects under Alternative B would be continued pressure on riparian areas, competition for forage between livestock, elk, bighorn sheep, and deer without the rest and deferral rotations of the pastures and allotments. The removal of old fences, drift fence construction, and development of water sources, placing salt and herding in all allotments would improve distribution over upland and riparian areas. The improved distribution would decrease

erosion and sloughing of deep soil on steep north facing slopes and allow these areas to improve over time.

Alternative C Direct and indirect Effects:

Direct and indirect effects of Alternative C would be similar to Alternative B except the Big Pine pasture would be created from a portion of the Lower Spain Saddle pasture to decrease hoof shear effects to Spalding's Catchfly and catchfly habitat and allow these areas to improve over time. The creation of this pasture would decrease acres of grazing utilized in the Toomey Allotment one out of two years. This would decrease competition between livestock, elk, bighorn sheep and deer during the year this pasture would be rested from livestock grazing.

Alternative D Direct and indirect Effects:

Same as Alternative C except the livestock would be scattered over a larger area which would decrease effects to deep soils on north facing slopes and vegetation utilized by elk. Alternative D would eventually reduce soil disturbance but at an incrementally faster rate than Alternative C.

Alternative E Direct and indirect Effects:

Alternative E direct and indirect effects would be the same as Alternative C because Toomey, Cow Creek and Rhodes Creek Allotments would be managed the same as Alternative C. Alternative E direct and indirect effects in the Lone Pine Allotment would be similar to Alternative C except the use would be three out of five years by other permittees in the case of wildfire or volunteer permittee resource protection. If the current permittee utilized Lone Pine the direct and indirect effects would be similar to Alternative D.

Cumulative Effects:

In conclusion the cumulative effects of the current and ongoing, past activities and the activities of the action alternatives (B, C, D, and E) include disturbance from recreational activities, hunting, firewood cutting, trail and road maintenance, transmission line maintenance, cultivation, and livestock grazing. There are no cumulative effects for Alternative A because there would be no livestock grazing or associated human activities.

In the event of a natural disaster such as wildfire, the action alternatives would lessen the effects of fire on Rocky Mountain elk habitat by decreasing the buildup of understory grasses, forbs, and shrubs more evenly across the allotments. Low severity fires would produce a mosaic of habitat and forage throughout the burned area. Vegetation growth after a fire would produce highly nutritious and palatable forage for elk, deer, bighorn sheep and livestock decreasing competition for forage. High severity fires would result in the least amount of habitat and forage availability for elk, deer, bighorn sheep and livestock resulting in an increase of competition between species. Livestock grazing would be deferred depending on the severity of the fire.

Bighorn Sheep

Alternative A Direct and indirect Effects:

If Alternative A were implemented, all grazing permits in the LIRA would not be renewed after they expire. The direct and indirect effects of the no-grazing alternative would result in an increase in forage in the open upland areas and a decrease in competition for forage. Old fencing is also a hazard to wildlife and livestock which can cause injury and death. Under this alternative, the range improvements such as removal of interior fencing in the Cow Creek Allotment pastures would not occur.

Alternative B Direct and indirect Effects:

Direct and indirect effects under Alternative B would be continued pressure on riparian areas, competition for forage between livestock, elk, bighorn sheep, and deer without the rest and deferral rotations of the pastures and allotments. The removal of old fences, drift fence construction, and development of water sources, placing salt and herding in all allotments would improve distribution over upland and riparian areas. The improved distribution would decrease erosion and sloughing of soil on steep deep north facing slopes and allow these areas to improve over time.

Alternative C Direct and indirect Effects:

Direct and indirect effects of Alternative C would be similar to Alternative B except the Big Pine pasture would be created from a portion of the Lower Spain Saddle pasture to decrease hoof shear effects to Spalding's Catchfly and catchfly habitat and allow these areas to improve over time. The creation of this pasture would decrease acres of grazing utilized in the Toomey Allotment one out of two years. This would decrease competition between livestock, elk, bighorn sheep and deer during the year this pasture would be rested from livestock grazing.

Alternative D Direct and indirect Effects:

Same as Alternative C except the livestock would be scattered over a larger area which would decrease effects to deep soils on north facing slopes and vegetation utilized by bighorn sheep. Alternative D would eventually reduce soil disturbance but at an incrementally faster rate than Alternative C.

Alternative E Direct and indirect Effects:

Alternative E direct and indirect effects would be the same as Alternative C because Toomey, Cow Creek and Rhodes Creek Allotments would be managed the same as Alternative C. Alternative E direct and indirect effects in the Lone Pine Allotment would be similar to Alternative C except the use would be three out of five years by other permittees in the case of wildfire or volunteer permittee resource protection.

Cumulative Effects:

In conclusion the cumulative effects of the current and ongoing, past activities and the activities of the action alternatives (B, C, D, and E) include disturbance from recreational activities, hunting, firewood cutting, trail and road maintenance, transmission line maintenance, cultivation, and livestock grazing. There are no cumulative effects for Alternative A because there would be no livestock grazing or associated human activities.

In the event of a natural disaster such as wildfire, the action alternatives would lessen the effects of fire on bighorn sheep habitat by decreasing the buildup of understory grasses, forbs, and shrubs more evenly across the allotments. Low severity fires would produce a mosaic of habitat and forage throughout the burned area. Vegetation growth after a fire would produce highly nutritious and palatable forage for elk, deer, bighorn sheep and livestock decreasing competition for forage. High severity fires would result in the least amount of habitat and forage availability for elk, deer, bighorn sheep and livestock. An increase of competition for forage would increase the possibility of bighorn sheep and livestock intermingling. Livestock grazing would be deferred depending on the severity of the fire.

Gray Wolf

Alternative A Direct and indirect Effects:

If Alternative A were implemented, all grazing permits in the LIRA would not be renewed after they expire. There would be no direct and indirect effects on gray wolves or their habitat because livestock would not be present on the grazing allotments, depredation would not occur, predator control would not take place to protect livestock, and wolf dens and rendezvous sites would not be disturbed from livestock and livestock management activities. Human activity and livestock presence associated with permitted livestock grazing would not preclude wolves from establishing dens or rendezvous sites in the LIRA.

Alternatives B, C, D, and E Direct and indirect Effects:

Under Alternatives B, C, D and E the continued grazing of livestock would affect wolves because of non-lethal and lethal means to control depredation of livestock by wolves. As the number of wolves increases and wolves become habituated to non-lethal deterrents depredation and lethal control would occur.

Cumulative Effects:

In conclusion the cumulative effects of the current and ongoing, past activities and the activities of the action alternatives (B, C, D, and E) include disturbance from recreational activities, hunting, firewood cutting, trail and road maintenance, transmission line maintenance, cultivation, and livestock grazing. There are no cumulative effects for Alternative A because there would be no livestock grazing or associated human activities.

The In the event of a natural disaster such as the Cactus Mountain Fire, the action alternatives would lessen the effects of wildfire on wolf habitat by decreasing the buildup of understory grasses, forbs, and shrubs more evenly across the allotments. Low severity fires would produce a mosaic of habitat and forage throughout the burned area for wolves main prey species of elk and deer. Vegetation growth after a fire would produce highly nutritious and palatable forage for elk, deer, bighorn sheep and livestock decreasing competition for forage. High severity fires would result in the least amount of habitat and forage availability for elk, deer, bighorn sheep and livestock. An increase of competition for forage could decrease the survival rate of young and adult elk and deer. A decrease in wolves prey species could lead to an increase of depredation of livestock. Livestock grazing would be deferred depending on the severity of fire.

Compliance with the Forest Plan and Other Direction

The actions proposed under all of the LIRA alternatives are in compliance with higher order plans and guidance, including with the Forest Plan and the Hells Canyon National Recreation Area CMP. There were no effects found during the analysis on species listed under the ESA, and therefore no consultation was required with the US Fish and Wildlife Service.

Water Resources

Introduction

The Lower Imnaha Rangeland Analysis area (LIRA) includes four allotments – Cow Creek, Rhodes, Toomey and Lone Pine – and is contained within the Watersheds and Subwatersheds listed in Table H-1 below.

Table H-1. Subwatersheds and their HUCs that contain the LIRA area.

Watershed	Subwatershed
Lower Imnaha	Thorne Creek-Imnaha River
	Lower Lightning Creek
	Upper Lightning Creek
	Sleepy Creek
	Lower Cow Creek
Wolf Creek-Snake River	Dug Bar-Snake River
	Deep Creek

Four major creeks and rivers traverse or about the LIRA area: the Imnaha River, Lightning Creek and Cow Creek run through the LIRA area, and the Snake River provides the eastern boundary to Lone Pine Allotment.

The majority of the LIRA area receives 10”-16” of rain per year, with the mouth of Lightning Creek receiving as little as 8” per year, and the headwaters of Rhodes and Toomey Allotments receiving as much as 18” per year.

Regulatory Environment, Forest Plan and Other Direction

Forest Plan

The Forest Plan Watershed Goal is to maintain or enhance the unique and valuable characteristics of riparian areas and to maintain or improve water quality, streamflows, wildlife habitat and fish habitat. Standards and guidelines applicable to LIRA are listed below:

- Water Quality Standards and Best Management Practices (BMPs): Meet Water Quality Standards for waters of the States of Oregon; application and monitoring of BMPs in conformance with the Clean Water Act.
- State Water Quality Management Plans (WQMPs): Implement Oregon WQMPs on lands administered by the USDA Forest Service as described in Memoranda of Understanding between The Oregon Department of Environmental Quality and U S Department of Agriculture, Forest Service (2/12/79 and 12/7/82).
- Floodplains: Address the potential impacts to any floodplain within the project area.
- Wetlands: Address the potential impacts to any wetlands within the project area. Particular attention will be paid to protection of springs during range allotment management plans. Adverse impacts to wetlands will be avoided or mitigated.

Hells Canyon National Recreation Area Comprehensive Management Plan (2003)

- BUC-O13: Ensure that management activities provide for protection, retention, or enhancement or water quality and quantity from natural springs, seeps and other wetlands.
- BUC-S21: Where springs are developed for any purpose, ensure that the water source is protected from trampling, the trough or other use point is located away from the spring and watercourse, and that overflow water remains at the spring source (use of float valves), or is transported back to the natural channel.
- Wqq-O1: Maintain or improve water quality while recognizing the limitations posed by marginally stable tributary stream channels in a canyon environment that efficiently collect and transport surface water from frequent intense runoff events in high-gradient, dendritic drainage networks.
- Wqq-S1: Meet or exceed state water quality standards for waters of the State of Oregon within the HCNRA, including total maximum daily loads.
- Wqq-S2: Implement water quality improvement standards and guidelines for water quality impaired waters of the State of Oregon within HCNRA, as required in state WQRPs.
- Wqq-S3: Develop WQRPs for water quality impaired waters within HCNRA.

Affected Environment

Stream Temperature

The Imnaha and Snake Rivers and Lightning Creek used to be on the 303(d) list for stream temperature prior to 2010. The Oregon Department of Environmental Quality (ODEQ) completed a Total Maximum Daily Load (TMDL) assessment for the Imnaha Subbasin in 2010 (ODEQ, 2014) which removed these rivers and creek from that list. They are now considered Category 4A streams: water quality limited but not listed because of the TMDL. The TMDL urges landowners surrounding these creeks and rivers to not do anything to contribute to their decline in terms of stream temperature or sediment. The WWNF is expected to develop and implement Water Quality Restoration Plans to address these TMDLs within the next few years.

The Nez Perce Tribe has been collecting data on Lightning Creek, Cow Creek and the Imnaha River since 2000 and the Forest Service monitored for stream temperature on Lightning Creek and the Imnaha River in 1993 and on Cow Creek in 1994. Findings show that depending on the year, Cow Creek exceeds the standard 41-88 days, Lightning Creek exceeds the standard 59-87 days, and the Imnaha River exceeds from 76-108 days. There is very little length of these streams on National Forest System land in the LIRA area; the upper part of Cow Creek has the most length. No active stream restoration is occurring within the LIRA area.

New data retrieved by the Environmental Protection Agency (EPA) in 2010 has placed the Imnaha River from River Mile 1- 72.2, which includes the LIRA area, on the 303(d) list for biological criteria.

Fine Sediment from Fire and Landslides

The LIRA area experiences fairly frequent canyon fires, but bunchgrass and annual invasive grasses start coming back after 2-3 months in the late fall, and bunchgrass roots that are still present even without above-ground vegetation tend to hold the soil in place until more growth occurs (Johnson, 1998).

The LIRA area is not prone to landslides but they will occasionally occur along with debris flows if there is a long and intense rainstorm. No recent landslides were observed in the LIRA area, however. Fine sediment from fire and landslides may occur on a sporadic basis, are not affected by this management activity, nor will they be affected by any of the alternatives and will not be considered in this analysis.

Peak Flows and Low Flows

The project alternatives will not affect peak flows or low flows in the LIRA area. As a result peak flows and low flow water quality parameters will not be considered in this analysis.

Road Density

Road densities in the LIRA project area are generally low. No changes are proposed under this analysis in road condition or status. Water quality related to road location will be discussed in detail within the “Impacts Related to Roads and Trails” section under each Allotment in the Hydrology Specialist report in the project record.

Cow Creek Allotment

Stream Form and Function

Cow Creek is the only perennial stream in the Cow Creek Allotment and has 3 high gradient intermittent tributaries: Rowley Gulch, Schleur Gulch and Fingerboard Gulch. Fingerboard Gulch may flow perennially near its confluence with Cow Creek. The allotment does not include the headwaters of Cow Creek or the lower 3 miles of Cow Creek which flows through the Rhodes Creek Allotment on private land. Most of the creek bottom in this allotment was privately owned until the land exchange in 2012: now all 4 miles of Cow Creek in this allotment is National Forest System land.

Cow Creek is a Rosgen B-type channel (B3) with good riparian vegetation and proper plan form and profile. Because the livestock graze these allotments in winter, they are not as attracted to the colder riparian areas, and spend most of their time in upland areas. PFC (proper functioning condition) surveys done along Cow Creek determined it to be “properly functioning”, where “current management has little impact on riparian areas” (see Aquatic Resources section). There are small isolated areas along Cow Creek where cattle access the stream, but these impacted areas are small and occur infrequently.

Impacts Related to Grazing

Grazing can negatively impact soils in riparian areas and spring sites by 1) trampling soils in draws or streamside wetland areas which may cause compaction or hinders vegetative growth; 2) breaks down streambanks which may widen the stream channel; and 3) grazing that results in less vegetation to protect the soil from the erosive power of raindrops, overland flow and streambank trampling. Grazing effects are mitigated by controlling livestock numbers, limiting season of use, setting utilization standards and by dispersing animals across the range (USDA Forest Plan 1990).

Negative impacts from livestock grazing in riparian areas are more common in pastures that are grazed in the summer. LIRA is grazed in the fall, winter and spring. Because of this, livestock tend to spend less time in the colder riparian areas (see discussion in Rangeland resources and Aquatic resources sections and resource reports in the project file), resulting in less livestock impacts to Cow and Lightning Creeks and the Imnaha River. There was livestock impacts observed in the lower part of Fingerboard Gulch as evidenced through woody species browse and trampled banks, however the upper two-thirds of Fingerboard Gulch appeared not to be used by livestock.

Upland hydrologic impacts in the Cow Creek Allotment are limited to the down-slope movement of exposed soil, which is created by ungulates (both elk and livestock) shearing soils on steep slopes, and trampling at spring sites. There are nine mapped springs scattered within the allotment, two of which were targeted for monitoring, but were not located on the landscape. It is unknown whether they represent where an intermittent creek may begin flowing and so are ephemeral, or that they were mis-mapped.

The areas of exposed soil that are seen in this allotment are on steep, north-facing slopes with deep soils. Those soils are prone to hoof shear because they remain moist or wet and are displaced because of the steep slope and the weight of the animal. The amount of soil movement is highly variable, and depends on factors such as rate of vegetative recovery and timing and intensity of rainstorms; refer to the Soils Resource section and specialist report in the project file for more detailed information.

There appears to be few impacts to riparian areas from livestock grazing in this allotment over winter. The exposed soils on steep slopes pose potential sediment impacts to draw bottoms or streams down-slope depending on vegetative recovery and rainstorm timing and intensity. More soils information as well as the impacts from compacted terrecettes can be found in the Soils Resource section of this document and the Soils Resource Report.

Cow Creek Allotment Hydrologic Conclusion

To summarize, the Cow Creek Allotment has few hydrologic concerns. Cow Creek has appropriate form and function, as well as adequate levels of riparian vegetation. Exposed soils on steep slopes pose potential sediment impacts to draw bottoms or streams down-slope, but effects are difficult to predict

Rhodes Creek Allotment

Stream Form and Function

Lightning Creek and its 4 major tributaries are the only perennial streams in this allotment and include Rhodes Creek, Butcherknife Creek, Sleepy Creek, and Hangover Creek –. The Rhodes Creek Allotment does not include the headwaters of Lightning Creek but it does include the mouth of Lightning Creek, as well as the bottom 3 miles of Cow Creek. Most of the land next to Lightning Creek and all of the land next to Cow Creek and the Imnaha River is privately owned. Cow Creek flows into the Imnaha River approximately 5 miles upstream of its confluence with the Snake River, and Lightning Creek flows into the Imnaha River about one mile above Cow Creek.

Lightning Creek is a Rosgen B-type channel (B3) in this allotment. It has good riparian vegetation and a proper planform and profile. It, too, does not get much use during the grazing season as it is the coldest drainage within the allotment on average. PFC assessments show some residual impacts to the stream from historical use associated with grazing, farming, and roads, but all 3 reaches surveyed were in proper functioning condition.

Rhodes Creek is incised (about 10 feet) at its confluence with Lightning Creek and appears a large disturbance came through the area as the New Year's Flood did in 1996/1997 (see Aquatic Resources Specialist report). There are young poplars, , growing along the bottom. This creek is less incised only 300 feet upstream; however the full extent of incision was not determined.

Impacts Related to Grazing

In small isolated areas along Lightning Creek there are trails to the water where cattle access the stream, but these impacts are found along a small percentage of the stream length within the area. Cattle also access the stream at the six rock armored ford locations.

Upland hydrologic impacts in the Rhodes Allotment are the same as Cow Allotment: the down-slope movement of exposed soil and trampling at spring sites. There are 27 mapped spring sites in this allotment. Four were visited in 2010 and 2011 and were in fair condition though showed some localized trampling of wet soils. Of the four, two had been developed, the others had not. The developed sites had not protected the spring source.

The areas of exposed soil in this allotment are also on steep, north-facing slopes with deep soils, specifically in the East and West Lightning Bench Pastures. These localized areas of sheared and exposed soil could move down-slope with the next rainstorm, but the amount of soil movement is hard to determine as it is highly variable and depends on factors such as rate of vegetative recovery and timing and intensity of rainstorms. For more discussion on the impact to soils refer to the Soils section, or the Soils Resource specialist report.

There appears to be few impacts to riparian areas from livestock grazing in this allotment over winter. There are, however, exposed soils on steep slopes that pose potential sediment impacts to draw bottoms or streams down-slope depending on vegetative recovery and rainstorm timing and intensity.

Rhodes Creek Allotment Hydrologic Conclusion

Rhodes Allotment has minor hydrologic concerns. Lightning Creek has appropriate form and function, as well as adequate levels of riparian vegetation. Exposed soils on steep slopes pose potential sediment impacts to draw bottoms or streams down-slope, but effects are difficult to predict.

Toomey Allotment

Stream Form and Function

The Toomey Allotment is situated on the northeast side of the Imnaha River canyon and is comprised of steep slopes and small, high-gradient streams that drain directly into the Imnaha River. In addition to the Imnaha River, perennial water can be found in the bottom parts of Tulley Creek, Vance Draw and Toomey Gulch, and in the middle section of the Tulley Creek

tributary. The allotment includes the headwaters and mouths of all these creeks and the majority of this allotment is on National Forest System land.

There are a few private parcels in this allotment, including part of the land next to the Imnaha River. One ranch in-holding is located in the south part of this allotment on a bench near Tulley Creek, and includes a ranch house and an outhouse, both located far enough away from Tulley Creek so as not to be a water quality issue.

The Imnaha River is a Rosgen C-type stream (C3-C4) and drains a Subbasin. This allotment includes four miles of the lower part of this river, only 1.5 miles from its confluence with the Snake River. There were no PFC surveys conducted on the Imnaha River, but it appears to be functioning-at-risk due to sparse riparian vegetation, numerous recreation access points, historic homestead development, and a wide planform (see Fisheries Report). The tributaries to the Imnaha that were visited in this allotment were primarily in good condition with adequate vegetation and untrampled banks.

In the headwaters of the Tulley Creek tributary that contains the stock driveway, there is evidence of slumping or some geologic movement of about half an acre of ground in one location. The evidence is a parabola of shifted soils/ground that is lower in elevation than the ground around it.

Impacts Related to Grazing

The Toomey Allotment shows the most hydrologic impacts of the four allotments. A document from 1993 stated that the Upper Spain Saddle pasture had 25% of the unit in poor condition as a result of over-grazing, and the Johnson Canyon pasture, because of the corridor between the road and the creek, was described as "…one of the worst condition pastures in the Lower Imnaha".

Conditions in these pastures have much improved since then, but many impacts still persist, mostly in the Upper Spain Saddle and Toomey pastures, and also to a lesser degree in the Lower Spain Saddle pasture. Some of the impacts in the Upper Spain Saddle and Lower Spain Saddle pastures are likely from a historic trail and stock driveway alongside the main Tulley Creek tributary that is used to move livestock back and forth from the LIRA Area and several other allotments adjacent to the Snake River to the higher elevation pastures in the headwaters of Chesnimnus Creek. The driveway runs through two other pastures, and the water resources in these pastures do not show livestock impacts from the driveway.

In the Lower Spain Saddle pasture the stock driveway is close to the Tulley Creek tributary: it fords the Tulley Creek tributary once and gets within a few feet of the stream through the narrow canyon toward the top of the pasture. There were also 3 livestock access locations where the Tulley Creek tributary, including the ford, and the stream bottom in these locations had more fine sediment than in other locations.

The Tulley Creek tributary flows intermittently except through a section of the canyon above the Tulley Ranch where it flows perennially. The Tulley Creek tributary appeared to be slightly

wider than expected, and the creek bottom was predominantly filled with cobbles excepting the sediment-laden areas mentioned above. The Tulley Creek tributary is in fairly good condition in this pasture considering how long this tributary has been used as a stock driveway. The amount of use as a stock driveway has drastically decreased since the early 1900's (see Rangeland Resource section and history discussed in Chapter 1). Impacts are more apparent in the Upper Spain Saddle pasture where the canyon opens up and there are more opportunities for livestock access near Tulley Creek tributary.

Upland hydrologic impacts in the Toomey Allotment are the same as the former allotments: the down-slope movement of exposed, sheared soil and limited trampling at spring sites. There are 12 mapped spring sites in the Toomey Allotment, and 7 were visited for this analysis. Most sites were locally impacted with trampled wet soils at the spring sources or around the trough locations if they were developed. Spring sources in these allotments are relatively small and can be laterally and vertically contained in narrow draws. Re-developing Tips trough as described in Alternative C would involve placing 3 rocked dips in the road, which would improve riparian conditions in Vance Draw from the reduction in road sedimentation.

Areas of exposed soil from hoof shear were apparent on steep, north-facing slopes in the Toomey and Johnson Canyon pastures posing a risk for down-slope movement during intense rainstorms. The amount of soil movement is hard to determine as it is highly variable and depends on factors such as rate of vegetative recovery and timing and intensity of rainstorms. For more detailed discussion of soil impacts, refer to the Soils Resource section or Soils Resource specialist report in the project file.

There appears to be impacts to riparian areas from livestock grazing in this allotment over winter on the Tulley Creek tributary. Additionally, there are exposed soils on steep slopes that pose potential sediment impacts to draw bottoms or streams down-slope depending on vegetative recovery and rainstorm timing and intensity.

Toomey Allotment Hydrologic Conclusion

To summarize, the Toomey Allotment has several areas of hydrologic concern: grazing impacts in the Upper Spain Saddle pasture and along the Tulley Creek tributary; the stock driveway's proximity to the Tulley Creek tributary in the Lower Spain Saddle pasture and sedimentation at access points; and soil sloughing on steep slopes in Toomey and Johnson Pastures which may contribute to excess sediment in draws below.

Lone Pine Allotment

The Lone Pine Allotment is situated on the west side of the Snake River and is comprised of steep slopes and high-gradient perennial and intermittent streams that drain directly into the Snake River. The largest drainage is Deep Creek with its major tributary Little Deep Creek in the southern part of the allotment. Others include Dug Creek, Coyote Gulch, Robinson Gulch, Fence Gulch, Birch Creek, Big Canyon Creek and China Gulch.

The streams are primarily Rosgen A-type streams with occasional sections of B-type stream. Steeper sections of stream (A-types) do not tend to get as much livestock use as lower gradient B-type streams. This allotment has not been grazed consistently for over 10 years and there is robust riparian vegetation next to all perennial streams. Field work conducted in the spring of 2011 showed creeks with easily accessible floodplains and no trampled or denuded access areas.

Impacts Related to Grazing

There are 17 mapped spring sites in this allotment and 3 were visited during field visits.

Lone Pine Allotment Hydrologic Conclusion

To summarize, the Lone Pine Allotment has no hydrologic concerns as the riparian vegetation is robust. These field data were collected, however, before the Nez Perce Tribe started grazing 50 head on this allotment throughout the winter, which may be having an impact on riparian areas or exposing more soil on steep, north-facing slopes.

Direct and Indirect Effects

Alternative A – No Action (No Grazing)

In the absence of grazing management, there would be an increase in ground-covering vegetation at springs sites, an increase in the amount and size of riparian vegetation along the entire length of the Tulley Creek tributary, a decrease in the amount of trampled soils in the Tulley Creek tributary headwaters in Upper Spain Saddle pasture, and a decrease in sheared and exposed soil on steep north-facing slopes, which would result in more vegetative growth on those slopes and less sediment transported downhill toward water resources.

Alternative B – Current Management

Direct effects would include continued trampling around a few spring sites, continued browsing and trampling of the riparian area of Tulley Creek tributary in the Upper Spain Saddle pasture, continued sedimentation at access sites along Tulley Creek tributary in Lower Spain Saddle pasture, continued shearing and exposure of soils on steep north-facing slopes in the Toomey and Johnson Canyon pastures, and increased browsing of riparian shrubs and bank trampling in riparian areas in the Lone Pine Allotment as it would be stocked. Indirect effects may include increased sedimentation of water resources down-hill of exposed soils and downstream of the Tulley Creek tributary in the Imnaha River.

Alternative C – Proposed Action

Direct effects would be the same as Alternative B but with less browsing and trampling of the riparian area of Tulley Creek tributary in the Upper Spain Saddle pasture as that pasture would be on a two-year rotation, and less sediment would be deposited into Vance Draw from the Tips trough re-development project.

Alternative D

Direct effects would include: less browsing and trampling of the riparian area of Tulley Creek tributary in the Upper Spain Saddle pasture as it would rested one out of every three years; less sedimentation at access sites along Tulley Creek tributary in Lower Spain Saddle pasture; and less shearing and exposure of soils on steep north-facing slopes in the Toomey and Johnson pastures; some riparian shrub browsing and bank trampling in the Lone Pine Allotment, but less than with Alternatives B & C; and less trampling around select spring sites in the Toomey and Lone Pine Allotments and in the East and West Lightning Bench and Rowley pastures, as they would be rested once in every three years.

Alternative E

Direct effects would be the same as Alternative C for the Cow Creek, Rhodes Creek and Toomey Allotments, and the same as Alternative D for the Lone Pine Allotment (some riparian shrub browsing and bank trampling, but less than with Alternatives B & C because of rest rotation). There may be some additional impacts to the headwaters of Little Deep Creek and to Fingerboard Gulch from using that trail as a driveway depending on agreement with the private landowner.

Cumulative Effects

Cumulative effects are the incremental impact of the proposed action, when added to impacts from the past, present and reasonably foreseeable future actions. Past actions that affect water resources in the LIRA analysis area include intense sheep, cattle and horse grazing, farming in riparian areas and road building. The effects of these past actions are captured, however, in the baseline affected environment, or present activities.

In the LIRA area, there are no foreseeable future activities. One side note to this is that the Nez Perce Tribe has recently begun grazing a small herd on the Lone Pine Allotment. The Nez Perce Tribe has the right to graze anywhere in the LIRA area, and while the number of head-months months may be the same on any allotment, the effects to riparian areas may be more detrimental because they do not have to adhere to Forest Plan S&Gs and Allotment Management Plans agreed to between the FS and Permittee. There has, however, been no request by the Nez Perce Tribe to graze on other LIRA allotments, and so for the purposes of determining cumulative effects, it will be assumed that no changes to the current condition are planned.

The cumulative effects analysis area for water resources includes the six subwatersheds that contain the analysis area because measureable effects from proposed activities are unlikely to extend downstream of these subwatersheds. The time frame for the cumulative effects discussion is from 5 to 10 years.

The risk of cumulative effects occurring is rated 3 ways:

- Low – insignificant cumulative effects to riparian areas or stream form/ function may occur. Insignificant effects are defined as effects that a person, based on professional judgment, would not be able to meaningfully measure, detect, or evaluate. On a scale of 1-10, low ratings would range from 1-3.
- Moderate – small, measureable cumulative effects to riparian areas or stream form/function are likely to occur. On a scale of 1-10, moderate ratings would range from 4-7.
- High – obvious cumulative effects to riparian areas or stream form/function are likely to occur. Adverse effects would take many years to repair or recover. On a scale of 1-10, high ratings would range from 8-10.

Based on the changes to the existing condition included in the Direct and Indirect Effects section above, a summary of the type and risk of cumulative effects for each Alternative follows:

- **Alternative A**: there would be **beneficial** cumulative effects to riparian areas or stream form/function in the Cow, Rhodes and Toomey Allotments as grazing would be terminated; there would be **no** cumulative effects for the Lone Pine Allotment as there would be no change in management.
- **Alternative B**: there would be a **moderate** risk of adverse cumulative effects to riparian areas or stream form/function in all four allotments.
- **Alternative C**: there would be a **moderate** risk of adverse cumulative effects to riparian areas or stream form/function in Cow, Rhodes and Lone Pine Allotments, as well as a **low-to-moderate** risk of adverse cumulative effects to riparian areas or stream form/function in the Toomey Allotment.
- **Alternative D**: there would be a **low** risk of adverse cumulative effects to riparian areas or stream form/function in all four allotments.
- **Alternative E**: there would be a **moderate** risk of adverse cumulative effects to riparian areas or stream form/function in Cow and Rhodes Allotments, and a **low-to-moderate** risk of adverse cumulative effects to riparian areas or stream form/function in the Toomey and Lone Pine Allotments.

Best Management Practices

BMPs that should be implemented with this project are found in the 2012 Forest Service BMP Technical Guide (USDA Forest Service, 2012). Follow applicable practices under “Range-1 Rangeland Management Planning” (pg. 81), “Range-2 Rangeland Permit Administration” (pg 83), “Rec-4 Nonmotorized Trails” (pg. 92) and “WatUses-3 Administrative Water Developments, Spring Developments” (pg. 146).

Consistency with Forest Plan and HCNRA CMP

Alternatives A, B, C, D & E are consistent with the Forest Plan and CMP as all watershed standards and guidelines outlined in the Analysis Framework section would be met, with the exception of Wqq-S2 and Wqq-S3.

Activities included in LIRA do not propose to occupy or modify any floodplain or wetland, and the LIRA area does not intersect with, or is not within, a municipal watershed. Implementation

of LIRA is consistent with Executive Orders 11988 and 11990 for floodplain management and protection of wetlands, respectively.

Aquatic Resources

Introduction

The majority of the LIRA is located in five subwatersheds in the Lower Imnaha River Watershed (HUC 1706010205) (Table AR-1). The Lone Pine Allotment is primarily located in the Snake River-Wolf Creek Watershed (HUC 1706010103) (Table AR-1AR-1).

Table AR-1. Location of Allotments in the Lower Imnaha Rangeland Analysis by subwatersheds. The Snake River-Dug Bar and Deep Creek subwatersheds are located in the Snake River drainage. All other subwatersheds are located in the Imnaha River drainage. *Snake River subwatersheds

Subwatershed	SWS Code (17060106XXXX)	Allotment			
		Cow Creek	Rhodes Creek	Toomey	Lone Pine
Imnaha River-Thorn Creek	170601020510		X	X	X
Lower Cow Creek	170601020509	X	X		
Lower Lightning Creek	170601020507		X		
Sleepy Creek	170601020506		X		
Upper Lightning Creek	170601020505		X		
Snake River-Dug Bar*	170601010305				X
Deep Creek*	170601010303				X

Regulatory Environment, Forest Plan and Other Direction

WWNF Forest Plan Standards (1990)

Standards and guidelines for forest-wide and management area specific activities are listed in Chapter IV of the Forest Plan. Forest Plan standards and guidelines related to livestock grazing and riparian/aquatic resources are identified in Chapter 1 of this document.

PACFISH Forest Plan Amendment (1995)

The Forest Plan was amended in 1995 by the PACFISH amendment that supplemented existing management direction and standards in the Forest Plan by replacing direction that provided less protection for aquatic habitat. The PACFISH amendment did not replace existing Forest Plan direction where the Forest Plan provided more protection for aquatic habitat. PACFISH contains three standards and guidelines for livestock grazing activities that apply to LIRA area; they are listed in Chapter 1 of this document.

PACFISH grazing guidelines (Enclosure B: Recommended Livestock Grazing Guidelines Rev. 7/31/95; "Enclosure B") state that the "Influences of grazing must result in riparian restoration at a minimum of near natural rates." This same reference, page 7, describes achieving a "near natural rate of recovery", in general, as avoiding effects that "carry over to the next year" so as to prevent the likelihood of cumulative, negative effects. In response to Enclosure B, the WWNF developed condition thresholds for utilization for herbaceous vegetation and shrubs (Enclosure: PACFISH/INFISH W-W Interpretations Pertaining to Livestock Management Activities [dated May 1996]; TableAR-2). By not exceeding these utilization levels a near natural rate of recovery should be achieved.

Table AR-2. Wallowa-Whitman NF recommended condition thresholds (utilization levels) to meet Forest Plan (PACFISH) Standard and Guideline GM-1.

Riparian condition (Based on PFC Assessment)	**Riparian**			
	Grass and Grass-like (Greenline)	**Sedge and Rush (Sinks)**	**Kentucky Bluegrass / Mixed Species (Terraces)**	**Woody Vegetation**
Proper Functioning Condition	4 inches	3 inches	2 inches	30%
Functioning at Risk (Static or upward trend)	6 inches	4 inches	4 inches	30%

Hells Canyon Comprehensive Management Plan FEIS/ROD (2003)

PACFISH management direction (pages C-17 through C-19), and PACFISH/INFISH management direction (A-1 through A-14), and including terms and conditions from the BOs for salmon, steelhead and bull trout.

For more in depth detail and explanation of the management direction concerning aquatic resources and livestock grazing see the Aquatic Resources Specialist Report in the project file.

Aquatic Habitat

Existing Conditions

Properly Functioning Condition Assessments

The primary focus of riparian monitoring is in evaluating the effects of current grazing activities/ strategies and recommending any modifications for future grazing in order to avoid negative effects that are likely to still be evident at the beginning of the next grazing season. This should allow for attainment of a “near natural rate of recovery” for riparian/stream systems, as defined by PACFISH Enclosure B.

Proper Functioning Condition (PFC) assessments are a qualitative method for determining the condition of riparian areas and stream channels. Functionality of riparian areas and stream channels rated is using three condition levels (Prichard et al. 1998):

- PFC – vegetation, landforms, or large woody debris are present to adequately dissipate stream energy associated with normal high flows events without channel degradation.
- Functional at Risk (FAR) – riparian areas are still functioning, however, the condition of one or more attributes make the channel susceptible to degradation during normal high flow events.
- Nonfunctional (NF) – Riparian areas that do not provide adequate vegetation, landforms or large woody debris to dissipate stream energy during normal high flow events.

In addition to the three condition levels, condition trend is also rated as: static (no recognizable trend), upward trend (riparian and/or channel conditions improving), and downward trend (riparian and/or channel conditions declining). An upward trend, such as the progress from early to late-seral vegetative communities, as determined during the PFC assessment process, can be a reliable indicator of successful management towards a “Near Natural Rate of Recovery”. While it is qualitative, experienced interdisciplinary teams use processes and principles based in science for the determination. Typically a trend rating is determined if the determination is NF or FAR, because the streams in the LIRA area were PFC in the table below the trend is signified as “N/A” or not applicable.

Table AR-3 summarizes the results of the PFC assessments within the LIRA area.

Table AR-3. Result of 2009 PFC Assessments

LIRA Proper Functioning Condition 2009							
Stream	**Reach**	**Determination**	**Trend**	**Stream Type**	**Plant Community**	**Allotment / Location**	**Comments**
Cow Cr	1	PFC	N/A	B3	PSME/ ACGL-PHMA5_ Floodplain	Cow Cr Allotment / FS boundary (Fingerboard gulch)	Current grazing management has little impact on riparian area. Shrub dominant community with PIPO/PSME overstory. Banks are armored with rocks and boulders. Livestock use in small open areas. Plant Community in late seral stage.
Cow Cr	2	PFC	N/A	B3	POTR15/ ALIN2-COST4	Cow Cr Allotment / boundary to Litch Ranch	Current grazing management has little impact on riparian area. Shrub dominant with white alder/cottonwood overstory. Banks armored with cobbles. More cattle use compared to Reach 1. Reach 2 is a little more open with a little less overstory and shrub diversity compared to Reach 1. Plant community is in mid-late seral stage.
Cow Cr	3	PFC	N/A	B3	POTR15/ ALIN2-COST5	Cow Cr Allotment / Litch Ranch to north boarder of allotment	Private land. More livestock use is evident in Reach 3. Cottonwood and hawthorn are dominant species. More weedy species are evident. Banks rock armored.
Lightning Cr	1	PFC	N/A	B/C3	POTR15/ ALIN2-COST4	On FS, between pvt land, down from Rhodes Creek	Rock and shrub stabilized. PIPO, Cottonwood, hawthorn, and alder dominant community. Reach recovering after large flow event (1996-97?). Banks rock and shrub armored. Late seral plant community.

LIRA Proper Functioning Condition 2009							
Stream	**Reach**	**Determination**	**Trend**	**Stream Type**	**Plant Community**	**Allotment / Location**	**Comments**
Lightning Cr	2	PFC	N/A	B3	ALRH2/ Mesic Shrub	Rhodes Cr Allotment / On FS, from pvt land to mouth of Lightning Creek	Historical use (roads, grazing, haying), and current grazing has led to a current lower (mid) seral state. Dominated by netleaf hackberry, brome plant community. Banks armored with rock. Vegetation transitions from white alder to the mid seral described above when travelling toward the mouth of the stream (onto the fan).
Lightning Cr	3	PFC	N/A	B3	ALRH2/ Mesic Shrub	Rhodes Cr Allotment / Start at the confluence of Sleepy Cr and travel upstream	Cobble and woody vegetation armored streambanks. Little livestock impact to stream and access is limited.
Rhodes Cr	1	PFC	N/A	A/B4	POTR15/ ALIN2-COST4	Rhodes Cr Allotment / Start @ confluence with Lightning Creek.	This stream was entrenched from an event or historic use. Currently, the channel is stable. Banks are armored with rocks and shrubs. Livestock access is limited to a few access points. Plant community in mid to late seral state.
Sleepy Cr	1	PFC	N/A	B3	ALRH2/ Mesic Shrub	Rhodes Cr Allotment / Start at the confluence of Lightning and travel upstream	Weedy areas adjacent to riparian. Streambank rock and woody vegetation armored. Some old gullied areas. Little livestock impact to stream and access is limited. Low amount of fine sediment.

PACFISH/INFISH Biological Opinion (PIBO)

The 1998 listing of steelhead and bull trout under the Endangered Species Act prompted a review of current habitat management practices on federal lands by the National Marine Fisheries Service (NMFS), and United States Fish and Wildlife Service (USFWS). As part of the Section 7 consultation process with the BLM and Forest Service, NMFS and USFWS issued Biological Opinions on the adequacy of land and resource plans to protect anadromous fish habitat. One of the commitments identified in the Biological Opinions was to monitor managed lands, specifically those grazed by livestock, to determine if current management practices were meeting PACFISH riparian management objectives.

One stream in the LIRA, Lightning Creek, is monitored as part of the PIBO Effectiveness Monitoring Project (Site 136-04-I). PIBO effectiveness monitoring was conducted on Lightning Creek in 2004 and 2009 (TableAR-4). With two cycles of PIBO effectiveness monitoring completed at the Lightning Creek DMA, trends in habitat condition are difficult to determine. Lightning Creek was meeting the Riparian Management Objectives (RMOs) for pool frequency, fine sediment, streambank stability and Large Woody Debris (LWD) in 2004. In 2009, Lightning Creek was meeting the RMOs for fine sediment, streambank stability and LWD.

Table AR-4. PIBO Effectiveness Monitoring Data LIRA for channel-based RMOs, 2004 and 2009. N/D = No data. See Figure 23 for location of sites. Data from 2010 unpublished PIBO data. Shading indicates that applicable RMO is being met. N/O = no RMO identified, N/A = Not Applicable.

Stream	PIBO Site Name (Site ID)	Year	Habitat Index	Pools per km	Percent Fines (< 6 mm)	Width-to-Depth Ratio (Bf-Riffles)	Percent Undercut Banks	Stream-bank Stability	Large Wood per km
Lightning Cr	136-04-I (882)	2004	51.7	38.70	6.6	51.3	21.4	97.7	103.7
		2009	25.8	28.09	4.4	24.6	9.1	97.7	133.9
			N/O	34.8 – 59.7	<20	N/O*	N/A**	≥90	32.2

*PACFISH RMO is for wetted width-to-depth ratio; **Lightning Creek is a forested stream system.

Since no changes in management activities or large channel altering events (e.g. floods, fires) have occurred from 2004 to 2009 it's difficult to rationalize the change in RMO values for pool frequency and bankfull width-to- depth ratio between the two surveys. Both of these features have a relatively high resistance to change in Rosgen B-type channels. Taken at face value, three of the habitat indicators (fine sediment, width-to-depth ratio, and LWD) improved from 2004 to 2009, one remained unchanged (streambank stability), and two declined (pool frequency, undercut banks). Overall, the habitat index declined from 2004 to 2009; pool frequency is a major component of the index.

Forest Plan Riparian Management Objectives

Critical aquatic habitat elements as defined by the 1990 Forest Plan (including the 1995 PACFISH amendment), and the 1995/98 Forest Plan Biological Opinions (BOs) include: 1) pool frequency, 2) water temperature, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) fine sediment levels. These habitat elements are considered to be important indicators of aquatic habitat function and health.

Riparian management objectives (RMOs) were developed as part of PACFISH to provide criteria for managers to compare existing stream habitat conditions to criteria that constitutes "good habitat" for anadromous fish (PACFISH 1995). RMOs are defined by PACFISH as "Quantifiable measures of stream- and streamside conditions that define good anadromous fish habitat, and serve as indicators against which attainment, or progress toward attainment, of the goals would be measured." (PACFISH 1995). Default RMOs came from a review and synthesis of data from stream inventories and monitoring studies throughout the western United States where "high quality" habitat occurred (USDA/USDI 1995).

There are five fish bearing (PACFISH Category 1) streams in the LIRA, including the Imnaha River and Snake River. Of the five, four fish-bearing streams have had stream surveys completed using the Region 6 stream survey protocol – a stream survey has not been completed on the Snake River due to its size (TableAR-5). Stream surveys were conducted using the Region 6 (R-6) stream survey protocol. Stream survey data for Deep Creek was lost in the 2010 Wallowa Mountains office fire, though some data was available in the electronic database. Stream surveys provide a snapshot in time of aquatic habitat conditions. Additional information of current aquatic habitat was gathered along all fish-bearing stream reaches during PFC assessments in 2009, site visits since 2010, and during PIBO effectiveness monitoring in 2004 and 2009 which is in the project file.

Table AR-5. Completed Stream Surveys in the Lower Imnaha Rangeland Analysis Area.

Stream	Year Surveyed
Imnaha River	1998
Deep Creek	1997
Cow Creek	1993
Lightning Creek	1993

Overall, stream survey data (see above table for location and year collected) indicated that fish-bearing streams in the LIRA were not meeting PACFISH objectives for pool frequency and width-to-depth ratios. All streams were meeting the fine sediment RMO. Streambank stability was lower than desired in Lightning and Cow creeks. All streams except for the Imnaha River were meeting the LWD RMO. Independent observations made during PFC assessments, site visits and the PIBO effectiveness monitoring indicate that Category 1 streams in the analysis areas are stable stream channels that are meeting the fine sediment and bank stability RMOs and have adequate levels of LWD based on professional experience and judgement.

Specific data on the trend of LWD levels and pool habitat in the analysis area are not available. In general, management activities such as timber harvest adjacent to streams can reduce the amount of LWD in streams (Bilby and Ward, 1991). Based on observations made during PFC assessments, timber harvest has occurred only on a limited scale along stream reaches on National Forest system lands. Natural levels of LWD in the lower Imnaha River are unknown. This reach of the river would be dependent on transportation of LWD from upstream areas.

Channel sinuosity and large roughness elements (e.g. boulders, tree roots, LWD, bedrock) create flow obstructions which result in the formation of pools. In general, pool habitat increases as LWD increases (Dollof and Warren, 2003; Montgomery et al., 1995). However, the relationship is less clear between LWD and pool habitat in steeper streams (Montgomery et al., 1995) or in streams with low stream power (Jackson and Sturm, 2002). Cow Creek, Lightning Creek and Deep Creek appear to have adequate levels of LWD and are stable channels as indicated by observations made during PFC assessments; yet are not meeting the PACFISH RMO for pool frequency.

Limited pool habitat likely limits rearing habitat for juvenile salmonids (i.e. salmon, trout and charr). Poor grazing management can impact pool habitat in lower gradient streams (<2%); however the majority of fish bearing streams in the allotment have gradients > 2% (TableAR-6). The quantity of pool habitat in higher gradient streams, such as the majority of streams on the LIRA, is a function of stream substrate, gradient, LWD, and past large-scale disturbance events such as wildfires.

There 46.8 miles identified as fish bearing streams in the LIRA based on WWNF GIS data (project file). Of these, 39.62 miles are considered to be fish bearing reaches with gradients ≤ 10%. Based on channel slope, about 41% of fish bearing stream segments are Rosgen C stream channels, 27% are Rosgen B stream channels, 17% are Rosgen B/A stream channels, and 15% are Rosgen A stream channels (TableAR-6).

Table AR-6. Miles of Rosgen Stream Types of Fish Bearing Streams in the Analysis Area. Data Generated from GIS Gradient Analysis.

Gradient	Rosgen Channel Type	Miles	Percentage of Total Stream Miles
≤2%	C	16.2	40.9
>2 & ≤4%	B	10.8	27.3
>4 & ≤6%	B/A	6.9	17.3
>6% & ≤10%	A	5.8	14.5

Environmental Consequences

Direct and Indirect Effects

The effects analysis area for direct and indirect effects on aquatic habitat encompasses the four allotments in the LIRA plus a 300 meter buffer to include stream segments adjacent to allotment boundaries. Based on professional judgment, direct and indirect effects from proposed livestock grazing activities are unlikely to extend beyond this area because: 1) the lower portions of streams that flow through the LIRA area are inaccessible to livestock, and 2) measureable effects from proposed activities are unlikely to extend downstream of the LIRA area.

Pool Habitat

Pools are a key habitat feature throughout all salmonid life stages (Bjornn and Reiser, 1991; Meehan, 1991). Pools provide: 1) adult holding habitat for anadromous and adfluvial salmonid species; 2) rearing habitat for juvenile, sub-adult salmonids; and 3) rearing habitat for stream resident adult salmonid. Pools serve as refugia during low flow periods and during cold winter temperatures. Pools slow the transport of nutrients through streams, storing nutrients that foster food production both within pools and in adjacent riffles. Pools serve as sediment storage sites creating optimal spawning areas for salmonids due to hydraulic gravel sorting and intergravel flow through pool tail-out areas.

Riparian Management Objective

The PACFISH Amendment established an RMO for pool frequency based on stream wetted width (Table AR-7).

Table AR-7. PACFISH/INFISH RMO for Pool Frequency.

Stream Wetted Width (ft)	10	20	25	50	75	100	125	150	200
Number of Pools per Mile	96	56	47	26	23	18	14	12	9

None of the Category 1 streams in the LIRA are meeting the RMO for pool frequency. As discussed earlier, pool habitat in the LIRA is a function of stream substrate, gradient, LWD, and past large-scale disturbance events such as wild fires.

Alternative A – No Action (No Grazing)

Direct and Indirect Effects

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting pool habitat. For both the Imnaha and Snake rivers, pool habitat is a function of geology, watershed conditions and past large flood events. For the Snake River, the dominant large flow event that has created the current channel morphology was the Bonneville Flood that occurred about 14,500 years ago. The flood is believed to be the second largest in known geologic history. Operations of the Hells Canyon Dam Complex result in seasonal variations in flow and habitat in the Snake River adjacent to the LIRA area.

On National Forest System lands in the LIRA area, the Imnaha River flows through a canyon constrained reach where pool habitat is a function of the local geology and upstream watershed conditions. The 1996 / 1997 New Year's flood event that occurred in Wallowa County resulted in large gravel bar waves moving slowly down through the Imnaha River. These large bars have resulted in localized reductions in pool habitat in unconstrained reaches as the bars move through the system.

On National Forest Systemlands, Lightning Creek and Cow Creek are in good condition and pool forming processes are not being impaired by livestock grazing activities because their streams are armored with cobble substrate. Majority of Deep Creek, from the mouth to the upper falls, is inaccessible to livestock from the Lone Pine Allotment due to steep topography. Above the upper falls, Deep Creek is in good condition and pool forming processes are functioning.

Based on the current lack of measureable impacts to pool forming processes along stream reaches in the LIRA, it is unlikely that cessation of livestock grazing would result in a change in pool habitat in streams in the LIRA.

Alternatives B, C, D, and E (Grazing Alternatives)

Direct and Indirect Effects

Alternatives B, C, D, and E would authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Streams in the LIRA area are relatively impervious to livestock influenced changes in channel morphology. While Cow and Lightning creeks are the smallest and most accessible, they have streambanks that are armored with cobble substrate. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. The reach of the Imnaha River that is on National Forest System land (below the Cow Creek Bridge to the confluence with the Snake River) is inaccessible to livestock along the south riverbank and armored to boulder

substrate along the north riverbank. Additionally, a gate would be reconstructed along the trail that would restrict access by livestock to the lower reach of the Imnaha River (see Chapter 2, Project Design Criteria).

PFC assessments in 2009 along Cow and Lightning creeks found only localized impacts to riparian areas with overall good conditions. Livestock impacts to channel morphology were not apparent. A site visit to Deep Creek by the Fisheries biologist in 2013 revealed that riparian and aquatic habitats are in overall good condition. Based on these observations, current livestock grazing activities are not measurably affecting pool frequencies in the LIRAA.

Bank Stability

The Forest Plan (1990) standard and guideline for bank stability is for streambanks to be ≥80% stable (Wildlife S&G-1). The PACFISH amendment (1995) established an RMO for bank stability for streambanks to be >80% stable. The PACFISH RMO was modified in 1995 and 1998 for streambanks to be >90% stable as part of the ESA consultations for the Forest Plan (NMFS 1995, 1998).

Streambanks in the LIRA generally meet the Forest Plan Standard (as modified by ESA consultations) based on PFC assessments, site visits and the PIBO Effectiveness monitoring. During PFC assessments along Lightning and Cow Creeks few instances of unstable banks were noted.

Alternative A – No Action (No Grazing)

Direct and Indirect Effects

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting streambank stability of streams in the LIRA. Streambanks along Cow Creek and Lightning Creek on National Forest System lands were found to be mostly stable during PFC assessment. PIBO Effectiveness Monitoring data also indicates that streambank stability is high for Lightning Creek. Similar conditions are present along Deep Creek above the upper falls. Deep Creek below the upper falls is not accessible to livestock.

Streambank stability would likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of livestock. However, overall, a measureable change in streambank stability at the stream reach level is unlikely because: 1) streambanks along Cow, Lightning and Deep creeks are in good condition, indicating few existing impacts from livestock and 2) streambanks along the lower reach of the Imnaha River are composed primarily of large boulders.

Alternatives B, C, D, and E (Grazing Alternatives)

Direct and Indirect Effects

Alternatives B, C, D, and E would authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams in the LIRA most susceptible to livestock influenced changes in channel morphology. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, streambanks along the lower reach of the Imnaha River are primarily composed of boulders and therefore are not affected by livestock grazing activities.

PFC assessments along Cow and Lightning creeks found only localized impacts to streambank areas with overall good conditions. Observations indicate that streambank stability is high along Deep Creek. Livestock impacts to channel morphology were not apparent. Based on these observations, current livestock grazing activities are not measurably affecting streambank stability in the LIRA.

Width-to-Depth Ratio

Width-to-depth ratio provides a dimensionless index of channel morphology. The ratio can be used as an indicator of the change in the relative balance between sediment load and sediment transport capacity (Knighton, 1987). High and/or increasing width-to-depth ratios are often linked to reduced channel depth. During summer months, widening and shallower channels may result in increases in water temperatures that can result in thermal stress to fish and other aquatic organisms. During winter months, widening and shallower channels may result in decreases in water temperatures resulting in ice formation that can stress fish and other aquatic organisms. Also during winter months, widening and shallower channels may result in large ice flow events which can result in channel scour thus physically damaging aquatic habitat.

Low and/or decreasing width-to-depth ratios may indicate that channel entrenchment (i.e. gullying) has or is occurring. Channel entrenchment can result in the loss of floodplain connectivity and channel complexity.

The WWNF Forest Plan (1990) does not contain a standard and guideline for width-to-depth ratio. The PACFISH amendment (1995) established an RMO for width-to-depth ratio of <10. The PACFISH RMO was not modified as part of the ESA consultations for the Forest Plan (NMFS 1995, 1998).

Existing Conditions

Width-to-depth ratios of streams in the LIRA exceed the PACFISH RMO (<10). However, the PACFISH RMO was developed prior to advances in our understandings of the relationship between width-to-depth ratios and natural channel forms (Rosgen, 1996). Of the four Rosgen channel types that reflect natural channels (A, B, E, and C channel types) only E channel types have average width-to-depth ratios of less than 10 (Rosgen, 1996). Due to topography, there are no areas in the LIRA where E channel types would be expected to occur. Normal ranges for width-to-depth ratios (bankfull width) for Rosgen B and C channels are 12 to 20 and 13.5 to 28.7, respectively (Rosgen, 1996). All surveyed streams in the analysis area are within the normal range for width-to-depth ratios for their respective Rosgen channel types

Alternative A – No Action (No Grazing)

Direct and Indirect Effects

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting width-to-depth ratios of streams in the LIRA. Streambanks along Cow Creek and Lightning Creek on National Forest System lands were found to be mostly stable during PFC assessments. Similar conditions are present along Deep Creek above the upper falls.

Width-to-depth ratios would likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of livestock. However, overall, a measureable change in width-to-depth ratios at the stream reach level is unlikely because 1) streambanks along Cow, Lightning and Deep creeks are in good condition indicating few existing impacts from livestock; and 2) streambanks along the lower reach of the Imnaha River are composed primarily of large boulders.

Alternatives B, C, D, and E (Grazing Alternatives)

Direct and Indirect Effects

Alternatives B, C, D, and E would authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams in the LIRA most susceptible to livestock influenced changes in channel morphology. Much of Deep Creek adjacent to the Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, streambanks along the lower reach of the Imnaha River are primarily composed of boulders and therefore are not affected by livestock grazing activities.

PFC assessments along Cow and Lightning creeks found only localized impacts to streambank areas with overall good conditions. Livestock impacts to channel morphology were not

apparent. Based on these observations, current livestock grazing activities are not measurably affecting width-to-depth ratios at the stream reach level in the LIRA area, therefore the current conditions would be maintained under the grazing alternatives.

Fine Sediment

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for a diverse assemblage of benthic macroinvertebrates as well as eggs and early life stages of numerous fish species. Macroinvertebrates represent a substantial portion of the diet available to various fish species, particularly stream dwelling salmonids.

Fine sediment in streams is a normal component of salmonid habitat; however, major disruptions of aquatic ecosystems occur when sediment levels substantially exceed natural levels. Filling of interstitial spaces (i.e. the gaps between rocks on the stream bottom) with fine sediment (particles < 2 mm in size) eliminates habitat for many macroinvertebrates. Fish eggs and early life stages can also be buried and smothered when interstitial spaces are embedded with fine sediment. Studies have shown that an increase in 1-3mm size sand from 20% to 30% can decrease emergent survival of salmonid species from 65% down to 40% (Phillips et al., 1975). Fine sediments are known to impact fry emergence and survival, and fine sediment (<6.5mm in size) levels above 40% can effectively eliminate salmonid populations and many macroinvertebrate species (Everest and Harr, 1982). Winter habitat for juvenile salmonids is also lost as interstitial spaces in cobble-sized and larger streambed material are embedded with fine sediment.

Increases in fine sediment in stream channels can occur from the increase in supply of fine sediment from upland areas and from destabilized stream banks. Native surface roads are can be a major source of fine sediment from upland areas. Destabilized streambanks can result from mechanical damage to streambanks, loss of bank stabilizing vegetation, and from increases in sediment in stream channels (see width-to depth discussion).

Existing Conditions

The WWNF Forest Plan (1990) standard and guideline for fine sediment is “Where natural stream characteristics permit...limiting fine inorganic sediment covering stream substrate to 15 percent…” (Wildlife S&G-1). Fine inorganic sediment is defined as sand and silty material less than 3.3 mm in size.

The PACFISH amendment (1995) to the WWNF Forest Plan did not include an RMO for fine sediment. As part of the ESA consultation for PACFISH and Forest Plans, an RMO was developed for fine sediment (NMFS 1995, 1998). The RMO is <20% fine sediment (particles <6.8mm in size) in spawning areas or <30% embeddedness in rearing areas.

Fine sediment levels are low to moderate across the LIRA area and are below the 20% threshold established under ESA consultation for the Forest Plan (NMFS 1995, 1998) (Table).

Alternative A – No Action (No Grazing)

Direct and Indirect Effects

Current grazing activities on the four allotments in the LIRA area are unlikely to be measurably impacting fine sediment levels in streams in the LIRA area. Fine sediment levels in fish bearing streams on National Forest System lands were found to be low to moderate during stream surveys (Table AR-11). Observations made during PFC assessments, site visits, and the PIBO Effectiveness Monitoring corroborated the stream survey data. Fine sediment levels would likely improve over the long-term in the LIRA area under Alternative A due to a reduction in overall erosion rates with the elimination of livestock grazing on National Forest System lands and elimination of livestock crossings along stream. However, the reductions in fine sediment levels are likely to be immeasurable because ground cover in the LIRA is good (see Range Specialist Report) and there are few livestock crossings.

Alternatives B, C, D, and E (Grazing Alternatives)

Direct and Indirect Effects

Alternatives B, C, D, and E would authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Fine sediment levels in fish bearing streams on National Forest System lands were found to be low to moderate during stream surveys (**Error! Reference source not found.**). Observations made during PFC assessments and other site visits corroborated the stream survey data. The current conditions would be maintained under the grazing alternatives.

Water Temperature

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges. However, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Fish are also more susceptible to diseases near the extremes of their suitable temperature ranges.

A large number of temperature preference ranges for salmonids have been reported in the literature (Carter 2005). Water temperatures above 71.6 – 75.2°F generally preclude occupancy by salmonids (Carter 2005). Steelhead and spring/summer Chinook salmon would generally occupy waterbodies with water temperatures from 55 to 64°F. Bull trout are adapted to colder water temperatures than other salmonid species; generally occupying waterbodies with water temperatures from 39 to 59°F.

Existing Conditions

The Forest Plan water temperature standard and RMO directs the Forest to meet state water quality standards and prevent measurable increases in water temperature (1990 Forest Plan Watershed S&G-2). The Forest Plan Watershed Standards and Guidelines are:

> **2. Water Quality Standards and BMPs.** Meet Water Quality Standards for waters of the States of Oregon (Oregon Administrative Rules, Chapter 340-41) and Idaho through planning, application, and monitoring of Best Management Practices (BMPs) in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.
>
> **7. Stream Temperatures.** Prevent measurable temperature increases in Class I Streams (less than a 0.5 degree Fahrenheit change). Temperature increases on SMU Class II (and fish bearing Stream Management Unit Class III) streams would be limited to the criteria in State standards. Temperatures on other streams may be increased only to the extent that water quality goals on downstream, fish-bearing streams would still be met. Normally, stream shade management on Class III streams would differ little from treatment on Class II streams

PACFISH (1995) established an RMO for water temperature of maintaining maximum water temperatures below 64°F within migration and rearing habitat, and below 60°F within spawning habitats. The PACFISH RMO was not modified as part of the ESA consultations for the Forest Plan (NMFS, 1995: NMFS, 1998).

In addition to meeting the Forest Plan standard, the Forest must meet Oregon water quality standards under the Clean Water Act (CWA). EPA approved new water quality standards for Oregon in March 2004. Streams in the aquatic effects are considered “salmon and trout rearing and migration habitat” for Oregon water temperature standards. For the aquatic effects area, the following water temperature standard applies:

> The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);

Limited water temperature monitoring has occurred in the LIRA (See Hydrology Specialist Report). The most recent water temperature data has been collected by the Nez Perce Tribe. Water temperature monitoring has occurred at the Cow Creek Bridge on the Imnaha River, lower Cow Creek and lower Lightning Creek (See Hydrology section of this Chapter for more information).

A common measure of chronic and acute stream temperature exposure is the maximum weekly maximum temperature (MWMT) (Carter 2005). The MWMT is also known as the seven day average of daily maximum temperature (7-DADM). The upper optimal MWMT temperature for juvenile steelhead rearing and growth is 60.8°F; with temperatures above 71.6 – 75.2°F in the lethal range (Richter and Kolmes 2005).

Salmonids have evolved strategies and tactics in response to seasonal and daily changes in water temperatures that occur in streams. Strategies include: 1) adult bull trout utilizing the lower Imnaha River for feeding during the fall, winter, and spring months when water temperatures have cooled; 2) juvenile fall Chinook salmon migrating from rearing areas in the lower Imnaha River as temperatures rise; and 3) adult steelhead and spring/summer Chinook salmon migrating through the lower Imnaha River during spring months.

Water temperatures in the lower Imnaha are seasonally high during July and August salmonids are likely either absent during this period or present only in larger thermally stratified pools or areas where cool water sources are present. Water temperatures during the rest of the year are below 75°F, indicating that the river is habitable by salmonids during the rest of the year.Water temperature regimes in lower Cow and Lightning creeks are similar to the temperature regime in the lower Imnaha River, but a few degrees cooler. These water temperatures indicate that the lower reaches of Cow and Lightning creeks are cool enough to provide habitat for juvenile steelhead and redband trout during July and August.

Additional water temperature data is available from Forest Service stream surveys. Maximum recorded water temperatures for all reaches of Cow Creek and Lightning Creek were below the PACFISH RMO of 64°F for migration/rearing habitats (Table AR-14). Maximum recorded water temperatures in three of the four reaches of Deep Creek were below the PACFISH RMO of 64°F for migration/rearing habitats (AR-8). Based on water temperature data collected during stream surveys, the middle reaches of Cow Creek and the upper reaches of Lightning and Deep Creek are meeting the PACFISH RMO of 60°F for spawning habitat . The lower reaches of Cow and Lightning creeks had recorded water temperatures above the PACFISH RMO of 60°F for spawning habitat, though these reaches are unlikely to be used for spawning by steelhead or resident redband trout. The lowest reach of Deep Creek, below the lower falls, also exceeded the PACFISH RMO of 60°F for spawning habitat. This reach of Deep Creek likely provides spawning habitat for steelhead. The upper most reach of Cow Creek also exceeded 60°F though the maximum temperature was recorded in a seep at the end of the survey. This reach is located upstream of the LIRA.

Table AR-81. Water temperature data from stream surveys in the Imnaha analysis area.

Stream	Survey Dates	Reach	Stream Miles	Max Temp (F)	Mean Temp (F)
Cow Creek	7/6/1993 - 8/4/1993	1	0 – 8.7	61	56.0
		2	8.7 – 10.9	54	51.2
		3	10.9 – 13.9	52	49.5
		4	13.9 - 19.3	61	50.1
Deep Creek	7/7/1997 -	1	0.0 – 6.4	68	61.3
		2	6.4 – 8.5	53.6	53.2
		3	8.5 – 11.9	51.8	47.1
		4	11.9 – 14.2	48.2	46.2

Stream	Survey Dates	Reach	Stream Miles	Max Temp (F)	Mean Temp (F)
Lightning Creek	7/6/1993 - 8/4/1993	1	0.0 – 2.8	62	55.4
		2	2.8 – 4.8	61	56.9
		3	4.8 – 17.3	58	53.4
		4	17.3 – 23.5	57	50.9
		5	23.5 – 25.7	51	49.0

Alternatives A (No Grazing Alternative)

Direct and Indirect Effects

Little information on the condition and composition of riparian areas is available that predates the onset of livestock grazing in the LIRA area (estimated to have been in 1730's, see range section). In the early 1909 a homestead entry survey (HES) was conducted along Lightning Creek for the Gaylord homestead claim (HES 046, Volume: OR-H0001 Page: 0149.0). The condition of the riparian area of Lightning Creek was described in this entry as "Enter bottom [Lightning Creek], dense undergrowth with pine, birch, balm, and alder trees," where north boundary line crossed the creek. The condition of the riparian area of Lightning Creek was described in this entry as "Enter bottom [Lightning Creek], dense undergrowth, scattering large pine and balm timber," where the south boundary line crossed the creek. (Note: "balm timber" likely refer to cottonwood, *Populus balsamifera* spp., from which balm oil can be made and which are a dominant component of the current riparian shrub community along Lightning Creek.)

The riparian areas adjacent to Cow Creek, Lightning Creek, and Deep Creek are currently in good condition. PFC assessments of Cow Creek and Lightning Creek found healthy riparian communities consisting of overstories of pine, cottonwood, and white alder with understories of birch, dogwood, and Rocky Mountain maple. Lower reaches of these streams riparian areas are drier and hawthorn and hackberry are present. Similar riparian conditions are present along Deep Creek. The current conditions of riparian areas along Cow Creek and Deep Creek are similar to the description of Lightning Creek in 1909.

Based on PFC assessments, the majority of Lightning Creek on National Forest Systemsystem lands is similar to conditions reported in 1909. However, riparian conditions along Reach 2 of Lightning Creek, lowest reach on National Forest Systemsystem lands, indicate that current grazing is contributing to impacts to the riparian area. Cessation of grazing would allow the riparian area in Reach 2 to recover.

Conditions of riparian areas along the lower Imnaha River prior to the onset of livestock grazing are unknown. It is likely that white alder and cottonwoods were more numerous. Construction of the Eureka Bar Trail (# 1713) has reduced the density of riparian shrubs from the Cow Creek Bridge downstream to the confluence with the Snake River. However, due to the stream width

and location of this section of the river in the watershed, stream temperatures are likely to be a function of upstream water temperatures and water withdrawals rather than local factors.

Riparian shrub levels would likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of herbivory from livestock. However, a measureable change in water temperatures is unlikely because 1) riparian areas along Cow, Lightning and Deep creeks are in good condition; and 2) water temperature in the lower Imnaha River is not influenced by local factors.

Alternatives B, C, D, and E (Grazing Alternatives)

Direct and Indirect Effects

Alternatives B, C, D, and E would authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams most susceptible to livestock influenced changes in water temperature. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, water temperature in the lower Imnaha River is primarily influenced by upstream factors due to its width and position in the watershed.

PFC assessments along Cow and Lightning creeks found only localized impacts to riparian areas with overall good conditions. Riparian communities were composed of healthy late seral shrub communities. Lower Lighting Creek was the exception where the riparian community was rated to be in mid-seral status along the about 0.4 miles on National Forest System lands. Based on these observations, current livestock grazing activities are not measurably affecting stream temperatures in the LIRA.

Cumulative Effects

Analysis Area

The cumulative effects analysis area for aquatic habitat are the same as the aquatics effects analysis area used for the direct and indirect effects analysis to aquatic habitat. This is an appropriate scale to analyze cumulative effects because: 1) the lower portions of streams that flow through the LIRA area are inaccessible to livestock, and 2) measureable effects from proposed activities are unlikely to extend downstream of the LIRA area. Time frames for this cumulative effects discussion are the same as those used for the direct/indirect effects analysis: short-term (0 to 5 years), mid-term (5 to 10 years), and long-term (10+ years).

Actions/Activities Considered

Refer to Appendix B-4 of the Aquatic Resources specialist report in the project file for a list of projects and activities occurring in the analysis area that were considered for cumulative effects to aquatic habitat. Only activities that pose a risk of cumulative effects (adverse or beneficial) are discussed below. The risks of cumulative effects with the effects of activities proposed under the action alternatives for the LIRA occurring are rated as:

- Low – insignificant or discountable cumulative effects to aquatic habitat may occur. Insignificant effects are defined as effects that a person, based on professional judgment, would not be able to meaningfully measure, detect, or evaluate. Discountable effects are those that are extremely unlikely to occur.
- Moderate – insignificant cumulative effects to aquatic habitat are likely to occur. A moderate rating assumes potential effects to aquatic habitat. The level of effects would not result in measureable changes in survival rates or population levels of aquatic species with special management status (i.e. ESA listed, MIS, or Sensitive).
- High – measureable cumulative effects to aquatic habitat are likely to occur. Measurable effects to aquatic habitat are likely to result in changes in survival rates and population levels of aquatic species with special management status (i.e. ESA listed, MIS, or Sensitive). A high rating assumes obvious adverse effects to habitat and aquatic species with special management status.

Past Activities

Past management activities that have occurred in the LIRA area include grazing, homesteading, mining, limited timber harvesting, road and trail construction, construction of a high voltage powerline, prescribed burning, and wildfires and fire suppression activities. Present activities occurring on National Forest System Lands include road maintenance, grazing (see discussion of effects of Alternative B), invasive plant treatments, and dispersed recreation. Effects occurring on other lands in the cumulative effects analysis areas include grazing and road maintenance. Effects from past activities have been described as part of the existing condition, and would not be discussed further (see Appendix B-4 in the Aquatic Resources specialist report in the project file for a list of all past activities). Effects from present or future foreseeable actions that overlap the aquatics cumulative effects area in time and space would be discussed below.

Present Activities

Homesteading

Homesteading in the LIRA was primarily concentrated along flatter areas adjacent to streams. Historic homesteads are still present adjacent to Cow Creek (McClaran Ranch and Litch Ranch) and Lightning Creek (Rhodes Creek Ranch). Dug Bar ranch is located adjacent to the Snake River. These sites are still used to support ranching activities. Deep Creek Ranch is located on Deep Creek adjacent to Lone Pine Allotment. It is no longer used. Other homestead sites and dryland farm fields are located in the bench areas in the LIRA.

Where homesteads were located adjacent to streams, homesteading has likely resulted in decreases in width of riparian areas where agricultural fields were developed and/or structures constructed. Historical, agricultural fields adjacent to streams were irrigated evidenced by the presence of ditches though irrigation no longer occurs in the LIRA. Decreases in riparian area widths would result in warming of cooler microclimates associated with shrub dominated riparian communities.

Homesteading activities have resulted in long-term changes in riparian conditions adjacent to homesteads and fields. Proposed activities under the grazing alternatives will result in localized disturbance to riparian areas and streambanks. There is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and past homesteading activities.

Mining

A number of mining claims were located adjacent to the lower Imnaha River (Toomey Gulch area) and along the lower Cow Creek (primarily along the eastern side of the drainage). (Note: The mining claims along Cow Creek were later developed into the McClaran Ranch.) None of the mines apparently produced commercial quantities of ore. The Mountain Chief Mine, located at the confluence of the Snake and Imnaha rivers, was the most extensively developed claim in the LIRA area. Little evidence is present at other mining sites in the LIRA area.

Mining activities in the LIRA area have had little impact to aquatic habitat, primarily having occurred in uplands areas and was primarily exploratory in nature. Development of the Mountain Chief Mine resulted in altered streambank areas along the Imnaha River localized to the vicinity of the mouth of the river. Proposed activities under the grazing alternatives will result in localized disturbance to riparian areas and streambanks. There is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and past mining activities.

Trail and Road Construction and Maintenance

The original trails in the area were developed by the Nez Perce. Trails and later roads were constructed in the LIRA area to support ranching and mining activities. A bridge was constructed at Big Eddy on the Imnaha River in the early 1900's in part to facilitate movement of livestock from one side of the river to the other. The current bridge at this location is called the "Cow Creek Bridge"; though it is not located at Cow Creek. The current road system dates from the late 1940's when a road was constructed from Fence Creek to Cow Creek. The road was extended to Dug Bar in early 1950's. This road is known as the Dug Bar Road. Additional road construction occurred in the mid 1950's when logging occurred in the Lightning Creek drainage.

Trail and road construction in the LIRA has had moderate impacts to aquatic habitat in the LIRA. Portions of the Dug Bar Road above Cow Creek Bridge have been constructed in what were formerly riparian areas adjacent to the Imnaha River. The Lightning Creek Road is primarily located outside and upslope of the riparian areas adjacent to Lightning Creek; however, there

are eight fords across Lightning Creek. The Cow Creek Road is primarily located outside and upslope of the riparian areas adjacent to Cow Creek.

Impacts to aquatic habitat from trails and roads in the LIRA are primarily localized to areas where roads occupy portions of riparian areas and at ford sites. Fine sediment levels in Cow Creek and Lightning Creek are at moderate levels indicating that the road system is not having a measureable impact to these streams.

Currently, Wallowa County conducts annual road maintenance along the Dug Bar road. Maintenance on other roads in the LIRA is haphazard. Maintenance of Forest Service trails occurs infrequently. Overall erosion rates in the LIRAA will likely be elevated above background levels as a result of proposed grazing activities under the grazing alternatives, though fine sediment levels are low to moderate thus indicating that increases in fine sediment in streams is immeasurable. There is a low risk of cumulative effects from fine sediments between proposed livestock grazing under Alternatives B, C, D, and E and road maintenance activities.

High Voltage Powerline Construction and Maintenance

A high voltage powerline was constructed through the LIRA in the 1950's. the powerline is located in upland areas through the LIRA, crossing the Snake River just to the south of the confluence with the Imnaha River and the Imnaha River about 2.5 miles above the mouth. The powerline is not impacting aquatic habitat in the LIRA.

Wildfires and Fire Suppression

Wildfires are a natural component of the disturbance regime for the NRA: with wildfires burning frequently in Hells Canyon NRA. However, since the creation of the Chesnimnus and Wallowa Forest Reserves in 1905, all documented large fires (>10 acres) in the LIRA have occurred since 2000. In large areas of the Lightning Creek and Cow Creek drainages large wildfires have not been documented during the last 100 years. Of the seven large fires that have been documented in the LIRA, two have accounted for the majority of acres burning in riparian areas adjacent to fish bearing streams.

The Deep Creek Fire (2000) burned into riparian areas in the upper Deep Creek drainage resulting in the mortality of large firs and pines. Riparian shrubs have increased as a result of the more open canopy conditions. The Deep Creek fire also burned into the riparian area adjacent to Cow Creek. The fire resulted in some mortality of large firs and pines but overall did not result in a measureable change in conditions of the riparian community.

The Haas Ridge Fire (2003) and the Haas Ridge Fire II (2005) burned into the riparian areas adjacent to upper and lower Lightning Creek, respectively. There is little evidence of impacts of these fires on aquatic or riparian habitats adjacent to Lightning Creek.

Fire suppression activities on National Forest System lands are implemented to minimize effects to riparian and aquatic habitats. There is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and fire suppression activities.

Invasive Plants and Treatments

Treatments to control and eradicate invasive plants are occurring on both National Forest System lands and private lands in the LIRA. Treatment areas include riparian areas as well as upland areas. Currently on National Forest System lands treatments are restricted to sites identified sites under the 1992 and 1994 WWNF Weed Treatment EAs. Additional sites would be treated once litigation is settled over the 2010 Wallowa-Whitman National Forest Invasive Weed Treatment EIS.

Riparian areas in the LIRA are at risk of invasion by two invasive plants; Japanese knotweed and Himalayan blackberry. Japanese knotweed can create dense colonies that exclude native vegetation and greatly alter natural tree regeneration. The Forest has successfully treated Japanese knotweed along Cow Creek and the lower Imnaha River in the LIRA. These sites are being actively managed to prevent a resurgence of Japanese knotweed.

Himalayan blackberry has invaded riparian areas throughout the NRA. Himalayan blackberry can dominate riparian areas, increasing the frequency and severity of wildfires and lead to the elimination of native vegetation, including shrubs, in riparian areas. The presence of dense thickets Himalayan blackberry in riparian areas eventually leads to altered stream channels resulting in degradation of aquatic habitat. Himalayan blackberry are easily dispersed by birds and bears from one drainage to the next. Currently, Himalayan blackberry is at low level along Lightning Creek and Cow Creek. Continued expansion of Himalayan blackberry in riparian areas in the LIRA would result in a significant decline in conditions of riparian areas and aquatic habitat in the future.

Timber Harvest

Timber harvest likely accompanied development of homesteads in the LIRA to provide wood for structures. Since then, limited commercial timber harvesting has occurred on National Forest System lands in the Lightning Creek drainage in the mid 1950's. There is little evidence today of the commercial harvest that has occurred along Lightning Creek, or the timber harvest associated with homesteading along Lightning, Cow and Deep creeks. Therefore, there would be no cumulative effects to aquatics resources from timber harvest.

Recreation

The lower Imnaha River Corridor is a high use area for dispersed recreation. The highest use period coincides with the spring steelhead run. Camps, located both on private and National Forest System lands, are primarily located in areas adjacent to the river, the majority of which are located within the riparian area. These camps result in areas of bare ground that are prone to erosion and establishment of invasive plants, and removal of dead wood for fires. These camps have localized impacts to riparian and aquatic habitat within the LIRA. Proposed grazing

activities under the grazing alternatives will result in localized disturbance of riparian areas, immeasurable increases in fine sediment, and spread of noxious weeds (See Weeds Specialist Report). There is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and dispersed recreation activities.

Nez Perce Tribe Activities

Tribal Grazing – The Nez Perce Tribe exercises its treaty right to graze livestock on unclaimed lands within its ceded territory. Currently a Tribal member grazes cattle on the Lone Pine Allotment and horses on the Thorn Creek Administrative Pasture. Tribal grazing is managed by the Nez Perce Tribe. There is a moderate risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and Tribal grazing activities.

Tribal Fisheries Management Activities – The Nez Perce Tribe conducts fish research and population monitoring activities in the LIRA. Activities include smolt monitoring (trap located just below the Cow Creek Bridge on private land), escapement monitoring using traps (trap currently located on Horse Creek on National Forest System land) and operation of two passive integrated transponder (PIT) tag arrays. Facilities for these activities are located in riparian areas and stream channels in the analysis area and have the potential to impact riparian and aquatic habitat. There is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and Tribal fisheries management activities.

Global Climate Change

Global climate change has the potential to have impacts to aquatic habitat through increases in water temperature and changes in streamflows in response to changes in climates. Please refer to the following information was developed by the Forest Service to highlight potential impacts to aquatic habitat in the Pacific Northwest:

Salmon and Trout in the Pacific Northwest and Climate Change

[Preparer: Pete Bisson, Aquatic and Land Interactions Program, Pacific Northwest Research Station. (http://www.fs.fed.us/ccrc/topics/salmon-trout.shtml) See original document for literature cited.]

Climate Change Impacts in the LIRA

Stream temperatures in the Pacific Northwest have increased an average of 0.22 °C during summer months per decade from 1980 – 2009 (Isaak et al., 2012) Additionally, maximum air temperatures are predicted to increase 2 to 4 degrees Fahrenheit while precipitation is predicted to remain unchanged in Wallowa County during the period 2025-2049 (USGS Climate and Land Use Change Research and Development Program; http://www.usgs.gov/climate_landuse/clu_rd/nex-dcp30.asp; accessed 12/30/2013). These predictions are similar to generalized predictions of changes in climate predicted for the northwest in "*Salmon and Trout in the Pacific Northwest and Climate Change*" by Bisson.

Impacts to aquatic habitat in the LIRA: Based on the above information, long-term changes to aquatic habitat in the LIRA area may occur as a result of climate change. These changes may be:

- Increases in water temperatures in response to increases in air temperature,
- Changes in runoff patterns in response to an increase in the amount of winter precipitation that falls as rain:
    - Decreases in summer streamflows in response to a reduction in snowpack.
    - Reduced duration of spring runoff but higher peak flows due to an increase the amount of winter precipitation that falls as rain

These impacts from climate change would likely result in decreased summer habitat for salmonids during the warmest months (July and August) due to increases in water temperatures above the thermal range for salmonids and reduced stream flows. Occupied habitat for salmonids during the warmest months is likely to shift upstream in response to the higher water temperatures and lower streamflows in the LIRA.

Fall Chinook salmon are likely the most vulnerable of salmonid species to climate change that currently occupy the LIRA. Fall Chinook salmon use the lower Imnaha River for spawning habitat and juveniles use the river for their initial rearing period prior to their migration toward the ocean. Increases in water temperatures in the lower Imnaha River could potentially decrease the initial rearing period thus reducing growth of juveniles prior to their down river migration into the Snake River. Growth rate of juveniles is important because in general, larger smolts have a higher survival rate to adulthood (Woodson et al. 2013).

Increasing water temperatures would also likely shift the distribution of other fish species to the detriment of juvenile salmonids. Habitat for smallmouth bass (*Micropterus dolomieui*) is likely to seasonally expand in the Imnaha River system in response to warmer water temperatures thus increasing predation on juvenile salmonids. Additionally, interspecific competition between juvenile northern pike minnow (*Ptychocheilus oregonensis*) and juvenile salmonids would likely increase as stream temperatures increase (Reese and Harvey, 2002).

Proposed changes in livestock grazing management in the LIRA are intended to achieve the following objectives: 1) maintain aquatic and riparian habitats where desired habitat conditions have been achieved, 2) maintain the current rate of recovery of aquatic and riparian habitats where a near natural rate of recovery is being achieved, and 3) increase the rate of recovery of aquatic and riparian habitats where a near natural rate of recovery is not being achieved. Maintaining the current condition of riparian vegetation along Deep Creek, Cow Creek and Lightning Creek would be important in buffering water temperatures as air temperatures increase in the future. The objectives for maintaining and improving riparian habitat in the LIRA are consistent with the recommendation to improve the carrying capacity of freshwater habitats as a response to adverse impacts to salmonids populations in the Pacific Northwest from climate change. Therefore, there is a low risk of cumulative effects between proposed livestock grazing under Alternatives B, C, D, and E and global climate change.

Foreseeable Future Actions

Recreation, invasive plant treatments and road maintenance activities would continue in the future. Impacts would be similar to those described under current management activities.

Conclusions

Effects past and current management activities in the LIRA are reflected in the current condition of aquatic and riparian habitats in the LIRA are (See Aquatic Habitat discussion). Overall, the aquatic and riparian habitats are in good condition in the LIRA area as evidenced by the current conditions of riparian areas adjacent to Cow, Deep and Lightning creeks. The riparian area adjacent to the Imnaha River has likely been altered the most. The majority of this alteration occurred during the homesteading and road building periods.

Alternative A (No Grazing) would not likely result in great changes in aquatic and riparian habitats because aquatic and riparian habitats are in good condition of National Forest System lands. Under Alternative A, livestock grazing would not be authorized in the LIRA. As stated in the direct and indirect effects for Alternative A, some conditions that reflect past management activities, terracing and establishment of nonnative vegetation would continue for the next ten years. Riparian shrub levels would likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of herbivory from livestock. However, these areas do not represent a significant portion of riparian areas on National Forest System lands.

The grazing alternatives (Alternatives B, C, D and E) would also not likely result in measureable changes in aquatic and riparian habitats because they vary little from the current grazing activities with respect to impacts to the riparian and aquatic habitats. Under Alternative B, livestock grazing would be authorized to occur for the next 10 years on the four allotments in the LIRA. Grazing on the four allotments would be similar to current grazing activities. Increased management by permittees and agency personnel would be used to improve livestock distribution in order to address current and emerging issues with the current grazing activities on the four allotments.

Overall, the aquatic and riparian habitats are in good condition on National Forest System lands in the LIRA area, as evidenced by the current condition of riparian and aquatic habitats of Cow, Deep, and Lightning Creeks. Proposed changes in livestock grazing activities under the grazing alternatives are designed to improve conditions in upland areas and would maintain the current condition of aquatic and riparian habitats for the next 10 years.

Aquatic Species with Special Management Status

Analysis Area

The effects analysis area for direct and indirect effects on aquatic species (fish and aquatic invertebrates) with special management status encompasses the four allotments in the LIRA area. This is an appropriate area to analyze direct, indirect and cumulative effects to aquatic species because the lower portions of streams that flow through the LIRA are inaccessible to livestock. Measureable effects from livestock grazing activities to the upper portions of these streams are unlikely to be carried through the lower in accessible reaches. Additionally, aquatic habitat conditions in the Snake River adjacent to and downstream of the LIRA is primarily driven by dam operations at the Hells Canyon Complex operated by Idaho Power.

Threatened and Endangered Fish and Aquatic Invertebrate Species

Snake River Steelhead (Threatened)

SR steelhead are widely distributed in the LIRA (**Error! Reference source not found.**). SR steelhead are also a WWNF management indicator species for aquatic habitat. Critical habitat is present in the LIRA area. For information on SR steelhead life history, abundance, and distribution, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

Snake River Basin Fall Chinook Salmon (Threatened)

SR utilize the Imnaha River and Snake River in the LIRA. Critical habitat is present in the aquatic LIRA area. SR fall Chinook salmon utilize the Imnaha River and Snake River for spawning and rearing in the LIRA area. For information on SR fall Chinook life history, abundance, and distribution, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

SR Spring/Summer Chinook Salmon (Threatened)

Migratory habitat for SR spring/summer Chinook salmon is present in the LIRA area. Essential Fish Habitat (EFH) for spring/summer Chinook salmon has been designated by NMFS in the LIRA area. SR spring/summer Chinook salmon seasonally present in the Imnaha River in the LIRA area belong to the Imnaha River and Big Sheep Creek spring/summer Chinook salmon populations of the Grande Ronde/Imnaha spring/summer Chinook salmon major population group (MPG). For more information about SR Spring/Summer Chinook salmon life history, abundance, and distribution, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

CR Bull Trout (Threatened)

Bull trout utilize the Imnaha River and Snake River in the LIRA area. Critical habitat is present in the LIRA area.

The Imnaha River local population is present seasonally in the LIRA. The Imnaha River local population consists of resident and fluvial life histories. For more information about bull trout life history, abundance, and distribution, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

Summary of Effects Determinations to ESA-listed fish within the LIRA Area

Table AR-9. Effects determinations to ESA-listed fish and critical habitat for the Lower Imnaha Range Project.

Species	Alternative A	Alternative B, C, D, and E
SR Steelhead (T)	Beneficial Affect	Likely to Adversely Affect
SR Spring/Summer Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
SR Fall Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
CR Bull Trout (T)	No Effect	Not Likely to Adversely Affect
SR Steelhead Critical Habitat	No Effect	Not Likely to Adversely Affect
SR Spring/Summer Chinook Salmon Critical Habitat	No Effect	Not Likely to Adversely Affect
SR Fall Chinook Salmon Critical Habitat	No Effect	Not Likely to Adversely Affect
CR Bull Trout Critical Habitat	No Effect	Not Likely to Adversely Affect

1) LAA for direct effects to SR steelhead due to potential redd trampling.

Direct and Indirect Effects

SR Steelhead

There are about 13.3 miles of spawning habitat for steelhead on National Forest system lands in the LIRA area. Spawning reaches are characterized as moderately steep Rosgen B-3/4 channel types. Floodplains and riparian areas are narrow with riparian vegetation in excellent condition.

Grazing in the LIRA allotments occurs during fall, winter and spring months. The spring period overlaps the spawning/emergence period of steelhead (typically March 15 – July 1). Presence of cattle in riparian areas is rare during the grazing period due to air temperature differences between stream bottoms and adjacent uplands. An additional factor that limits cattle presence in riparian areas is the presence of mid-elevation benches. Cattle use of riparian areas is generally limited to watering with the vast majority of time spent on the mid-elevation benches. Current riparian conditions reflect the limited amount of use of riparian areas by cattle.

There is a moderate risk that spawning steelhead or redds would be disturbed where grazing occurs prior to July 1. The probably of take occurring is low because: 1) cattle are placed in upland areas, primarily on mid-elevation benches, adjacent to spawning reaches in the pastures used prior to July 1; 2) cattle typically avoid riparian areas characterized by wet soil and cold

temperatures during the early spring grazing period (Platts and Nelson 1985, Kovalchik and Elmore 1991); and 3) cattle concentrate their foraging effort in uplands rather than riparian areas during the early spring grazing period because forage palatability (Platts and Nelson 1985). However, Cow and Horse creeks are used by livestock for watering so there is a potential risk of redd trampling. The portion of Deep Creek used for spawning and rearing by steelhead is in an area closed to grazing and generally inaccessible to livestock.

Researchers from the PNW lab at the Starkey Experimental Forest in the Blue Mountains near Starkey, Oregon submitted the following telemetry data regarding cattle distribution during steelhead spawning times:

> DelCurto et al. (2000) determined cattle locations from the Starkey Project Loran telemetry system, to determine relative use of creek bottoms and the potential for direct impacts (trampling) to spawning steelhead. The cattle locations summarized here are those from years 1991, 1993, and 1995, during the period from turn-out (approximately 6/15 through 7/1). Cattle were monitored 24 hours a day. A total of 20,371 cattle locations were logged for the three years during this two week period. Of these, 36 locations included the stream channel (0.2%) and 61 locations (0.3%) included the area within 30 meters of the channel. This clearly shows that the potential for direct impacts to spawning steelhead is extremely low. During this early season of use, forage quality in the uplands is extremely high, and cattle are widely dispersed.

While conditions on the LIRA allotments are dissimilar to those on the Starkey Experimental Forest with regards to climate, terrain, and vegetation; distinct temperature gradients between the stream corridors and adjacent uplands are present. Upland areas are generally warmer, especially the bench areas, than the stream corridors. Therefore cattle behavior during the early grazing period (prior to July 1) in the LIRA is likely similar to cattle behavior on Starkey Experimental Forest.

SR Spring/Summer Chinook Salmon

No direct effects to spring/summer Chinook salmon are anticipated from livestock grazing activities proposed under the LIRA project. Spring/summer Chinook do not spawn in stream reaches within the LIRA. The Imnaha and Snake Rivers in the LIRA are used as migratory corridors by spring/summer Chinook salmon. Cow Creek and Lightning Creek are used as winter rearing habitat by juvenile spring/summer Chinook salmon.

SR Fall Chinook Salmon

Spawning occurs in the Imnaha River throughout the LIRA area. There are about 4 miles of spawning habitat for fall Chinook salmon on National Forest system lands in the LIRA. The Imnaha River below the Cow Creek Bridge, about 3.75 miles, is generally inaccessible to cattle due to a drift fence and terrain. The drift fence will be reconstructed by installing a new gate as part of Alternatives B, C, D, and E. On National Forest system lands in the LIRA area above the Cow Creek Bridge, the Imnaha River, about 0.25 miles, is accessible to cattle but due to its

width cattle generally avoid entering it. Cattle are moved from one side of the river to the other using the Cow Creek Bridge

CR Bull Trout

No direct effects to bull trout are anticipated from livestock grazing activities proposed under the Lower Imnaha Range Analysis project. Bull trout do not spawn in stream reaches within the LIRA. Stream reaches in the LIRA are used as migratory corridors by bull trout.

Effects to ESA Matrix Habitat Indicators

When consulting on Forest Service proposed actions, a determination of the direct and indirect effects to listed fish and their habitat indicators is completed. This involves an analysis of the existing baseline condition for the project area, coupled with a specific analysis of the effects the project may have on the life history of the listed fish. Guidance for making this biological determination is provided by *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996) and *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS 1998). This guidance is based on a "Matrix of Pathways and Indicators" (Matrix), provides the information required to characterize environmental baseline conditions and predict the effect of human activities on them. This guidance provides a consistent approach for analysis of impacts to listed fish species and their habitat including designated critical habitat.

Effects to the functionality of the habitat indicators are rated as follows: 1) Restore: to change the function of a "functioning at risk" indicator to "functioning appropriately", or change the function of a "functioning at unacceptable risk" indicator to "functioning at risk or "functioning appropriately" (i.e. it does not apply to "functioning appropriately" indicators). 2) Maintain: the function of an indicator does not change (i.e. it applies to all indicators regardless of functional level). 3) Degrade: to change the function of an indicator for the worse (i.e. it applies to all indicators regardless of functional level).

The environmental baseline for the subwatersheds encompassing the LIRA are rated overall as "Functioning at Risk" (**Error! Reference source not found.**). The following analysis focuses on indicators that have the potential to be affected by grazing and related activities proposed under the Lower Imnaha range Analysis. These are**: 1) Temperature, 2) Sediment/Turbidity/Substrate, 3) Pool Frequency/Quality, 4) Width/Depth Ratio, 5) Streambank Condition, and 6) Riparian Conservation Area indicators.**

For more detailed information on the matrix, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

Temperature

The Imnaha River, spawning and rearing habitat for fall Chinook salmon, consistently exceeded 57 °F during the first half of the spawning period, NMFS's upper threshold to be considered

properly functioning for spawning and rearing habitat for salmon and steelhead. The Imnaha River also consistently exceeded 57 °F during the latter half of the rearing period for juvenile fall Chinook salmon and the adult migration period of spring Chinook salmon. During the migration period for adult spring/summer Chinook salmon (May through early July), the Imnaha River is properly functioning for temperature. During the rearing period for juvenile spring/summer Chinook salmon (September through May), the Imnaha River is properly functioning for temperature. USFWS does not provide a criterion for migration habitat for bull trout.

Cow Creek and Lightning Creek, spawning and rearing habitat for steelhead, consistently exceeded 57 °F, NMFS's upper threshold to be considered properly functioning for spawning and rearing habitat for salmon and steelhead. During the rearing period for juvenile spring/summer Chinook salmon (September through May), Cow Creek and Lightning Creek are properly functioning.

Water temperature data collected during stream surveys on Cow and Lightning creeks suggest that water temperatures in spawning and rearing areas are within recommended ranges for steelhead (see Table AR-81). Water temperatures in lower Deep Creek appear to be above the recommended range for steelhead spawning and rearing habitat (see Table AR-81AR-10). Spawning in Cow and Lightning creeks general occurs during the period from early March through early June (Young and Hatch, 2012). Spawning likely takes place in lower Deep Creek during the same period.

Additional temperature monitoring data has been collected as part of the PIBO Effectiveness Monitoring project (Table0). Lightning Creek is a major spawning stream for steelhead.

Table AR-10. PIBO Effectiveness Monitoring Data for Rhodes Creek Allotment for water temperature RMO, 2004. Data from 2010 unpublished PIBO data. Data collected from July 15 to August 31.

Stream	PIBO Site Name/ Site ID	Year	Rank* (Warmest =1, Coolest =8)	Max Weekly Max Temp(°C)	# Days Exceeding 12 °C	# Days Exceeding 18 °C	# Days Exceeding 22 °C
Lightning Cr	136-04-I 882	2004	5	18.66	42	24	0

*Based on 8 years of water temperature data for the Little Minam River from 2001 – 2010 used as a "reference" river for stream temperature ranking.

Alternative A (No Grazing Alternative)

The current condition of riparian areas adjacent to Cow Creek, Lightning Creek, and Deep Creek are currently in good condition. PFC assessments of Cow Creek and Lightning Creek found healthy riparian communities consisting of over stories of pine, cottonwood, and white

alder with understories of dogwood, need more here. Similar riparian conditions are present along Deep Creek. The current conditions of riparian areas along Cow Creek and Deep Creek are similar to the description of Lightning Creek in 1909.

Based on PFC assessments, the majority of Lightning Creek on National Forest System lands is similar to conditions reported in 1909. However, riparian conditions along Reach 2 of Lightning Creek, lowest reach on National Forest System lands, indicate that current grazing is contributing to impacts to the riparian area. Cessation of grazing would allow the riparian area in Reach 2 to recover.

Conditions of riparian areas along the lower Imnaha River prior to the onset of livestock grazing are unknown. It is likely that white alder and cottonwoods were more numerous. Construction of the Eureka Bar Trail (# 1713) has reduced the density of riparian shrubs from the Cow Creek Bridge downstream to the confluence with the Snake River. However, due to the width and location of this section of the river in the watershed, stream temperatures are likely to be driven by upstream water temperatures and water withdrawals.

Riparian shrub levels will likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of herbivory from livestock. However, a measureable change in water temperatures is unlikely because 1) riparian areas along Cow, Lightning and Deep creeks are in good condition and 2) water temperature in the lower Imnaha River is not influenced by local factors.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E will authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams most susceptible to livestock influenced changes in water temperature. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, water temperature in the lower Imnaha River is primarily influenced by upstream factors due to its width and position in the watershed.

PFC assessments along Cow and Lightning creeks found only localized impacts to riparian areas with overall good conditions. Riparian communities were composed of healthy late seral shrub communities. Lower Lighting Creek was the exception where the riparian community was rated to be in mid-seral status along the about 0.4 miles on National Forest System lands. Based on these observations, current livestock grazing activities are not measurably affecting stream temperatures in the LIRA.

Sediment/Turbidity/Substrate Indicators

Fine sediment levels are at low to moderate levels across the LIRA. Overall fine sediment levels do not exceed the 20% threshold established under ESA consultation for the Forest Plan (NMFS 1995, NMFS 1998).

Alternative A (No Grazing Alternative)

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting fine sediment levels in streams in the LIRA. Fine sediment levels in fish bearing streams on National Forest System lands were found to be at low to moderate levels during stream surveys. Observations made during PFC assessments and other site visits corroborated the stream survey data. Fine sediment levels will likely improve in the LIRA under Alternative A due to a reduction in overall erosion rates with the elimination of livestock grazing on National Forest System lands.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E will authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Fine sediment levels in fish bearing streams on National Forest System lands were found to be at low to moderate levels during stream surveys. Observations made during PFC assessments and other site visits corroborated the stream survey data. The current conditions would be maintained under the grazing alternatives.

Pool Quality/Frequency Indicator

Pools are a key habitat feature throughout all salmonid life stages (Bjornn and Reiser, 1991; Meehan, 1991). Pools provide: 1) adult holding habitat for anadromous and adfluvial salmonid species; 2) rearing habitat for juvenile, sub-adult salmonids; and 3) rearing habitat for stream resident adult salmonid. Pools serve as refugia during low flow periods and during cold winter temperatures.

Alternative A (No Grazing Alternative)

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting pool habitat. Both the Imnaha and Snake rivers are where pool habitat is a function of geology, watershed conditions and past large flood events. For the Snake River the dominant large flow event that has created the current channel morphology was the Bonneville Flood that occurred about 14,500 years ago. The flood is believed to be the second largest in known geologic history. Operations of the Hells Canyon Dam Complex result in seasonal variations in flow and habitat in the Snake River adjacent to the LIRA.

On National Forest System lands in the LIRA, the Imnaha River flows through a canyon constrained reach where pool habitat is a function of the local geology and upstream watershed conditions. The 1996/97 New Year's flood event that occurred in Wallowa County resulted in large gravel bar waves moving slowly down through the Imnaha River. These large bars have resulted in localized reductions in pool habitat in unconstrained reaches as the bars move through the system.

On National Forest System lands, Lightning Creek and Cow Creek are in good condition and pool forming processes are not being impaired by livestock grazing activities. Majority of Deep Creek, from the mouth to the upper falls, is inaccessible to livestock from the Lone Pine Allotment due to steep topography.

Based on the current lack of measureable impacts to pool forming processes along stream reaches in the LIRA, it is unlikely that cessation of livestock grazing would result in a change in pool habitat in streams in the LIRA.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E will authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Streams in the LIRA are relatively impervious to livestock influenced changes in channel morphology. While Cow and Lightning creeks are the smallest and most accessible, they have streambanks that are armored with cobble substrate. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. The reach of the Imnaha River that is on National forest system land (below the Cow Creek Bridge to the confluence with the Snake River) is inaccessible to livestock along the south riverbank and armored to boulder substrate along the north riverbank.

PFC assessments along Cow and Lightning creeks found only localized impacts to riparian areas with overall good conditions. Livestock impacts to channel morphology were not apparent. Based on these observations, current livestock grazing activities are not measurably affecting pool frequencies in the LIRA.

Width/Depth Ratio Indicator

Width-to-depth ratios of streams in the LIRA exceed the PACFISH RMO (<10). However, the PACFISH RMO was developed prior to advances in our understandings of the relationship between width-to-depth ratios and natural channel forms (sensu Rosgen, 1996). Of the four Rosgen channel types that reflect natural channels (A, B, E, and C channel types) only E channel types have average width-to-depth ratios of less than 10 (Rosgen, 1996). Due to topography, there are no areas in the LIRA where E channel types would be expected to occur. Normal ranges for width-to-depth ratios (bankfull width) for Rosgen B and C channels are 12 to

20 and 13.5 to 28.7, respectively (Rosgen, 1996). All surveyed streams in the analysis area are within the normal range for width-to-depth ratios for their respective Rosgen channel types.

Alternative A (No Grazing Alternative)

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting width-to-depth ratios of streams in the LIRA. Streambanks along Cow Creek and Lightning Creek on National Forest System lands were found to be mostly stable during PFC assessment. Similar conditions are present along Deep Creek above the upper falls.

Width-to-depth ratios will likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of livestock. However, overall, a measureable change in width-to-depth ratios is unlikely because 1) streambanks along Cow, Lightning and Deep creeks are in good condition indicating few impacts from livestock and 2) streambanks along the lower reach of the Imnaha River are composed primarily of large boulders.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E will authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams in the LIRA most susceptible to livestock influenced changes in channel morphology. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, streambanks along the lower reach of the Imnaha River are primarily composed of boulders and therefore are not affected by livestock grazing activities.

PFC assessments along Cow and Lightning creeks found only localized impacts to streambank areas with overall good conditions. Livestock impacts to channel morphology were not apparent. Based on these observations, current livestock grazing activities are not measureable affecting width-to-depth ratios in the LIRA and the current conditions would be maintained under the grazing alternatives.

Streambank Condition Indicator

Streambank stability was lower than desired in Lightning and Cow creeks when these streams were surveyed in the 1990's. Independent observations made during PFC assessments and the PIBO effectiveness monitoring indicate that Category 1 streams in the analysis areas are stable stream channels and are meeting the bank stability RMO. Data for streambank stability for the 1997 survey of Deep Creek was lost in the 2010 WMO office fire.

Alternative A (No Grazing Alternative)

Current grazing activities on the four allotments in the LIRA are unlikely to be measurably impacting streambank stability of streams in the LIRA. Streambanks along Cow Creek and Lightning Creek on National Forest System lands were found to be mostly stable during PFC assessment. Similar conditions are present along Deep Creek above the upper falls. Deep Creek below the upper falls is not accessible to livestock.

Streambank stability will likely improve in areas where livestock congregate, such as crossings and watering sites, over the next ten years due to the removal of livestock. However, overall, a measureable change in streambank stability is unlikely because: 1) streambanks along Cow, Lightning and Deep creeks are in good condition indicating few impacts from livestock and 2) streambanks along the lower reach of the Imnaha River are composed primarily of large boulders.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E will authorize various levels of grazing on the four allotments in the LIRA over the next 10 years. Differences in the four alternatives are driven by upland conditions and ESA listed plants. Livestock impacts to riparian areas and aquatic habitat are likely to be essentially the same for the four grazing alternatives which are typified by the current conditions of riparian areas under Alternative B (current management).

Cow and Lightning creeks are the streams in the LIRA most susceptible to livestock influenced changes in channel morphology. Much of Deep Creek adjacent to Lone Pine Allotment is not accessible to livestock due to steep terrain. As discussed earlier, streambanks along the lower reach of the Imnaha River are primarily composed of boulders and therefore are not affected by livestock grazing activities.

PFC assessments along Cow and Lightning creeks found only localized impacts to streambank areas with overall good conditions. Livestock impacts to channel morphology were not apparent. Based on these observations, current livestock grazing activities are not measurably affecting width-to-depth ratios in the LIRA.

Riparian Reserves/Conservation Areas Indicator

This indicator looks at whether the riparian reserve system provides adequate shade, large woody debris recruitment, and habitat protection and connectivity in all subwatersheds, and buffers or includes known refugia for sensitive aquatic species (>80% intact).

Alternative A (No Grazing Alternative)

The current conditions of riparian conservation areas (i.e. RHCAs) are good for stream reaches on National forest lands within the LIRA. Cessation of grazing would eliminate impacts from

livestock grazing. However, since riparian areas are already in good condition it's hard to say whether there would be any measureable change over the next 10 years.

Alternatives B, C, D, and E (Grazing Alternatives)

The current conditions of riparian conservation areas (i.e. RHCAs) are good for stream reaches on National forest lands within the LIRA. Grazing activities proposed under the grazing alternatives (B, C, D, and E) will likely maintain the current conditions of riparian conservation areas. Therefore a change in the current condition of the riparian conservation area Matrix habitat indicator is not expected and this indicator would be maintained in its current condition.

Effects to SR Steelhead

Alternative A (No Grazing Alternative)

Under Alternative A, no livestock grazing would occur on National Forest System lands in the LIRA. Removal of livestock from the four allotments would eliminate the potential for direct take to occur as a result of eliminating the potential for trampling of steelhead redds. Riparian and aquatic habitat conditions are generally in good condition across the LIRA. Cessation of grazing would eliminate areas of high use where cattle are congregating and resulting in localized effects to riparian and aquatic habitat though these areas are few in number and widely scattered. Therefore Alternative A ***may affect, beneficially affect*** SR steelhead.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E (Grazing Alternatives) of the LIRA Project ***May Affect, Likely to Adversely Affect*** (LAA) SR Steelhead. Under Alternatives B, C, D, and E (Grazing Alternatives) livestock grazing would be authorized on the four allotments for the next ten years. The differences in the alternatives are designed to address unsatisfactory conditions in upland areas and address concerns regarding ESA-listed plants.

There is a moderate risk that spawning steelhead or redds will be disturbed where grazing occurs prior to July 1. The probably of take occurring is low because: 1) cattle are placed in upland areas, primarily on mid-elevation benches, adjacent to spawning reaches in the pastures used prior to July 1; 2) cattle typically avoid riparian areas characterized by wet soil and cold temperatures during the early spring grazing period (Platts and Nelson 1985, Kovalchik and Elmore 1991); and 3) cattle concentrate their foraging effort in uplands rather than riparian areas during the early spring grazing period because forage palatability (Platts and Nelson 1985). However, Cow and Horse creeks are used by livestock for watering so there is a potential risk of redd trampling. The portion of Deep Creek used for spawning and rearing by steelhead is in an area closed to grazing and generally inaccessible to livestock.

Under Alternatives B, C, D, and E, livestock grazing activities similar to current activities along riparian and aquatic habitats would continue. Riparian and aquatic habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Riparian communities along Cow, Deep, and Lightning creeks are late serial shrub communities.

The risk of cumulative effects to aquatic habitat is rated low overall. There is a moderate risk of cumulative effects from Tribal grazing and proposed grazing activities under Alternatives B, C, D and E. Therefore, the risk of cumulative effects on SR steelhead is rated low.

Effects to SR Spring/Summer Chinook Salmon

Alternative A (No Grazing Alternative)

Under Alternative A, no livestock grazing would occur on National Forest System lands in the LIRA. SR spring/summer Chinook salmon use the Imnaha and Snake Rivers as migration corridors to holding and spawning areas higher in the watersheds. The Imnaha River, Cow Creek and Lightning Creek are used as winter rearing habitat for juvenile spring/summer Chinook salmon. Riparian and aquatic habitat conditions are generally in good condition across the LIRA. Therefore Alternative A ***would have no effect to*** SR spring/summer Chinook salmon.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E (Grazing Alternatives) of the LIRA Project ***May Affect, Not Likely to Adversely Affect*** (NLAA) SR spring/summer Chinook salmon. Under Alternatives B, C, D, and E (Grazing Alternatives) livestock grazing would be authorized on the four allotments for the next ten years. The differences in the alternatives are designed to address unsatisfactory conditions in upland areas and address concerns regarding ESA-listed plants.

SR spring/summer Chinook salmon use the Imnaha and Snake Rivers as migration corridors to holding and spawning areas higher in the watersheds. The Imnaha River, Cow Creek and Lightning Creek are used as winter rearing habitat for juvenile spring/summer Chinook salmon. Under Alternatives B, C, D, and E, livestock grazing activities similar to current activities along riparian and aquatic habitats would continue. Riparian and aquatic habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Riparian communities along Cow, Deep, and Lightning creeks are late serial shrub communities.

The risk of cumulative effects to aquatic habitat is rated low overall. There is a moderate risk of cumulative effects from tribal grazing and proposed grazing activities under Alternatives B, C, D and E. Therefore, the risk of cumulative effects on SR spring/summer Chinook salmon is rated low.

Effects to SR Fall Chinook Salmon

Alternative A (No Grazing Alternative)

Under Alternative A, no livestock grazing would occur on National Forest System lands in the LIRA. SR fall Chinook salmon use the Imnaha and Snake Rivers as spawning and early rearing habitat. Riparian and aquatic habitat conditions are generally in good condition across the LIRA. Impacts to aquatic habitat in the Imnaha River and Snake River on National Forest

System lands in the LIRA are primarily the result of activities upstream of the LIRA. Therefore Alternative A would have ***no effect to*** SR spring/summer Chinook salmon.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E (Grazing Alternatives) of the LIRA Project ***May Affect, Not Likely to Adversely Affect*** (NLAA) SR spring/summer Chinook salmon. Under Alternatives B, C, D, and E (Grazing Alternatives) livestock grazing would be authorized on the four allotments for the next ten years. The differences in the alternatives are designed to address unsatisfactory conditions in upland areas and address concerns regarding ESA-listed plants.

SR fall Chinook salmon use the Imnaha and Snake Rivers as spawning and early rearing habitat. Under Alternatives B, C, D, and E, livestock grazing activities similar to current activities along riparian and aquatic habitats would continue. Riparian and aquatic habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Impacts to aquatic habitat in the Imnaha River and Snake River on National Forest System lands in the LIRA are primarily the result of activities upstream of the LIRA. Riparian communities along Cow, Deep, and Lightning creeks are late serial shrub communities.

The risk of cumulative effects to aquatic habitat is rated low overall. There is a moderate risk of cumulative effects from Tribal grazing and proposed grazing activities under Alternatives B, C, D and E. Therefore, the risk of cumulative effects on SR fall Chinook salmon is rated low.

Effects to CR Bull Trout

Alternative A (No Grazing Alternative)

Under Alternative A, no livestock grazing would occur on National Forest System lands in the LIRA. CR bull trout use the Imnaha and Snake Rivers as migration corridors to holding and spawning areas higher in the watersheds. Riparian and aquatic habitat conditions are generally in good condition across the LIRA. Impacts to aquatic habitat in the Imnaha River and Snake River on National Forest System lands in the LIRA are primarily the result of activities upstream of the LIRA. Therefore Alternative A would have ***no effect to*** CR bull trout.

Alternatives B, C, D, and E (Grazing Alternatives)

Alternatives B, C, D, and E (Grazing Alternatives) of the LIRA Project ***May Affect, Not Likely to Adversely Affect*** (NLAA) CR bull trout. Under Alternatives B, C, D, and E (Grazing Alternatives) livestock grazing would be authorized on the four allotments for the next ten years. The differences in the alternatives are designed to address unsatisfactory conditions in upland areas and address concerns regarding ESA-listed plants.

CR bull trout use the Imnaha and Snake Rivers as spawning and early rearing habitat. Under Alternatives B, C, D, and E, livestock grazing activities similar to current activities along riparian and aquatic habitats would continue. Riparian and aquatic habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Impacts to aquatic habitat in the

Imnaha River and Snake River on National Forest System lands in the LIRA are primarily the result of activities upstream of the LIRA. Riparian communities along Cow, Deep, and Lightning creeks are late serial shrub communities.

The risk of cumulative effects to aquatic habitat is rated low overall. There is a moderate risk of cumulative effects from Tribal grazing and proposed grazing activities under Alternatives B, C, D and E. Therefore, the risk of cumulative effects on CR bull trout is rated low.

Critical Habitat for Threatened and Endangered Fish Species

Snake River Steelhead (Threatened)

Critical Habitat Status and Description

Critical habitat was designated for the SR steelhead DPS on February 16, 2000 (65 FR 7764) and revised on September 2, 2005 (70 FR 52808). Critical habitat includes the stream channels within the designated stream reaches, and includes a lateral extent as defined by the ordinary high-water line (33 CFR 319.11). In areas where ordinary high-water line has not been defined, the lateral extent is defined by the bankfull elevation. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge which generally has a recurrence interval of 1 to 2 years on the annual flood series. Critical habitat in lake areas is defined by the perimeter of the water body as displayed on standard 1:24,000 scale topographic maps or the elevation of ordinary high water, whichever is greater. In estuarine and near shore marine areas critical habitat includes areas contiguous with the shoreline from the line of extreme high water out to a depth no greater than 30 meters relative to mean lower low water.

There is about 19.7 miles of critical habitat for SR steelhead on National Forest System lands in the LIRA (Table AR-11AR-11). See Figure 2 for the distribution of critical habitat for SR steelhead in the LIRA.

Table AR-11. Miles of Steelhead Critical Habitat Present in the Lower Imnaha Range Analysis Area. Habitat use types: SR=spawning and rearing, FMO=feeding, migration, overwinter.

Stream	Habitat Use Type	Miles
Cow Creek	SR	5.6
Deep Creek	SR	0.5
Imnaha River	FMO	5.9
Lightning Creek	SR	5.2
Sleepy Creek	SR	2.5
	Total	**19.7**

The primary constituent elements (PCEs) that are essential for the conservation of listed ESUs are those sites and habitat components that support one or more life stages.

Effects to PCEs

PCEs were developed that describe habitat elements needed for continued survival and recovery of SR steelhead. The direction is to maintain or improve PCEs.

PCE 1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development

Alternative A – Current livestock grazing activities are not impacting components of PCE 1. Fine sediment levels in spawning areas are low to moderate (See **Error! Reference source not found.**). Water temperatures in Lightning, Cow and Deep creeks are within levels needed to support successful spawning, incubation and larval development. Cessation of grazing activities on the four allotments in the LIRA is unlikely to result in a measureable improvement of PCE 1.

Alternatives B, C, D and E - Current livestock grazing activities are not impacting components of PCE 1. Fine sediment levels in spawning areas are low to moderate (See **Error! Reference source not found.**). Water temperatures in Lightning, Cow and Deep creeks are within levels needed to support successful spawning, incubation and larval development. Continuation of grazing activities on the four allotments in the LIRA is unlikely to result in a measureable improvement of PCE 1.

PCE 2) Freshwater rearing sites with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

Alternative A - Current livestock grazing activities are not impacting components of PCE 2. Riparian areas in spawning and rearing areas are in good condition, floodplain connectivity is unimpaired, and channel complexity is good. Cessation of grazing activities on the four allotments in the LIRA is unlikely to result in a measureable improvement of PCE 2.

Alternative B, C, D and E - Current livestock grazing activities are not impacting components of PCE 2. Riparian areas in spawning and rearing areas are in good condition and floodplain connectivity is unimpaired. Continuation of grazing activities on the four allotments in the LIRA is unlikely to result in a measureable improvement of PCE 2.

PCE 3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;

Elements of this PCE have been addressed under PCEs 1 and 2.

Determination

Alternative A - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternative A. Cessation of grazing activities on the four allotments under Alternative A is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternative A will have no effect on spawning and rearing habitat for SR steelhead.

Alternatives B, C, D and E - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternatives B, C, D and E. Continuation of grazing activities on the four allotments under Alternatives B, C, D and E is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternatives B, C, D and E ***May Affect, Not Likely to Adversely Affect*** (NLAA) spawning and rearing habitat for SR steelhead.

Snake River Fall Chinook Salmon (Threatened)

Critical Habitat Status and Description

Critical habitat was designated for the SR fall Chinook salmon ESU on December 28, 1993 (58 FR 68543). Critical habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers presently or historically accessible to SR fall Chinook salmon (except reaches above impassible natural falls and Dworshak and Hells Canyon Dams). For more information and description of critical habitat status and effects to Essential Habitat Features see the Aquatic Resources Report in the project file.

Determination

Alternative A (No-Action) - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternative A. Cessation of grazing activities on the four allotments under Alternative A is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternative A will have no effect on spawning and rearing habitat for SR fall Chinook salmon.

Alternatives B, C, D and E - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternatives B, C, D and E. Continuation of grazing activities on the four allotments under Alternatives B, C, D and E is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternatives B, C, D and E ***May Affect, Not Likely to Adversely Affect*** (NLAA) spawning and rearing habitat for SR fall Chinook salmon.

Snake River Spring/Summer Chinook Salmon (Threatened)

Critical Habitat Status and Description

Critical habitat was designated for the SR spring/summer Chinook salmon ESU on December 28, 1993 (58 FR 68543) and revised on October 25, 1999 (64 FR 57399). Critical habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers presently or historically accessible to SR spring/summer Chinook salmon (except reaches above impassible natural falls and Dworshak and Hells Canyon Dams). For more information and description of critical habitat status and effects to Essential Habitat Features see the Aquatic Resources Report in the project file.

Determination

Alternative A (No-Action) - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternative A. Cessation of grazing activities on the four allotments under Alternative A is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternative will have no effect on migration habitat for SR spring/summer Chinook salmon.

Alternatives B, C, D and E - Current grazing activities on the four allotments in the LIRA are having few effects to aquatic and riparian habitats as evidenced by the conditions of these habitats. See the Aquatic Habitat section for a discussion of habitat and effects from Alternatives B, C, D and E. Continuation of grazing activities on the four allotments under Alternatives B, C, D and E is unlikely to result in measureable changes in riparian and aquatic habitat. Therefore, Alternatives B, C, D and E May Affect, Not Likely to Adversely Affect (NLAA) migration habitat for SR spring/summer Chinook salmon.

Columbia River Bull Trout (Threatened)

Critical Habitat Status and Description

The USFWS issued a Final Rule for bull trout critical habitat for the coterminous United States on January 14, 2010 (75 FR 2270). The bull trout critical habitat designation includes approximately 5730.8 miles of streams for the Mid-Columbia River Recovery Unit including the Imnaha River and Snake River in the LIRA.

Critical habitat includes the stream channels within the designated stream reaches and a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of 1 to 2 years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent

of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. Critical habit for CR bull trout is present in the LIRA. In the LIRA, critical habitat consists of feeding, migration, and overwinter habitat. There are about 14 miles of critical habitat for CR bull trout in the LIRA (TableAR-12).

Table AR-12. Miles of Bull Trout Critical Habitat Present in the Lower Imnaha Range Analysis Area. Habitat use types: SR=spawning and rearing, FMO=feeding, migration, overwinter.

Stream	Habitat Use Type	Miles
Imnaha River	FMO	5.9
Snake River	FMO	7.9
	Total	**13.8**

PCEs were developed that describe habitat elements needed for continued survival and recovery of CR bull trout.

Effects to PCEs

DCH for bull trout consists of feeding, migration, and overwintering habitat. Therefore the applicable PCEs are: 2, 3, 4, 7, and 9.

PCE 2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

Alternative A – The Imnaha River and Snake River serve as migration corridors through the LIRA for bull trout. These migration corridors for bull trout in the LIRA have not been disrupted by either physical and flow barriers. Current livestock grazing on the four allotments has had little impact on the Imnaha River and the Snake River. Therefore, cessation of grazing on the four allotments is unlikely to result in measureable changes in aquatic habitat conditions of either stream.

Alternatives B, C, D and E – Impacts to migration habitat from Alternatives B, C, D, and E are likely to be similar to current conditions. Overall, riparian habitat is in good condition on National Forest System lands in the LIRA. Therefore, cessation of grazing on the four allotments is unlikely to result in measureable changes in aquatic habitat conditions of the Imnaha River or the Snake River.

PCE 3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

Alternative A – Bull trout using the Imnaha and Snake Rivers as migratory habitat are primarily large fluvial adults. These bull trout are primarily piscivorous; preying on other smaller fish. The combination of large runs of natural and hatchery spring/summer Chinook smolts suggest that food is not limiting. Current livestock grazing on the four allotments has had little impact on the

Imnaha River and the Snake River. Therefore, cessation of grazing on the four allotments is unlikely to result in measureable changes in aquatic habitat conditions of either stream.

Alternatives B, C, D and E - Current livestock grazing on the four allotments have had little impact on the Imnaha River and the Snake River. Therefore, cessation of grazing on the four allotments is unlikely to result in measureable changes in the prey base for bull trout in either stream.

PCE 4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

Alternative A – The natural channel conditions of the Imnaha River and the Snake River has not been documented. Based on research on other large river systems, channel conditions in large river systems have been simplified as a result of activities to improve navigation. In concept, LWD would be present in large jams in eddy areas of the Imnaha and Snake Rivers, such as Big Eddy on the Imnaha River. Current grazing on the four allotments is not impacting LWD or other channel forming processes. Therefore, cessation of grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current channel conditions of the Imnaha and Snake Rivers.

Alternatives B, C, D and E - Current grazing on the four allotments is not impacting LWD or other channel forming processes. Therefore, continuation of grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current channel conditions of the Imnaha and Snake Rivers.

PCE 7) A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.

Alternative A – The hydrograph of the Imnaha River is unaltered during months the river is used as a migration corridor by bull trout. The hydrograph of the Snake River is altered as a result of operations of dams on the Snake River and tributaries. Current grazing on the four allotments is not impacting the hydrograph of either the Imnaha or Snake Rivers. Therefore, cessation of grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current hydrographs of the Imnaha and Snake Rivers.

Alternatives B, C, D and E - Current grazing on the four allotments is not impacting the hydrograph of either the Imnaha or Snake Rivers. Therefore, continued grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current hydrographs of the Imnaha and Snake Rivers.

PCE 9) Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Alternative A – Nonnative predatory species are present in both the Imnaha and Snake River; though fluvial bull trout are likely large enough that they are not preyed on. Current grazing on the four allotments is not impacting habitat conditions that have resulted in the establishment or continued presence of nonnative predators in either the Imnaha or Snake Rivers. Therefore, cessation of grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current population levels of nonnative predators present in the Imnaha and Snake Rivers.

Alternatives B, C, D and E - Current grazing on the four allotments is not impacting habitat conditions that have resulted in the establishment or continued presence of nonnative predators in either the Imnaha or Snake Rivers. Therefore, continued grazing on National Forest System lands in the LIRA is unlikely to result in changes in the current population levels of nonnative predators present in the Imnaha and Snake Rivers.

Determination

Alternative A - Alternative A of the Lower Imnaha Range Analysis Project will have ***no effect*** to critical habitat for CR bull trout. Under Alternative A, grazing on the four allotments would cease. However, grazing is currently no impacting migration habitat for bull trout in the LIRA. Therefore, current habitat conditions would continue with the cessation of grazing.

Alternatives B, C, D and E **-** Alternatives B, C, D and E of the Lower Imnaha Range Analysis Project ***May Affect, Not Likely to Adversely Affect*** (NLAA) critical habitat for CR bull trout. Under Alternatives B, C, D and E, grazing on the four allotments would continue. However, grazing is currently no impacting migration habitat for bull trout in the LIRA. Therefore, current habitat conditions would continue with the continuation of grazing.

Region 6 Sensitive Fish and Aquatic Invertebrate Species

A biological evaluation was completed of the R6 sensitive species potentially present within the LIRA area, including Western Ridged Mussel, Short-faced Lynx, and Columbia pebblesnail. It was determined that No Impact (no direct, indirect or cumulative effects) to any of the sensitive species would occur from the LIRA alternatives. Refer to the Aquatic Resources Specialist Report in the project file for detailed information about the species, abundance, and effects analysis.

Table AR-13. Effects determinations R-6 sensitive aquatic invertebrates in the LIRA by alternative.

Species	Alternative A	Alternative B, C, D, and E
Western Ridged Mussel (S)	No Impact	No Impact
Short-faced Lanx (S)	No Impact	No Impact
Columbia pebblesnail (S)	No Impact	No Impact

Forest Plan Aquatic / Riparian Management Indicator Species

MIS Selection

The WWNF Forest Plan identifies two fish species as Management Indicator Species (MIS); redband/rainbow trout and steelhead (USDA 1990). Redband trout are widely distributed across the WWNF occupying streams in both anadromous and non-anadromous stream systems. Redband trout in anadromous stream systems are not genetically isolated from steelhead populations. Steelhead are widely distributed in anadromous stream systems on the WWNF; being the most widely distributed anadromous species present on the WWNF. Steelhead and redband trout are present in the LIRA.

Redband trout and steelhead were selected as MIS as they were considered to be good indicators of the maintenance and quality of riparian and stream habitats (WWNF Forest Plan). Riparian ecosystems occur at the margins of standing and flowing water, including intermittent stream channels, ephemeral ponds, and wetlands. The aquatic MIS were selected to indicate healthy stream and riparian ecosystems across the landscape. Attributes of a healthy aquatic ecosystem includes: cold and clean water; clean channel substrates; stable streambanks; healthy streamside vegetation; complex channel habitat created by large wood, cobles, boulders, streamside vegetation, and undercut banks; deep pools; and waterways free of barriers. Healthy riparian areas maintain adequate temperature regulation, nutrient cycles, natural erosion rates, and provide for instream wood recruitment.

Monitoring

The NFMA regulations require that “fish and wildlife habitat be managed to maintain viable populations of existing …species in the planning area.” Monitoring for aquatic/riparian MIS consists of field inventory of stream conditions (WWNF Forest Plan Chap 5, p 11). Current inventory methods for stream and riparian conditions include: stream surveys, Properly Functioning Condition (PFC) assessments, pebble counts, and Multiple Indicator Monitoring (MIMs). ODFW and the Nez Perce Tribe monitor the Imnaha population of SR steelhead.

Project Relationship to Forest Plan

For more information on project relationship to the Forest Plan, including CMP direction, see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file.

Project-level MIS Effects Analysis

Steelhead Trout

Distribution and abundance of steelhead in the analysis area for the LIRA are discussed in the Threatened and Endangered Fish and Aquatic Invertebrate Species Section above.

Redband Trout

Redband trout, the resident form of *Oncorhynchus mykiss*, are a WWNF management indicator species for aquatic habitat. Behnke (1992) classifies the rainbow trout species "east of the Cascades" as steelhead and redband trout. Redband trout may or may not be reproductively isolated from steelhead and may share a common gene pool with steelhead from the same geographic area.

Redband trout are sensitive to changes in water quality and habitat. Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat functions as important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD. For information on redband trout life history see the Aquatic Species with Special Management Status section of the Aquatics Resources Specialist report in the project file. Habitat requirements are similar for redband trout and juvenile steelhead.

Redband trout are widely distributed in the LIRA. About 21.7 total miles of redband trout spawning and rearing habitat is present in the LIRA on Forest Service lands (Table AR-2). Redband trout are sympatric with steelhead in many of the streams in the LIRA and therefore distribution of the two overlap to a great extent. The redband trout population in Deep Creek above the barrier falls is isolated from steelhead and occupies about 5.2 miles of Deep Creek.

Table AR-2. Miles of redband trout spawning and rearing habitat in the LIRA by allotment.

Allotment	Miles of Spawning and Rearing Habitat
Cow Creek	4.9
Rhodes Creek	11.1
Tomey	0.0
Lone Pine	5.7

There are about 3300 miles of habitat for redband trout and steelhead on the WWNF; with about 65% of the mileage in anadromous watersheds. There are about 27 miles of habitat for redband trout and about 13 miles of habitat for steelhead in the LIRA. Therefore the LIRA Project has the potential to affect less than 1% for redband trout and steelhead on the WWNF.

In the LIRA Cow Creek, Deep Creek, and Lightning Creek provide spawning and rearing habitat for steelhead and redband trout. The Imnaha River and Snake River provide migratory and overwinter habitat for primarily steelhead and occasionally redband trout.

Fish habitat in the analysis area meets the PACFISH RMOs for fine sediment and LWD, and does not meet the RMOs for pool habitat and width-to-depth ration. Pool habitat in particular is lacking in the analysis area. Streams were found to be stable with riparian areas in good conditions during PFC assessments (Cow Creek and Lightning Creek) and other site visits (Deep Creek).

The LIRA Project avoids impacts to riparian and aquatic habitats by designing the project activities to be consistent with Forest Plan Standards and Guidelines for aquatic habitat. Effects (direct, indirect, and cumulative) of proposed activities on habitat for redband trout and steelhead are disclosed in the Aquatic Habitat section of this report. Effects (direct, indirect, and cumulative) to steelhead resulting from the LIRA Project are disclosed in the Fish and Aquatic Invertebrates Section above. Effects to redband trout from proposed activities are similar as described for steelhead because their freshwater habitats are similar. Under Alternatives B, C, D, and E, livestock grazing activities similar to current activities along riparian and aquatic habitats would continue. Riparian and aquatic habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Riparian communities along Cow, Deep, and Lightning creeks are late serial shrub communities. Therefore, the project will not contribute to a negative trend in viability of redband trout and steelhead populations on the WWNF.

Consistency with Direction, Regulations and Laws

Wallowa-Whitman Forest Plan

The Lower Imnaha Rangeland Analysis is consistent with the WWNF Forest Plan including the 1995 PACFISH amendment. In addition to meeting standards and guidelines for water quality (see effects to aquatic habitat discussion), the proposed activities are consistent with all Forest Plan Watershed, and PACFISH standards and guidelines.

Table AR-3. Effects determinations for ESA-listed fish species and R-6 sensitive aquatic invertebrates in the LIRA by alternative.

Species	Alternative A	Alternative B, C, D, and E
SR Steelhead (T)	Beneficial Affect	Likely to Adversely Affect
SR Spring/Summer Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
SR Fall Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
CR Bull Trout (T)	No Effect	Not Likely to Adversely Affect
Western Ridged Mussel (S)	No Impact	No Impact
Short-faced Lanx (S)	No Impact	No Impact
Columbia pebblesnail (S)	No Impact	No Impact

Wild and Scenic Rivers Act

Imnaha Wild and Scenic River Management Plan

Fisheries and water quality have been designated as Outstanding Remarkable Values (ORVs). Management direction applicable to the LIRA Project regarding the Fisheries ORV is presented in Table AR-4.

Table AR-4. Standard and Guidelines Applicable to the Fisheries ORV for the Imnaha River Wild and Scenic River Plan

Standard and Guideline	Description
51	Fisheries. (Outstandingly Remarkable Value) Desired Future Condition: Stable stream banks, excellent water quality, habitat complexity, natural levels of woody debris delivery, and increased woody debris amounts from Neil Creek to Evergreen Campground. The population of anadromous fish, bull trout, and other native fish will be at or near the carrying capacity of the habitat potential. Many constituents of the desired future condition are present in the Imnaha River today. Maintaining these conditions will be the major task required to achieve the desired future condition, and allow the river to continue to function as the valuable resource that it is.
52	A management zone of 200 feet on Class I and II streams, 100 feet on Class III, and 50 feet on Class IV streams will be in place. This management zone is for the protection of fish habitat and water quality. All ground disturbing or vegetation disturbing activities within the zone will be analyzed and designed to have no impact on fish habitat or water quality. Existing developments are acceptable, however, any maintenance or reconstruction of existing developments would apply this standard and guideline.

The LIRA Project is consistent with the Imnaha River Wild and Scenic River Management Plan. Riparian habitats in the LIRA are currently in good condition with few impacts from livestock grazing evident. Proposed grazing activities are similar to current grazing practices. Therefore the current riparian conditions will be maintained.

Endangered Species Act

Four ESA-listed fish species are present in the LIRA (

Table AR-5). The greatest risk of adverse effects to ESA-listed fish species is posed from the potential for trampling of SR steelhead redds to occur. However, the risk is rated low due to terrain and cattle behavior.

Affects to the other three ESA-listed fish species are anticipated to be immeasurable. ESA Consultation for the LIRA will occur when a preferred alternative is identified.

Table AR-5. Effects determinations to ESA-listed fish and critical habitat for the Lower Imnaha Range Project.

Species	Alternative A	Alternative B, C, D, and E
SR Steelhead (T)	Beneficial Affect	Likely to Adversely Affect
SR Spring/Summer Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
SR Fall Chinook Salmon (T)	No Effect	Not Likely to Adversely Affect
CR Bull Trout (T)	No Effect	Not Likely to Adversely Affect
SR Steelhead Critical Habitat	No Effect	Not Likely to Adversely Affect
SR Spring/Summer Chinook Salmon Critical Habitat	No Effect	Not Likely to Adversely Affect
SR Fall Chinook Salmon Critical Habitat	No Effect	Not Likely to Adversely Affect
CR Bull Trout Critical Habitat	No Effect	Not Likely to Adversely Affect

1) LAA for direct effects to SR steelhead due to potential redd trampling.

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of essential fish habitat (EFH) descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH. The Lower Grande Ronde Subbasin (HUC 17060106) has been designated as EFH for Chinook and coho salmon. Effects to EFH are the same as those described under the ESA section. EFH Consultation for the LIRA will occur when a preferred alternative is identified.

Executive Orders

Recreational Fisheries

The Lower Imnaha Rangeland Analysis will not result in reductions in quantity, function, sustainable productivity, and distribution of recreational fisheries as directed under Executive Order 12962, Recreational Fisheries.

Other Required Disclosures

Best Available Science

The aquatic effects analysis meets the advice for incorporating “best available science” in specialist reports for NEPA projects as given in the May 2, 2007 advice letter (Advice on Documenting “Best Available Science”) and the clarification letter dated June 20, 2007 (Clarification of May 2nd 2007, Advice on Documenting “Best Available Science”) issued by the Acting Director and Director for Ecosystem Management Coordination, respectively.

This analysis of effects to aquatic resources, including aquatic habitat and aquatic species with special management status, was based on a combination of peer reviewed papers published in scientific journals, publications produce by Forest Service Research Laboratories, stream habitat data collected using the R6 stream survey protocol, fish distribution data compiled by Streamnet (http://www.streamnet.org), population analyses developed in the Grande Ronde Subbasin plan, Forest Plan direction (including the PACFISH amendment) and observations of aquatic and watershed conditions made by the Zone fisheries biologist and hydrologist.

Respondents to the scoping letter sent out for the Lower Imnaha Rangeland Analysis provided the following references relating to the effects of livestock grazing on aquatic and riparian resources for our review:

HCPC (letter dated September 13, 2011)

- Belsky, A.J., A, Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation 54: 419–431.

Oregon Wild (email dated September 23, 2011)

- A.D. Bradshaw 1996. Underlying principles of restoration. Can. J. Fish. Aquat. Sci. 53(Suppl. 1): 3–9 (1996)

These references were reviewed and were cited in the analysis of effects where they provided additional information or where they provided countervailing viewpoints to references used in the aquatic effects analysis, see the Aquatic Resources Specialist report for complete details, information, and analysis.

Incomplete or Unavailable Information

Population data is unavailable for redband trout in the LIRA. Since redband trout distribution is sympatric with SR steelhead over the majority of the LIRA and interbreeding occurs between the anadromous and resident life forms of *Oncorhynchus mykiss* and resident life forms can result from anadromous life forms, and vice versa, it is assumed that redband population levels track SR steelhead levels in the LIRA. Population data for the isolated redband population in Deep Creek is unavailable. However, riparian and stream habitat is in good condition, no large events that would cause a concern for extirpation have occurred in since the stream survey was completed in 1997. Therefore it is assumed that the Deep Creek population is healthy.

Heritage Resources

Existing Conditions

Background

Cultural resources (including all resources variously referred to as cultural, historical, archaeological, ethnographic, tribal or traditional, and sacred sites) represent past human activities or uses and, by their nature, are considered an irreplaceable and nonrenewable resource. Because they represent important cultural values, they are of special concern to the public in general, and of great concern to specific ethic groups. Interest in our heritage and concern over the destruction of cultural resources has prompted the passage of national, state, and local levels of legislation designed to promote and protect these examples of our nation's historical and traditional cultural legacy.

The project is located lands within the territory ceded by the Nez Perce Tribe in 1855 (Nez Perce Tribe 1995). The lands ceded by the Nez Perce represent the “usual and accustomed places” for hunting, fishing, gathering, and pasturing livestock (Nez Perce Tribe 1995:9). By the terms of the 1855 and 1863 treaties, the Nez Perce Tribe reserves the right to conduct these activities on unclaimed land within this ceded territory.

In addition, the project area is within the usual and accustomed places of the Cayuse, Walla Walla, and Umatilla peoples (Confederated Tribes of the Umatilla Indian Reservation 2010).

This section of the DEIS summarizes information from a complete Heritage specialist report located in the project file.

Introduction

The Wallowa Whitman National Forest (WWNF) proposes to reissue cattle grazing permits within the Cow Creek, Rhodes Creek, Toomey, and Lone Pine Allotments. To address the Section 106 process (36 CFR 800) of the National Historic Preservation Act (NHPA), WWNF

Archaeologists conducted inventories to determine the impacts of the proposed undertaking on cultural resources. These four allotments total 43,897 acres of land managed by the USDA Forest Service. The literature review and the application of a predictive model indicated that 1,695 acres within these allotments constitute the area of potential effects (APE), and required Level III Survey. Heritage personnel surveyed a total of 1,874 acres in 2010 and 2011. 43 previously recorded sites were in the area of potential effects (APE) for grazing related impacts. Heritage personnel revisited 28 previously recorded sites for monitoring or NRHP Evaluation. During the scope of work for this project, five of the previously recorded sites were determined eligible. Heritage personnel documented thirteen additional cultural resources during the level III survey. Of the newly recorded sites, Heritage personnel evaluated five as eligible, four as not eligible, and four not evaluated. WWNF Heritage Resources Staff recommended a determination of No Adverse Effect provided the project decision implements the site-specific stipulations. The Oregon State Historic Preservation Office (SHPO) concurred with this finding on September 27, 2013 (SHPO Case No. 13-0557). A complete Heritage Resources specialist report and Cultural Resource Inventory report for this project can be found in the project file.

Regulatory Environment

Federal Laws

Forest Service Policy (FSM 2361.3) (USDA, 2008) requires that projects with the potential to affect historic properties be surveyed for heritage resources in order to comply with 36CFR 800; the National Historic Preservation Act (NHPA) of 1966, as amended; the Archeological Resources Protection Act (ARPA) of 1979; and the American Indian Religious Freedom Act of 1978. To comply with these laws, all cultural resources known to be 50 years or older will be recorded according to State Historic Preservation Office Standards (SHPO, 2010), and addressed for potential effects from the proposed action.

Forest Plan

According to the Wallowa Whitman National Forest Land and Resource Management Plan (Forest Plan), the stated goal for cultural resources is to “provide for the identification, protection, preservation, enhancement and interpretation of prehistoric and historic sites, buildings, objects, and antiquities of local, regional or National significance so as to preserve their historical, cultural, and scientific values for the benefit of the public” (4-20). The Hells Canyon NRA Comprehensive Management Plan (CMP) also contains this goal and associated standards and guidelines. In addition, the Imnaha River Wild and Scenic Corridor Management Plan (River Plan) considers cultural resources an Outstandingly Remarkable Value. These plans address standards and guidelines for achieving the goals for cultural resources below.

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Land and Resource Management Plan (Forest Plan) direction. Heritage personnel did not address standards and guidelines that are not applicable to this undertaking. This section analyzes the alternatives for

consistency with all applicable Forest Plan standards and guidelines for Heritage Resources. The overall goal is to provide for the identification, protection, preservation, enhancement, and interpretation of prehistoric and historic sites, buildings, objects, and antiquities of local, regional or National significance to preserve their historical, cultural, and scientific values for the benefit of the public. Refer to the Heritage Resources specialist report in the project file for a complete description of Forest Plan Heritage Resources standards and guidelines.

Environmental Assessment for the Imnaha River Wild and Scenic River Management Plan (1993)

The River Plan provides standards and guidelines to protect the scenic Outstandingly Remarkable Values in the river corridor. The River Plan also provides standards and guidelines to protect the Historic/Prehistoric Outstandingly Remarkable Value. Historic/prehistoric sites are protected until management actions can be determined. These actions may include data collection, mitigation, interpretation, education, or preservation. Selected sites would be used for public education and interpretation. All activities would be in coordination and cooperation with the Nez Perce Tribe. Refer to the Heritage report in the project file for a complete description of River Plan Heritage Resources standards and guidelines.

Within this project area, there is one cultural resource location within the Imnaha River Corridor where additional protection, education, and interpretation are under analysis for feasibility. The Forest Service is currently working with the Nez Perce Tribal Historic Preservation Officer and the adjacent land owner to accomplish this. The Forest may propose additional data collection for this location as well.

The River Plan also includes standards for activities on private land within the river corridor; these standards relate to the use and development of private land and provide direction for compliance with applicable local, state, and federal laws, regulations and ordinances, and also provide some direction for visuals.

A fence configuration change is proposed in this project, along with additional fencing at one location within the scenic section of the Imnaha River corridor. The project proposes fence work on both public and private lands. The project design would place the fence relatively low in relation to the surrounding landscape, in such a manner that it does not dominate the setting. Additionally, the project proposes to construct the fence out of locally traditional materials and in a design consistent with local rustic fence-building traditions. Specifically, the fence would include traditional style rock jacks at appropriate locations to perpetuate and emulate the local styles.

Hells Canyon National Recreation Area Comprehensive Management Plan (HCNRA CMP) (2003)

The CMP provides direction for meeting the goal of projects being consistent with existing laws, regulations and policies for protection of heritage resources, and to manage historic sites that typify the economic and social history of the region and American west for their preservation and restoration.

Several sites and areas were identified where additional protection measures would be required. The design criteria for this undertaking would address locations where additional protection measures are needed due to grazing related impacts within the scope of this undertaking. Resource issues and concerns not related to grazing are outside the scope of this undertaking and the Forest will address these issues as part of other undertakings as appropriate.

Specific CMP direction relative to this project include:

Her-S6: Consult with the Nez Perce Tribe to prioritize and manage plant, wildlife, and fishery species identified as important to Tribe for harvesting, gathering, and for cultural, spiritual, and religious activities. These consultations are part of standard staff to staff discussions between the Nez Perce Tribe and the Wallowa-Whitman National Forest.

Her-S7: In conjunction with the Nez Perce Tribe, protect American Indian sites, where determined to be necessary and desirable, using natural barriers such as native vegetation. Several sites and areas were identified where additional protection measures would be required due to dispersed motorized recreation. Forest Service heritage personnel visited these locations with Nez Perce tribal staff and, based on these on-site discussions, developed appropriate protection strategies.

Her-G2: Consider the use of a programmatic memorandum of agreement to help meet concerns of the Nez Perce Tribe regarding traditional use and prehistoric resources. There are no specific MOAs proposed for this undertaking.

Her-G3: Consider Nez Perce National Historical Park General Management Plan (USDI 1997) in protecting and providing interpretation for Nez Perce sites on the HCNRA. (CMP). One cultural area within the project boundary is part of the Nez Perce National Historical Park. The National Park Service is adding additional interpretation at this location.

Her-S8: Prevent degradation of heritage resource sites from domestic livestock grazing through appropriate practices. The primary focus of the analysis was to determine the effects of grazing on cultural resources within the analysis area. Additionally, the cultural resources inventory sought to identify all vectors of impact to cultural resources. In fact, the inventory suggests that dispersed motorized recreation is the primary source of impact to cultural resources in the project area. With regard to the cumulative effects, there is no spatial overlap of grazing and recreational impacts (refer to Recreation Resources section of this Chapter).

Her-S9: Conduct maintenance, renovation, and/or restoration activities involving listed or potentially eligible historic properties, in accordance with the Secretary's Standards for Rehabilitation of Historic Properties. (36 CFR 68). We identified several sites and areas where restoration work in the form of vegetation re-establishment is proposed. The Secretary's Standards for Rehabilitation of Historic Properties (36 CFR 68) are guiding principles for this restoration.

Her-G5: In cooperation with private landowners, develop mechanism for monitoring heritage resources on private lands within the HCNRA per the Private LURs. There are no private rangeland grazing permits within or associated with this undertaking, within the analysis area. The private landowners have not agreed to graze their private lands in the same manner as forest lands. Therefore, the effect of grazing on private lands to heritage resources is outside the scope of this undertaking. Furthermore, development of a mechanism for monitoring heritage resources on private lands within the HCNRA is outside the scope of this undertaking.

Her-S16: Maintain, stabilize, or restore the most significant representative historical structures within and outside of the Hells Canyon Wilderness. Allow other structures to deteriorate following appropriate data collection. Within the Hells Canyon Wilderness, allow structures or sites used in administration of Wilderness resources and permitted domestic livestock operations to remain. The Forest designated two sites within the project area as “priority heritage assets” under the Forest Service-Wide “Heritage Program Managed to Standard” protocols. This means that comprehensive, site-specific management plans for these sites are either in place, or under development. Part of this proposed undertaking involves an analysis of the adaptive reuse of the Dug Bar Ranch Complex. In addition, the CMP contains management direction for all historic structures within the project area. There are no elements of this proposed grazing permit issuance that involve modifications to this plan, the plan will serve as the guiding document for the management of all historic facilities with this project area.

Effects Analysis Methodology

Objectives and Expectations

The intent of the inventory was to identify all cultural resources 50 years of age or older within the APE for the undertaking. Additionally, the inventory also sought to provide management recommendations for all cultural resources within the APE, which meet the definition of “historic property” as defined in 36CFR800.

Field and Laboratory Methodology

Literature Search Methods

Heritage personnel conducted a records review for this project using resources located at the Wallowa Whitman National Forest Heritage Office in Enterprise and Joseph, Oregon. These resources include GLO Maps, Plat Maps, Master Title Index Maps, and other historic primary resources. Additional information concerning homestead entries, mineral entries, and other legal land transactions was obtained from the Bureau of Land Management’s Online Land Status and Cadastral Records Viewer (http://www.blm.gov/or/landrecords/survey/ySrvy1.php). Reports and site forms located in the Heritage Office in Joseph and Enterprise provided information about previous cultural resource inventories and previously recorded sites. Additional information was obtained using the Forest Service online database (Iweb/ INFRA). Heritage personnel used this information to determine the presence of known cultural resources and prior surveys in the project area. Prior to completion of this project, all of the reference material physically located at the Wallowa Mountains Office in Enterprise was lost in an office fire.

Survey Methods

Heritage personnel surveyed areas within the APE without prior adequate cultural resource inventory. Field crews do not inventory slopes greater that 15%, unless the literature search suggests historic human activity in that area (Reagan 1984). Survey transects are spaced 20 meters or less. Heritage personnel give special attention to areas of high visibility such as rodent mounds, stream cuts, areas of erosion, native surface roads and trials, and other natural and human-caused disturbance areas. All cultural resources located during the survey which are 50 years of age or older are documented based on Oregon State Historic Preservation Office Standards (Oregon State Historic Preservation Office 2009). Heritage personnel do not record objects such as isolated wire fragments, isolated and deteriorated metal fragments, isolated glass fragments with no distinguishably historic characteristics, and isolated wire nails. In addition, Heritage personnel did not record evidence of human activity confirmed to be less than 45 years old, as well as clearly modern loci of human activity.

Traditional Cultural Properties

National Register Bulletin: Guidelines for Evaluating and Documenting Traditional Cultural Properties says “to determine what constitutes a reasonable effort to identify traditional cultural properties is to consult those who may ascribe cultural significances to locations within the study area.” The Agency Official initiates consultation with interested parties, including Tribal Historic Preservation Offices and elected Tribal government officials through the Section 106 process of the NHPA and through the National Environmental Policy Act. If the Section 106 process or NEPA scoping identifies Traditional Cultural Properties, they will be evaluated through consultation with the THPO and SHPO offices. The Forest will depend on Tribal Feedback in order to identify potential traditional properties.

On February 28, 2013, The Forest sent letters requesting information regarding traditional cultural properties to the Nez Perce Tribe in Lapwai, Idaho, the Confederated Colville Tribes in Nespelem, Washington, and the Confederated Tribes of the Umatilla Indian Reservation in Pendleton, Oregon. In addition, the Wallowa-Whitman National Forest (in consultation with the above-mentioned tribes) is in the process of re-evaluating its approach to identifying and protecting traditional cultural properties and other places of significance. It is a work in progress, and the February 28, 2013 letters of request represents an attempt to improve efforts with regard to traditional cultural properties.

Indicators

For the purposes of this undertaking, the APE is defined as the intersection between areas within the allotments where cattle tend to congregate, and areas of defined as “high,” and “medium high” probably for past human use according to the WWNF Stratified Inventory Probability System (SIPS) (Reagan 1984:11). Cattle tend to congregate around water sources, fence lines, gates, salting stations, and on gentle slopes. Areas with high probably of past human use generally include slopes less than 15% within .25 miles of water, topographic prominences, and along major ridge systems and saddles.

Vertical and Horizontal Depth of Disturbance

Livestock congregation and concentration is the primary aspect of grazing with the potential to impact cultural resources. Livestock congregation can result in soil compaction, devegetation, erosion, trampling, and deflation—all of which can represent an adverse impact to archaeological sites. In addition to congregation, cattle also tend to create trails. Incised, braided cattle trails also represent a significant threat to cultural resources because they also cause soil compaction, devegetation, erosion, and deflation.

Potential Effects to Treaty Reserved Resources and Activities

For indigenous nations such as the Nez Perce, Cayuse, Umatilla, and Walla Walla, control of traditional resources is an absolute prerequisite for sovereignty and self-determination. What is more, these resources—including game animals, fish, plants for food, plants for traditional technologies, and plants used in medicine—are critical for the health and well-being of individual tribal members and the tribe as a whole (Abrahms 1996).

In a letter to the USDA Forest Service Planning Committee, Samuel N. Penny, Chairman of the Nez Perce Tribal Executive Committee (NPTEC), summarizes this importance and the resultant obligations it places on the Forest Service:

> *Today, the Nez Perce Tribe continues to exercise its treaty-reserved rights on these lands. Tribal members take fish in streams that run through NFS lands, hunt elk, bighorn sheep, deer and bison that reside on NFS lands, and gather berries, ceremonial medicines and wood located, in many cases uniquely, on national forest system lands. The perpetual existence of these rights was an absolute prerequisite to the [1855] treaty agreement between the Nez Perce Tribe and the United States, and that guarantee was memorialized in the treaty, and is in force today. It is imperative that the Forest Service, as a federal agency and manager of these lands, must administer them in a manner that is consistent with the rights and obligations attendant to the treaty, which is the supreme law of the land*
>
> *(Penny 2010).*

Due to the scale and extremes in elevation of the project area, the APE includes the habitats for a variety of important resources. These resources include elk, salmon, bighorn sheep, deer, and many other traditional resources.

Plants

The floral community within the LIRA area is diverse, owing to the extremes in elevation, topography, and aspect. As such, the list of culturally significant plants that exist within the analysis area is exhaustive. Most plants known to exist in Northeast Oregon between elevations of 1000 and 6000 feet likely occur within the project area. The project area is dominated by

bunchgrass communities, with shrub-dominated woody drainages, and mixed conifer communities in the uplands.

Berry Crops

The predominant berry crop in most areas of the project area is service berry. They generally occur in well-drained areas adjacent to streams. Huckleberry becomes more prevalent at higher elevations (above 4000 feet).

The Forest Service Wallowa Mountain Zone botanist (Hustafa, personal communication 2013) indicates that that cattle grazing generally has few direct impacts to these crops. Cattle may browse these shrubs incidentally, but they are generally too woody to be palatable for cattle. However, the indirect effects of trailing, trampling, and loafing occur within the project area, and can create localized areas of adverse impact to berry crops. Overall, Hustafa states that berry-producing shrubs in the project area are doing very well except in areas taken over by invasive Himalayan blackberries.

Root Crops

Root crops are abundant and varied in the project area, especially in the grassland dominated settings. Hustafa states that most biscuit root and camas species are tolerant and even thrive in areas of moderate ground disturbance. Another factor to consider is that most grazing occurs in the winter months, when these plants are dormant in most of the analysis area.

While camas and biscuit roots are thriving in the project area, Hustafa says the same is not necessarily the case for sego and mariposa lilies. Lilies are common in the project area, but it’s important to note that they are actively grazed by cattle. Hustafa believes that lilies would be more abundant in the project area with less cattle grazing.

Bunchgrasses

Literature review indicates that bunchgrasses are important for storing and caching, and traditionally served in the same role as modern wax paper to store dried berries, meat, fish, and processed root crops.

Bunchgrasses that occur in the project area include Idaho Fescue, bluebunch wheatgrass, red three-awn, sand dropseed, and prairie junegrass.

Cattle grazing can cause a decrease in the proportions of Idaho fescue, and prairie June grass, with a resultant increase in the proportions of red three-awn, and sand drop seed because they are less palatable to cattle.

Affected Environment/Environmental Consequences

Affected Environment

Indigenous Nations

The project is located within the territory ceded by the Nez Perce Tribe in 1855 (Nez Perce Tribe 1995). The lands ceded by the Nez Perce represent the “usual and accustomed places” for hunting, fishing, gathering, and pasturing livestock (Nez Perce Tribe 1995:9). By the terms of the 1855 and 1863 treaties, the Nez Perce Tribe reserves the right to conduct these activities on unclaimed land within this ceded territory.

In addition, the project area is within the usual and accustomed places of the Cayuse, Walla Walla, and Umatilla peoples (Confederated Tribes of the Umatilla Indian Reservation 2010). Refer to the Heritage specialist report in the project file for a more detailed description of the prehistory/history of the project area.

Environmental Consequences

Alternative 1 – No-action Alternative (no-grazing)

Direct and Indirect Effects of No Action:

Under the No Action Alternative, the existing grazing permits would expire after two years and no permitted grazing would occur. Discontinuation of permitted grazing would have no adverse direct or indirect effects to heritage resources. This alternative complies with all laws, regulations and policy pertaining to heritage resources. Since there is no federal action with the potential to impact heritage resources under the no action alternative, compliance with Section 106 of the NHPA and other laws, regulations, and policies is not required.

Effects Common to All Action Alternatives

Action Alternatives B, C, D, and E all include continued grazing. Impacts the cultural resource inventory emphasized were deflation, erosion, trailing, trampling, devegetation, and compaction. There are 39 cultural resources within the area of potential effects for grazing impacts. Grazing is evident at most of these sites in the form of manure, but it is not occurring at a level that is causing adverse impacts to these sites. At one site, there is evidence of excessive trailing and compaction, but the impacts are not so severe to change the site from NRHP eligible to not

eligible. In addition, some cattle grazing is occurring at cultural resource site locations where grazing is not permitted. While again, this grazing is not occurring at a level that is causing adverse effects to these sites, the fence reconstruction as proposed in Chapter 2 would eliminate grazing at these sites. If the management recommendations and project design criteria included in Chapter 2, and requirements in the Cultural Resources Inventory report (project file) are followed, grazing would have no direct or indirect impacts to cultural resources.

Alternative B – Current Management

Direct and Indirect Effects of Current Management

Current management has the highest potential to affect cultural resources because it does not address issues related to soil disturbance and rest cycles. Despite this alternative's higher potential to impact cultural resources, its impacts are still negligible. If the management recommendations and project design criteria included in Chapter 2, and requirements in the Cultural Resources Inventory report are followed, grazing will have no direct or indirect impacts to cultural resources.

Alternative C – Proposed Action

Direct and Indirect Effects of the Proposed Action

While the proposed action addresses impacts to soils better than current management (which has the indirect effect of greater potential to protect cultural resources), there is no measurable difference under the proposed action compared to current management.

Alternative D – Reduced Overall Head-Months through Adding Rest Periods

The effects to cultural resources under this alternative are the same as the Alternative C, the Proposed Action. However, because this alternative reduces overall head-months, the potential for future grazing-related effects to cultural resources is lower under this alternative.

Alternative E – Converting Lone Pine Allotment to a Forage Reserve

The effects to cultural resources under this alternative are the same as the Alternative C, the Proposed Action.

Cumulative Effects

Cumulative Effects Analysis

Past, present, and reasonably foreseeable activities that are likely to overlap in both time and space with the current undertaking include recreational activities of the public, issuance of special use permits, and other Forest Service administrative actions. However, these actions—

when considered in relation to the action alternatives for the LIRA area—are not likely to contribute to the incremental loss of cultural resources, nor are they likely to push cultural resources beyond the critical threshold of changing NRHP eligible sites to NRHP not eligible sites.

The primary reasonably foreseeable action that overlaps in time and space with the current project is the Dug Bar Interpretive Project. This project involves the installation of interpretive signage and monuments as part of the Nez Perce National Historical Park. The intent of the Dug Bar Interpretive Project is to enhance and interpret cultural resources. Therefore, it is not likely to contribute to the incremental loss of cultural resources, nor is it they likely to push cultural resources beyond the critical threshold of changing NRHP eligible sites to NRHP not eligible sites.

Summary of Effects Analysis across Alternatives

Direct and Indirect Effects

The cultural resources inventory indicated all of the action alternatives will have no adverse impact to cultural resources if the management recommendations and project design criteria stipulated in Chapter 2 are followed, along with the requirements in the Cultural Resources Inventory report. All alternatives adequately provide for the protection of cultural resources; however, Alternative D is marginally better because it has the potential for faster rehabilitation of the over-utilized spring location where minor impacts to cultural resources were documented. While the project addresses the impacts at this spring site in all alternatives, resting this pasture every few years would erase the impacts in a shorter period.

Cumulative Effects Summary

There are no cumulative impacts to Cultural Resources because all action alternatives for this undertaking adequately address cultural resource protection, and there are no present or reasonably foreseeable activities with the potential to impact cultural resources that overlap in time and space with the LIRA area.

Compliance with the Forest Plan and Other Direction

As described in the “Regulatory Environment” section above, all alternatives comply with applicable laws, regulations, policies, and management directions.

Fire and Fuels

The Lira Area is comprised of fuel models GR1 and GR2. GR1 is short, sparse dry climate grass. GR2 is low load, dry climate grass.

GR1 Description: The primary carrier of fire in GR1 is sparse grass, though small amounts of fine dead fuel may be present. The grass in GR1 is generally short, either naturally or by heavy grazing, and may be sparse or discontinuous. The moisture of extinction of GR1 is indicative of a dry climate fuel bed, but GR1 may also be applied in high-extinction moisture fuel beds, because in both cases predicted spread rate and flame length are low compared to other GR models.

GR2 Description: The primary carrier of fire in GR2 is grass, though small amounts of fine dead fuel may be present. Load is greater than GR1, and fuelbed may be more continuous. Shrubs if present, do not affect fire behavior.

Existing Conditions

The majority of the LIRA area is a GR1 fuel model. This occurs naturally in some areas, but is also attributed to current grazing management in the area. This fuel model during a wildfire event will produce moderate spread rates and low flame lengths (See Behave Run below for examples). Conditions near extreme for this fuel model in a wildfire event would produce flame length of approximately 2 feet, and a rate of spread at approximately 20 chains per hour (a chain equals 66 feet).

Effects

Under the no-action alternative (no grazing), a greater portion of the LIRA area would be best represented by a GR2 fuel model. The grass fuel load would be greater and you would see a more continuous fuel bed. This fuel model during a wildfire event would produce high spread rates and moderate flame lengths (See Behave Run below for examples). Conditions near extreme for this fuel model in a wildfire event would produce flame lengths of approximately 10 feet, and a rate of spread at nearly 200 chains per hour.

Under all of the action alternatives in the LIRA area, grazing will still be present resulting in much of the area remaining in a GR1 fuel model. The changes in timing or patterns of the grazing would not contribute to measurable differences from the existing conditions for the Fire and Fuels resource.

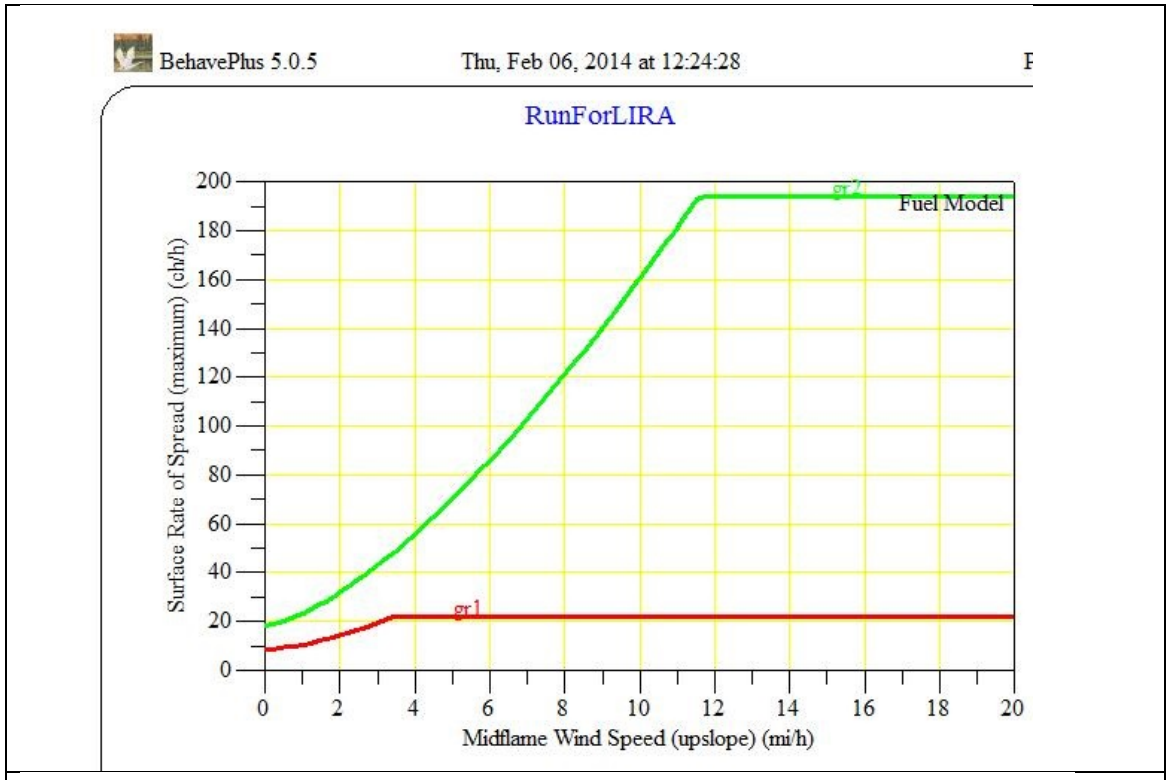
Continued use of existing stock driveways would have no effect on the Fire and Fuels resource.

Creation of new fences or the removal of existing fences would have no effect on the Fire and Fuels resource.

Summary

If the no-action alternative is selected, eliminating grazing from the LIRA area, much of the area would trend towards the GR2 fuel model. If the area trends toward GR2 with no grazing, the result would be faster moving wildfires with greater flame lengths making fire suppression efforts

more difficult. Fire behavior runs from Behave Plus are provided below to depict the difference in fire behavior between the grass fuel models GR1 and GR2.



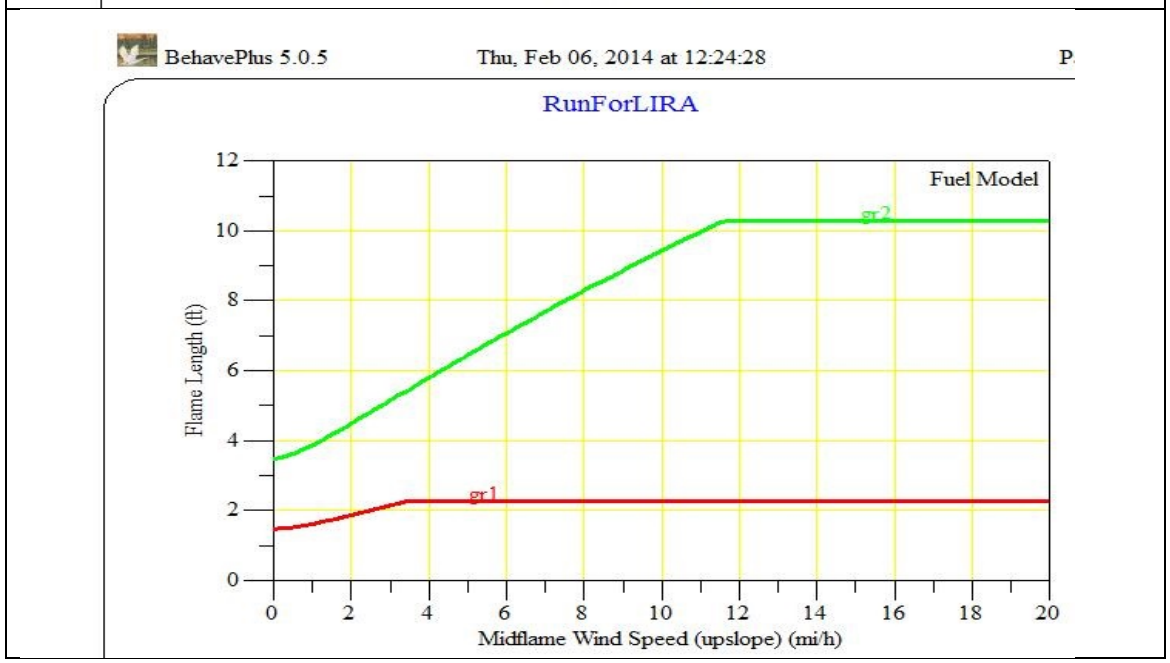


Figure Fuel 1. Model for rate of fire spread for No Grazing alternative (top) and action alternatives (bottom).

Socioeconomics

Introduction

This section describes the analysis of effects on Socioeconomics by permitted livestock grazing on the Cow Creek, Lone Pine, Rhodes Creek, and Toomey allotments (LIRA) of the Hells Canyon National Recreation Area administered by the Wallowa Mountains Office. The description along with the analysis, the expected and potential effects were assessed using data collected from a variety of publications, U.S. Census Bureau, county records, and professional judgment (see references). Site visits to the allotment and conversation with Wallowa -Whitman National Forest grazing permittee were conducted during the spring of 2013. Only those acres under National Forest ownership are considered in this analysis.

Livestock grazing has economic and social importance in the study area. Allotments support agricultural jobs and income as well as the ranching way of life for many families. Communities surrounding the National Forest Lands have deep rooted historical ties to agriculture. For many residents, ranching is more than just a form of employment; it is a way of life and supports long-standing family traditions. However, due to the multiple use nature of NFS lands, grazing may conflict with other land management goals such as potentially inhibiting healthy ecosystems and recreational opportunities. Many stakeholders value these services offered by the National Forest. The objective of this report is to describe the existing conditions, environmental justice issues, and the social and economic consequences of the alternatives.

Study Area

The primary assessment area for this project consists of Wallowa County in eastern Oregon. Communities are closely tied to the forest in both work activities and recreation. The main local communities in Wallowa County that are anticipated to be directly or indirectly affected by the proposed action and alternatives include Imnaha, Joseph, and Enterprise.

Existing Condition

The National Environmental Policy Act of 1969 (NEPA) requires integrated use of the natural and social sciences in all planning and decision making that affect the human environment. The human environment includes the natural and physical environment and the relationship of environment (40 CFR 1508.14). Furthermore, the Hell's Canyon NRA CMP also refers to the Section 7 of the Hell's Canyon National Recreation Act that aims to preserve the "valid and traditional uses" of Hells Canyon which includes grazing activities.

Natural resource based production has and continues to be a major staple in Wallowa County's economy. Oregon State University Wallowa County Extension Service provided economic data demonstrating that natural resource based production supported approximately 40% of the Wallowa County economy in 2012, an increase of approximately 10% from 2005 (Williams, 2012 and 2005). Natural resource based production includes ranching, farming, mining and wood products. Of the farming and ranching portion, livestock accounted for 45% of the farm gate sales in 2012. That means that when the livestock leave the farm, that is the value to the producer. That number does not account for the economic multiplier as the dollar works its way through the local economy. Changes in these natural resource based productions can impact the economics around the Wallowa-Whitman National Forest including Wallowa County, as well as other surrounding communities. This impact occurs in changes to purchasing of local goods for farming, ranching and mining which all require yearly maintenance materials; machinery for operation; improvements to ranch lands and dwellings; farm and industrial commerce; financial commitments to local veterinarian/supplies; and feeds and supplements. Revenue resulting from production and beef processing is a main source of income for many areas including towns such as Cottonwood, Idaho, Fossil, Oregon, and Hermiston, Oregon.

Due to the Lone Pine Allotment being vacant, there is currently one ranching family that relies on livestock grazing within the (LIRA) allotments and maintains their base ranch operations within Wallowa County. However, for the sake of this analysis there is an assumption that there could be a second ranching family that would maintain their base operation in Wallowa County if an alternative was selected where Lone Pine is stocked with a different permittee. Stocking of each allotment is described in terms of head-months (HM). A HM is a unit of measure that counts one animal for 30.4 days. A cow-calf pair qualifies as one animal in these calculations if the calf is 6 months of age or less. The Cow Creek Allotment permits 231 cow calf pairs (1,255 Head Months between November 1 and May 15) on the 5,824 acre allotment. The Lone Pine Allotment permits 300 cow calf pairs and 6 mature horses or mules from December 1 through May 31 (1,800 cattle and 33 horse/mule HMs between December 1 and May 31) on the 11,138 acre allotment. The Rhodes Creek Allotment permits 784 cow calf pairs (4,495 cattle HMs and 97 horse/mule HMs between November 1 and May 15) on the 22,660 acre allotment, of which 2,823 acres is private land. The Toomey Allotment permits 184 cow calf pairs from November 1 through December 31 and February 1 through May 15 (1,000 HMs between November 1 and May 15) on the 4,276 acre allotment. The permitted grazing land is located entirely in the Hells Canyon National recreation area (HCNRA).

Information provided in the Range Resources section of Chapter 3 of this EIS supports a conclusion that on an allotment wide-basis, rangeland conditions within the LIRA are generally satisfactory and in a upward trend.

Demographics

The total population in the study area in Wallowa County is 6,821 in 2012, according to Headwater Economics, January 2014. The population has declined slightly since 2010 (7,008). The population reached a peak in 2000 at 7,220; however fluctuations from 2000 to 2012 have occurred annually. From 2000 to 2012, the population shrank 394 people, a 5 percent decrease. This is common in agricultural communities around the nation. Transitions in

economic base and advancements in technology have led to declining populations in rural communities. However, longer term from 1970 to 2011, the population grew from 6,255 to 6,990 people, a 12 percent increase, compared to 53% for the United States. (Headwater Economics, January 2014).

Table E-6: Population and Growth Rate

	2000	2010	% Change
Wallowa County	7,226	7,008	-3
Enterprise	1,895	1,940	+2
Joseph	1,054	1,081	+3
Oregon	3,421,399	3,831,074	+12
United States	281,421,906	308,745,538	+10

Source: U.S. Census Bureau 2000, and 2010

reports the 2000 and 2010 population counts for Wallowa County and the State of Oregon, and the nation. Wallowa County has seen a modest decrease in population, in contrast the state of Oregon has had an above average growth rate during the ten year span in conjunction with the national average of 10 percent. The study area lacks a major metropolitan center. Wallowa County has had a below average growth rate while the State of Oregon has experienced an above average growth rate compared to the national average. However, longer term from 1970 to 2011, the population grew from 6,255 to 6,990 people, a 12 percent increase, compared to 53% for the United States. (Headwater Economics, January 2014).

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Source: U.S. Census Bureau 2000, and 2010

The median age of residents in the study area is approximately 48 years (U.S. Census Bureau, Wallowa County, 2010). The county seat of Enterprise is somewhat dominantly rural community, offering education and employment opportunities that the smaller towns in Wallowa County (Joseph, Lostine, and Wallowa) do not. County seats are predominately larger communities and this helps attract and retain younger residents. The median age of residents in Wallowa County continues to grow (See Table E-2) from 44-51 years of age in Wallowa County from 2000-2010. Rural areas often have trouble attracting and retaining younger residents due to a lack of education and employments opportunities. Often, when children leave home they relocate for higher education and do not return because career opportunities do not exist. Areas with an older demographic tend to have a higher percentage of retirees, and are thus less dependent on local employment conditions. Primary sources of income for retirees can include transfer payments and sources of investment income from outside the local region. Residents

of Wallowa County are more likely to depend on a mixed form of income from employment and non-labor sources, (transfer payments and investment income).

Table E-7: Median Age

	2000 Median Age (Years)	2010 Median Age (Years)
Wallowa County	44.4	50.5
Enterprise	43.8	46.0
Joseph	43.3	51.0
Oregon	36.3	38.4
United States	35.3	37.2

Source: U.S. Census Bureau 2010

The population density for Wallowa County is much less than the counties respective state

Table E-8). This is common in rural areas where the majority of land base is reserved for agricultural and natural resource-related activities. Clackamas County has the highest density at 200.1 people per square mile, many of whom live in Portland. Wallowa County has a population density of just 2.2 and Klamath County at 10.8 people per square mile.

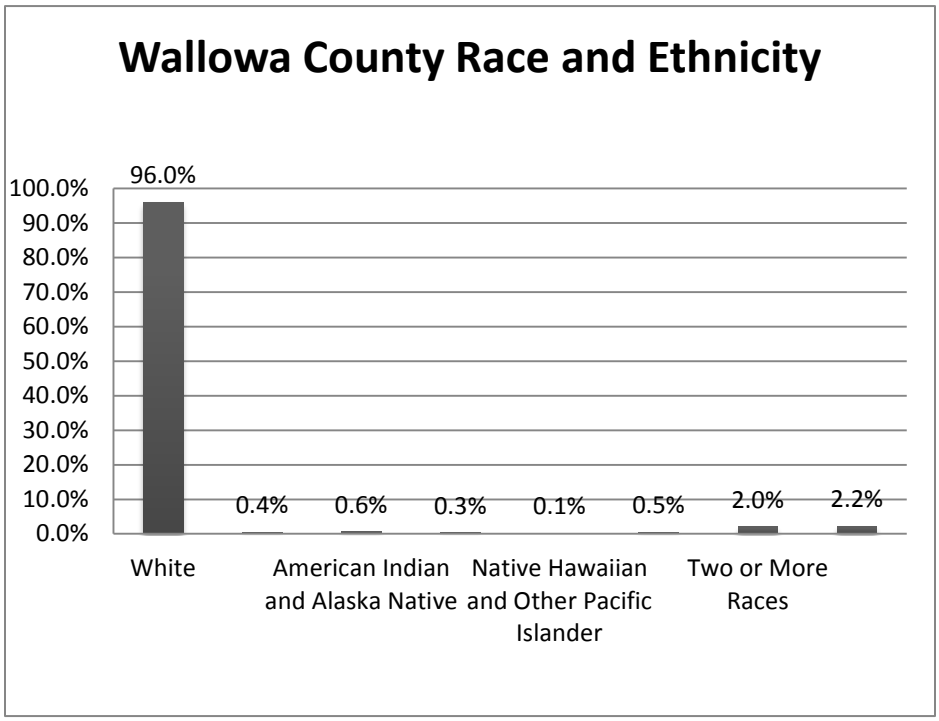
Table E-8: Population Density

2010	Population Density (People/Sq Mile)
Baker County	5.3
Wallowa County	2.2
Klamath County	10.8
Clackamas County	200.1
Oregon (State)	38.9
National	81.4

Source: U.S. Census Bureau 2010

Figure E-1 reports the racial and ethnic distribution for Wallowa County. According to Census definitions, Hispanic or Latino may be of any race. Because of this, summing the ethnic distribution in an area often results in a sum of greater than 100 percent; this is the case in Figure E-1 and Table E-9. The majority of the individuals in the study area self-identify as white, Wallowa County is identified at 96 percent. Hispanic or Latino constitutes the second largest racial group in the study area, at 2.2 percent of total population. This is driven by the relatively moderate proportion of Oregon residents who identify as Hispanic or Latino (11.7 percent).

Figure 1 Race and Ethnicity in the Study Area 2007-2011



Source: U.S. Census Bureau 2010Table E-9 reports ethnicity figures for Wallowa County and the State of Oregon independently. The State of Oregon has a lower percentage of whites than Wallowa County although it is more diversified throughout the other ethnic groups.

Table E-9: Ethnicity by County and State

	Wallowa County	State of Oregon
White	96.0%	83.6%
Black or African American	0.4%	1.8%
American Indian and Alaska Native (AIAN)	0.6%	1.4%
Asian	0.3%	3.7%
Native Hawaiian and Other Pacific Islander (NHPI)	0.1%	0.3%
Some Other Race	0.5%	5.3%
Two or More Races	2.0%	3.8%
Hispanic or Latino	2.2%	11.7%

Source: U.S. Census Bureau 2007-2011

Employment

The most recent US Census data for employment in the study areas are for the years 2007-2011. Given the changes in population, and possible changes to industry composition, employment data is reported simply as jobs, not full time equivalents (FTEs), thus one person with multiple jobs will show up more than once in the data. This prohibits the comparison to local population data provided by the US Census. Figure E-2 provides a visual breakdown of employment by industry in Wallowa County using local data. A secondary data source is utilized to report employment and income. According to Williams, 2012, Wallowa County economy generates 425 million in annual sales.

Figure E-2, Wallowa County Employment by Industry

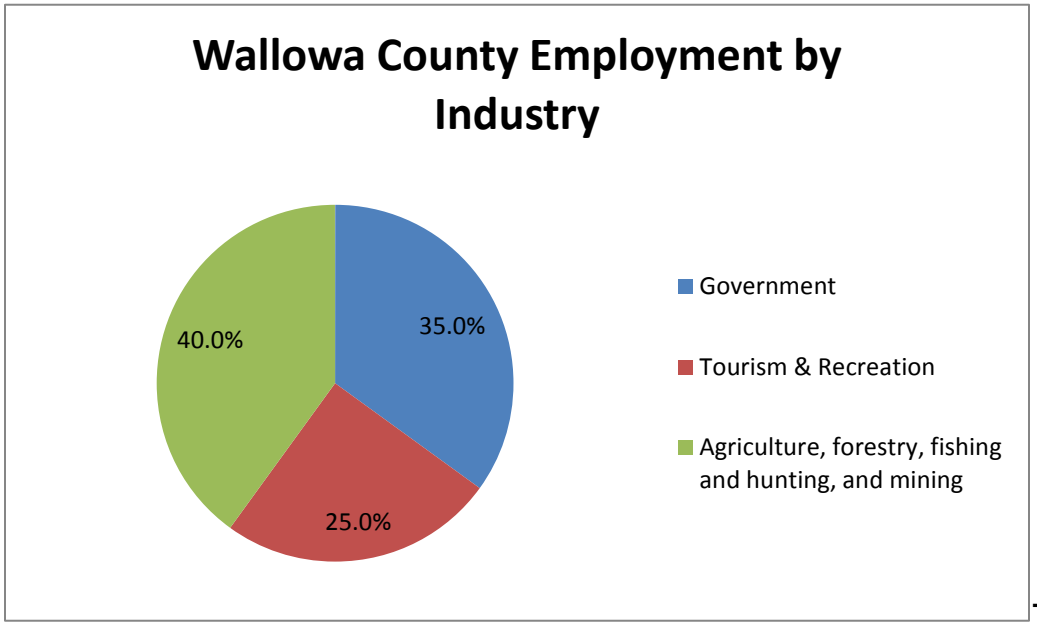


Table E-10 reports total employment by industry at the county level (Total employment in the study areas is 2,532 jobs). The largest employing sector in the study area is Government, followed by Service, agriculture, and trade. These sectors combined account for 68 percent of total employment. From 1970 to 2011, employment increased (Headwaters Economics, January 2014).

In Wallowa County, 19 percent of jobs are in the agriculture sector. Agricultural employment is less dominant in the state of Oregon and the United States where it accounts for approximately 5 percent and 3 percent of employment, respectively. To summarize, agricultural employment as a percentage of total employment is substantially higher in Wallowa County than both Oregon and the nation.

Wallowa County has a very low population density (compared to the state) and no major cities or towns. Clackamas, Marion and Washington counties account for the largest population in the State, although they are not in the study area they are represented (State of Oregon) in Table 5 and are a large component of the economic base in the state.

Table E-10: 2007-2011 Employment by Industry (# of Jobs)

	Wallowa County	State of Oregon	United States

Agriculture, Forestry, Mining, Fishing and Hunting	478	61,622	2,669,572
Construction	243	113,378	9,642,450
Manufacturing	198	201,509	15,281,307
Transportation, Information, and Public Utilities (TIPU)	86	76045	7,171,438
Trade	389	270,029	20,495,604
Service	553	308,719	24,790,091
Government	585	252,078	21,173,686
Total	2,532	1,283,380	101,224,148

Source: U.S. Census Bureau 2007-2011

Table E-11 further breaks down the agriculture sector into more disaggregated activities. Livestock ranching employment in Wallowa County is moderately higher than crop farming. Losing livestock production jobs in the study area could be devastating to the economy because other sectors would not be able to absorb the additional labor that would enter the market. Households would likely be forced to move in search of new employment opportunities. This is one likely cause of the decrease in population in recent years.

Table E-11: 2009 Employment in the Agriculture, Forestry, Fishing and Hunting Sector (# of Jobs)

	Wallowa County	**State of Oregon**
Crop Farming	34	25,911
Livestock	40	3,567
Forestry & Logging	66	6,057
Fishing, Hunting & Trapping	No Data	311
Ag & Forestry Services	18	10,832

Source: work source qualityinfo.org 2012Table E-7 reports the annual unemployment rates from 2000 through 2012 for Wallowa County, the state of Oregon and the nation. Wallowa County and Oregon maintained unemployment rates higher than the nation throughout the decade. This does not bode well for the economic health of the communities in the study area, which have fared far less than most during the recent economic downturn. Wallowa County had its highest unemployment rate in 2010 at 12 percent, which is substantially higher than the 9.6 percent experienced nationally. Wallowa County has a significant economic return in the travel and tourism industries. Tourism tends to suffer during recessions, which likely caused some of the increase in the study area's unemployment rate. As the economy rebounds, the areas of study should experience a decrease in unemployment.

Table E-7: Annual Unemployment Rates, Not Seasonally Adjusted

	Wallowa	**State of**	**United**

	County	Oregon	States
2000	7.5%	5.1%	4.0%
2001	9.2	6.4%	4.7%
2002	8.6	7.6%	5.8%
2003	9.8	8.1%	6.0%
2004	9.0	7.3%	5.5%
2005	7.5	6.2%	5.1%
2006	6.5	5.3%	4.6%
2007	6.1	5.2%	4.6%
2008	7.5	6.5%	5.8%
2009	11.8	11.1%	9.3%
2010	12.0	10.7%	9.6%
2011	11.2	9.6%	8.9%
2012	10.2	8.7%	8.1%

Source: Bureau of Labor Statistics 2012

Income

Another indicator of the overall health of the local economy is income. Table E-8 reports the labor income by industry for each county. Labor income is the sum of employee compensation. The sector with the most labor income in the study area is government, accounting for 21 percent of the total. Also government employment accounts for 23 percent of total jobs, which indicates that government employment is relatively high paying. Generally jobs in the agriculture sector are relatively low paying, however in this instance those jobs account for 19 percent of total employment, and 19 percent of total income for the study area.

Of total income in the State of Oregon, less than 1 percent comes from Wallowa County. Wallowa County accounts for less than 1 percent of total labor income earned in the agriculture sector. Agriculture has much less of an influence over the labor income in the state (4.4 percent) than in Wallowa County. In summary, the majority of land base remains in agricultural use, and there are many ranching families whose livelihoods depend on income from that sector. Economic activities in the larger communities of the state have a tendency to dilute the importance of agriculture when analyzing the economic data. However, these activities remain of social consequence to the entire study area. From 1970 to 2011, personal income grew from $139.1 million to $243.4 million, a 74 percent increase.

Personal income is significantly lower (approximately 20%) in Wallowa County compared to the State of Oregon. Out of 36 counties, Wallowa County is 35th for income per individual in 2012 according to the Oregon Employment Department. Determining the income of an individual rancher or employee of a ranch is difficult due to wide variation in economics factors specific to each operation. However, an analysis of a subset of Wallowa County ranchers suggests that an average ranch laborer annual income is around $27, 652 (Williams, pers. comm. 2014), which is lower than the 2012 average individual income amount within Wallowa County of $29,654 (Oregon Employment Department, 2012).

Table E-8: 2012 Labor income by Industry (2012 USD, Thousands)

	Wallowa County	State of Oregon
Agriculture and Mining	$36,384	$4,733,029
Construction	$30,727	$5,419,007
Manufacturing	$24,142	$ 17,799,881
Transportation, Information, and Public Utilities (TIPU),Trade	$35,850	$ 30,386,676
Service	$20,891	$ 4,020,826
Government	$38,615	$ 44,514,406
Total	$186,609	$106,873,825

Source: work source qualityinfo.org 2012.

Table E-12 further breaks down the labor income earned in the agriculture sector. Wallowa County generates 61 million from livestock according to Williams, 2012; this is comparable to crop farming operations which account for 32 percent of labor income in the study area (agriculture sector). Conversely the state's percentage from livestock is 8 percent, which is indicative that the livestock industry is not as crucial of a component in the state as in the study area. These data highlight the major role that livestock operations play in the study area economy.

Table E-12: Labor Income in the Agriculture, Forestry, Fishing and Hunting Sector (2009)

	Wallowa County	State of Oregon
Crop Farming	$32,874,000	$643,325,000
Livestock (Cattle)	$27,455,000	$106,112,000
Forestry & Logging	$2,897,000	$286,593,000
Fishing, Hunting & Trapping	No data	$18,874,000
Ag & Forestry Services	$672,000	$275,144,000
Total	$5,820,000	$1,330,048,000

Source: work source qualityinfo.org 2012, Williams 2014

Livestock Grazing

Livestock grazing is an important component of the socioeconomic environment. A large portion of the land base in the study area is dedicated to agricultural use, of which livestock production is an important element and a common activity. Many families depend on livestock grazing as a source of income, but it also supports a way of life and family traditions. Table reports the volume of cattle and calves by county and state. The trend is misleading, the figures from 1997 and 2002 are from USDA NASS data, 2007 and 2013 is actual data from Wallowa County. In the last 10 years the volume of cattle in the study area has remained relatively consistent with a slight declining trend over the past 5 years (Williams pers. comm. 2014). During this time

period, Wallowa County supported approximately 3 percent of total cattle in the State of Oregon; this further illustrates Wallowa County's dependence on livestock as an economic driver, as well as the states dependence on these counties, which provide a significant economic value to the state. This reinforces the importance of cattle ranches in Wallowa County to continue purchasing inputs to production in the state's cattle industry due to the states limited economic cattle base. Therefore, major reductions in cattle inventory in Wallowa County could be detrimental to communities and adjacent counties throughout the study area and state.

Table E-10: Inventory of Cattle and Calves (# of Head)

	Wallowa County	State of Oregon
1997	51,935	1,522,751
2002	36,749	1,360,025
2007	66,601	1,389,189
2013	63,995	N/A

Source: USDA NASS 2012, Williams 2014

According to the 2013 Cattle Worksheet for Wallowa County that collects data for livestock production within the county, fed steers & heifers sold for an estimated average of $125/ cwt in 2012-2013. Fed steers and heifers are cattle where the operator retains ownership of the animals until they are generally between 12 and 24 months of age. It is assumed that the permittees that are or would be permitted in the LIRA are would retain ownership of their livestock, although that could change depending on the markets and operator. The current permittee retains ownership to market their livestock through a natural beef cooperative and grass fed program, and may realize a price per hundred weight that is different from the generic market due to marketing through a specialized program with particular requirements for participation. The revenues generated by the permittees on these allotments are generally returned to the local community through fuel consumption, capital investments, veterinary fees, fence materials, animal feeds and supplements, water system supplies, as well as other maintenance necessities. These revenues generally also trickle into other adjacent communities.

For most ranching families, raising livestock is more than a job. It is a lifestyle that has been part of their families for generations, in which they have grown accustomed, take pride in, and want to preserve for the future. The current permittee is a fourth generation ranching family. For more information, refer to the social history section in chapter 1 and in the Range Resource Specialist report. Most operations use grazing permits on National Forest Lands to supplement other grazing opportunities. Currently, there are 4 grazing allotments in the planning area, authoring livestock grazing of 8,680 HMs.

The LIRA allotments are unique because of the continuation of winter season of grazing that has been occurring in Hells Canyon for the about the last 300 years. Grazing the LIRA area during the summer is unfeasible due to extreme heat and lack of adequate stock water. The current permittee evolved from grazing sheep in the 1920's to cattle grazing in the 1945 in the LIRA area (Lightning Creek). They are the only remaining "year round" livestock operation

authorized on the Wallowa Mountains Zone. They have wintered livestock in the HCNRA since the 1920's and summered livestock on NFS land since at least the 1950s. Long standing family ran ranching operations contribute to the local culture and tradition of the local community they are part of, this holds true for the LIRA area.

Environmental Justice

As stated in Executive Order 12898, it is required that all federal actions consider the potential of disproportionate effects on minority and low-income populations in the local region. The principles of Environmental Justice require agencies to address the equity and fairness implications associated with Federal land management actions. The Council on Environmental Quality (CEQ) provides the following definitions in order to provide guidance on compliance with environmental justice requirements:

- "Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis..."
- "Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect." (CEQ 1997)

According to the US Census data reported in Table E-9; Hispanic or Latino populations occupy the largest sector of the minorities in Wallowa County (2.2%). The next sector includes those identified themselves as mixed race at (2.0%). Wallowa County is also represented by American Indian and Alaska native population of (0.6%), refer to Table E-4.

Based on the minority status data presented above, environmental justice issues appear unlikely. However, even in counties with relatively small minority populations, disproportionate impacts to vulnerable groups may occur.

The poverty rate for all geographic regions reported in **Error! Reference source not found.** increased between 2000 and 2011. Poverty rates have been on the rise nationally due to declining economic conditions. Each county has consistently had a higher poverty rate than their respective state. Given the high poverty rates, it is important to consider the impact of alternative development scenarios on local income, and the potential effect on low income populations.

Table E-13: Percent of Population below the Poverty Level, All Ages

	2000	2007-2011
Wallowa County	14.0	15.9%
Wallowa	22.0	10.9
Joseph	12.2	21.4
Enterprise	11.3	12.0
Oregon	11.6	14.8%
United States	12.4	14.3%

Source: U.S. Census Bureau, 2000 and 2008

The Forest Service does not maintain records on the minority status of permit holders and does not discriminate in the permitting process. However, for this exercise it is important to know the permittee is grooming the next generation to take over operations, which are three daughters. This project does not generate disparate impacts to civil rights, women or minorities. The project alternatives, given the size of potential social and economic effects, are also not likely to result in civil rights impacts to Forest Service employees or customers of its programs.

Environmental Consequences

The previous sections assessed social and economic conditions and trends. The following section will consider the potential consequences of alternative management scenarios on the social and economic environment.

Data and Methodology

Economic impacts: The economic effects of the three management alternatives were assessed in terms of grazing viability, local employment supported, and the cost and benefit to the community/Counties.

Economic efficiency: Analysis was conducted with program revenues and ranching operation expenditures were provided by resource specialists.

Social impacts: Were determined by identifying how management changes may alter the conditions and trends presented in the Affected Environment section.

Assumptions

1. The economic efficiency analysis does not provide actual data for the ranching operations that are or could be within the LIRA area or a full accounting of all costs and benefits, but is based off of a combination of the best available data related ranching in the state of Oregon and to ranch costs in Wallowa County. The only benefits considered are program revenues (i.e., National Forest receipts) and the Wallowa average price as of fall 2013 for fed steers and heifers ($125/cwt according to the Wallowa County Cattle Worksheet 2013). The only costs considered are direct ranching operation expenditures (Forage expense). Although other ranching expenses are

apparent; it is problematic to quantify as the expenses may change from year to year due to unforeseen scenarios. Therefore, the estimates of Social and Economic Efficiencies by Alternative do not fully account for the social costs and benefits of management actions.

2. The framework for the social analysis employs generalities. Area residents and users National Forest have diverse preferences and values that may not be fully captured in the description of social consequences. Nevertheless, generalities are useful for assessing social impacts based on particular National Forest -related interests.
3. The Economic Viability Change is calculated by subtracting the sum of National Forest grazing fees (HMs multiplied by the federal grazing fee) from the replacement cost of this forage from private providers (HMs multiplied by private grazing fee). Economic Viability Change is the difference between what ranchers are willing to pay for forage and what they are required to pay for forage. (**Table E-12** is calculated over a 4 year period; surmising many of the calculations throughout this document refer only to one grazing season).

Alternative A – No Grazing

Under this alternative, the current permits for the LIRA would be cancelled within 2 years, upon notification of the decision as required by 36 CFR 222.4(4)(1), and directed in the R6/PNW Supplement FSH 2209.13-2005-1, section 16.24. Livestock grazing would no longer be authorized within LIRA, resulting in 8,680 HMs of cattle grazing eliminated from National Forest Lands.

All range developments currently in existence on the allotment would be abandoned. Subsequent NEPA decisions may need to be made regarding retention of any improvements (such as water developments) for other resource needs, and funding for maintenance may need to be secured. All interior fences and any water developments not needed for wildlife or other purposes may need to be removed. Permittees may be reimbursed for their amortized share of cooperative range improvements where they participated in the development (FSH 1109.13 Chapter 70). Exterior allotment boundary fences may be assigned to adjacent permittees for continued maintenance.

Direct and Indirect Effects

The NFS lands would not provide any value to the profitability of the ranching operations that depend on the (LIRA) allotments, since livestock grazing would no longer be authorized. This would be a 100% reduction in value added to livestock on NFS lands. According to Williams and Sorte (2005), reducing the land available for grazing can cause ranchers to reduce herd sizes, and use rangeland that could have been used to grow their operations to offset this loss, or terminate their operations.

In the long term, the decline in ranching will reduce the whole economy. There are conflicting opinions on the ability of natural resource based economy to restructure enough to overcome this kind of shock. A good deal of speculation has been expressed as natural resource based industries have contracted in rural areas of the West. The speculation suggests that other

industries can be recruited to replace the natural resource based industries. There are very few successful examples of this happening. Typically the recruited industries have lower wage scales (e.g. tourism related service industries) ….and the often leave when less expensive source of labor can be found (e.g. call centers), Williams and Sorte, 2005.

The LIRA area is unique because it is grazed in the winter, this changes the cost analysis of replacement forage. In Wallowa County in the winter there are very few opportunities to pasture cattle out, and the majority of the livestock are put on hay for about an average 120 day feeding season from December to April. Feeding hay is an expensive input cost for ranchers in Wallowa County, on average the second most or potentially more costly input than labor. For this analysis it is assumed that during the time that cattle are not on summer range (November through late May) the private replacement cost of NFS managed forage would be a combination of private land leases (for one month on either side of the hay feeding season) and the cost of feeding hay for four months. Using an average private grazing fee of $22.00 in Wallowa County Oregon (Personal Conversations Dan Warnock, Linda McLean and Jamie McCormack) over the past three years (2010-2013), and 2013-2014 average market value of hay and alfalfa, the private replacement cost of NFS-managed forage would be $436,156/year for 1,295 head that could be grazed within the project area. In contrast, the cost of NFS-managed forage would be $11,718 (8,680 HMs multiplied by $1.35 federal grazing fee). Therefore, the replacement of NFS-managed forage for private forage would cost ranchers an additional $424,438 in the LIRA area (see Economic Specialist Report appendices in the project file for calculations and additional assumptions). However, fees account for only one portion of the total cost of grazing. Rimbey and Torrell (2011) find that the cost differential between public and private grazing is not what is suggested by the grazing fees. Once they account for other grazing-related costs (e.g. maintenance, water, salting, riding, etc.), the cost difference is eliminated. Indeed, in their study of three western states (New Mexico, Wyoming, and Idaho) the authors find that the total cost of a public land AUM exceeds the total cost of a private land AUM. Nevertheless, it is possible that the reduction in available forage (through the elimination of grazing on National Forest Land) would increase the private grazing fees, due to increased demand from ranchers seeking to replace lost forage. However, this situation is unique because of the winter grazing. There is extremely limited private winter range available for lease in Wallowa County, therefore the permittees would have secure fall and early spring private land leases and feed 1,295 head for approximately 4 months. The other option would be to send the livestock out of county during the winter, the calculations for that scenario are not accounted for in this analysis because they are highly variable and speculative to forecast.

In the “History of Grazing in Wallowa County” in 2005, Williams did interviews with local ranchers and had the following finding:

> “ The general public has a perception that grazing on federal land is cheap because grazing fees are relatively inexpensive (Birkmaier, 2005; McClarans, 2005). However, restrictions are constantly being added, maintenance costs continue to increase, and more labor is required today versus the past because more riding is being done to keep cattle moving. Time converts to more money (Birkmaier, 2005). Jack McClaran says he worked with Dr. Fred Obermiller to compare costs of federal land to renting private land, and they concluded the total cost of everything such as fences, transportation, packing

> equipment and supplements in to remote areas, and time, comes out to be more expensive than rent of private grazing land (McClaran, 2005)."

As described in the Income section, agriculture accounts for 19 percent of study area employment, and 19 percent of study area income. This finding suggests that individuals who work in the agriculture sector have moderate incomes. Based on this, it is reasonable to assume that the poverty rate is may be higher among individuals employed in the agriculture sector than those employed in other sectors (e.g., government). This raises the possibility of environmental justice consequences. The cost of elimination of grazing on the National Forest could fall most heavily on individuals most vulnerable to economic change.

The social consequences of Alternative A are not fully captured in the economic impact analysis. Although Alternative A would eliminate approximately 11 sources of income (9 fulltime and 2 temporary/seasonal) in the study area than the action Alternatives B through E, this does not suggest that only 11 individuals would be affected by Alternative A. All individuals (and members of their households) who rely on forage from the National Forest lands would be affected. Socially, livestock grazing contributes to local sense of place. The study area continues to be heavily influenced by agriculture. Shifts away from agricultural land uses may challenge residents' values. Comments received from the local community in relation to the LIRA analysis process validate that statement.

Alternative A would not produce revenue from grazing fees; in turn revenue for the counties in the study area would be reduced; although some administrative costs of limited rangeland management may continue (e.g. trespass livestock, removal of fences, maintenance of water for wildlife, etc.). Williams, personal communication 2014 and Williams and Sorte 2005, suggests that the total effects to Wallowa County for every head of livestock that is reduced would be an economic loss to Wallowa County of $2,337 per year (direct effect to ranchers, indirect effects to ranching support services, and induced effects to expenditures of ranchers/support services in the form of money that go back into the community).

Cumulative Effects

As the section described, Wallowa County may be experiencing a number of trends that compromise their social and economic resiliency. The consequences of a loss of grazing opportunities on the National Forest could be exacerbated by expected future conditions and trends. Recall several conditions and trends and their implications for study area residents:

(1) Low population density generally indicates less developed infrastructure, which contributes to social and economic isolation.
(2) Low (or negative) population growth signals stagnant or declining economic opportunities in the study area.
(3) High poverty rates and low per capita income indicate less access to capital needed to start businesses and expand economic opportunities.
(4) Low education rates signal lower human capital, which is an important element of social and economic well-being.

(5) A high median age in the study area suggests that retirees make up a large percentage of the population, which means that a smaller percentage of area residents are employed (or seeking employment) compared to the state and nation.

(6) Approximately 19 percent of the study area is dependent on livestock/Agriculture for employment and income.

Williams and Sorte, 2005 suggest: "Cattle ranching has been an important stabilizing and basic sector of Wallowa County's economy through the decline of the timber industry. It may help the county weather the eventual slowing or decline of the recreation industry."

Under all management scenarios (action alternatives), these conditions and trends are expected to continue. However, the elimination of livestock grazing on these National Forest allotments could accumulate with the consequences of these trends to produce results that are more pronounced than predicted by the economic impact analysis. Fewer opportunities for residents to engage in agricultural activities could hasten population decline and increase poverty rates. Fewer economic opportunities in the study area would also likely contribute to the out-migration of young individuals in search of educational and employment opportunities. Fewer young and educated individuals would reduce the probability that new businesses may locate in the study area. The impact of grazing decisions under Alternative A on these trends would likely be minimal; any decisions regarding National Forest management are unlikely to change the trajectory of these trends. Nevertheless, the removal of grazing from the National Forest could, particularly for some individuals, magnify existing social and economic trends.

Williams and Sorte 2005 did an economic analysis of the effect to Wallowa County if grazing privileges were eliminated on the Wallowa-Whitman National Forest in the Joseph Creek Rangeland Analysis Area. Many of the cost of inputs have stayed in proportion with the income once the livestock is sold from 2005 to 2013 (Williams, pers comm. 2014). Under the same management and analysis assumptions as the analysis in 2005, adjusted to 2013 for the LIRA analysis, the conservative present value for the potential loss of 1,295 head of livestock (all four LIRA allotments) would be approximately 1.25 million dollars to the Wallowa County economy annually. This loss would persist as long as the LIRA allotments are closed to grazing.

Across the entire area, many of the allotments within the HCNRA have been closed allotments since 2003, ore before. Therefore if these 4 LIRA allotments were also closed, a large opportunity to preserve the valid and traditional use in a large portion of the HCNRA where grazing is authorized, would be lost.

Alternative B – Current Management

Alternative B represents the Current Management. This alternative would authorize livestock (cattle) and an incidental level of horse grazing within the LIRA allotments. The level of permitted use would be similar to past levels that have been authorized through term grazing permits (FSH 2230 2231.11 and 2231.13), which are administered each year by annual instructions and authorized by the payment of grazing fees (FSH 2230 2231.41).

Direct and Indirect Effects

Under Alternative B, grazing activity on the National Forest lands would support approximately 11 jobs (9 permanent and 2 temporary/seasonal assuming 4-6 months of labor) and approximately $248,868 (annually) permanent labor income and approximately $18,434 (annually) for the seasonal work force in the study area.

The ranchers would be responsible for the range improvement maintenance assigned in the Term Grazing Permit and a portion of the cost of construction of infrastructure improvements – approximately $11,718 annually for grazing permit (8,680 HMs x $1.35 permit grazing fees) and an underdetermined amount for infrastructure. This cost reduces the forage expenses to ranchers from $436, 156 ($22.00/HM private land and 2.44$/day/head to feed hay) to approximately $34, 044. This accounts for a small portion of the herd in Rhodes Creek and Toomey are put on feed for 30-45 day feeding period on private land within the grazing season (for specifics see Chapter 2). As discussed in the Assumptions section, the economic efficiency calculations use only the difference between private and public grazing fees or fed replacement forage (hay). The actual consumer surplus of ranchers will be influenced by other costs associated with grazing.

Cumulative Effects

No cumulative effects are anticipated under Alternative B.

Alternative C – Proposed Action

Alternative C represents the Proposed Action. The proposed action is similar to Current Management in Cow Creek, Rhodes Creek, and Lone Pine allotments, with several site-specific changes to management in the Toomey Allotment. These changes include creation of an additional pasture and adaptive management driven grazing rotation plan, as well as reconstruction and addition of water improvements. This alternative was driven by the significant issues and other analysis issues identified by the public and interdisciplinary team.

Direct and Indirect Effects

Under Alternative C, grazing activity on the National Forest lands would support approximately 11 jobs (9 permanent and 2 temporary/seasonal assuming 4-6 months of labor) and approximately $248,868 (annually) permanent labor income and approximately $18,434 (annually) for the seasonal work force in the study area.

The ranchers would be responsible for the range improvement maintenance assigned in the Term Grazing Permit and a portion of the cost of construction of infrastructure improvements – approximately (8,680 HMs x $1.35) $11,718 annually for grazing permit fees and an underdetermined amount for infrastructure. This cost reduces the forage expenses to ranchers from $436, 156 ($22.00/HM private land and 2.44$/day/head to feed hay) to approximately $34, 044 for 1,295 head of livestock. This accounts for a small portion of the herd in Rhodes Creek and Toomey are put on feed for 30-45 day feeding period on private land within the grazing

season (for specifics see Chapter 2). As discussed in the Assumptions section, the economic efficiency calculations use only the difference between private and public grazing fees. The actual consumer surplus of ranchers will be influenced by other costs associated with grazing.

Cumulative Effects

No cumulative effects are anticipated under Alternative C, as there are no reductions in HMs.

Alternative D

Alternative D represents the greatest change from current management across the project area. Alternative D would incorporate the Lone Pine Allotment into the Cow Creek, Rhodes Creek, and Toomey Allotment pasture rotations. This alternative provides additional opportunities for rest and deferment of pastures within all four allotments. A reduction in use would be realized by the rest periods scheduled for each allotment.

Direct and Indirect Effects

Under Alternative D, grazing activity on the National Forest lands would support approximately 10 jobs (7 permanent and 1 temporary/seasonal assuming 4-6 months of work) and approximately $193,564 (annually) permanent labor income and approximately $9,217 (annually) for the seasonal work force in the study area.

The ranchers would be responsible for the range improvement maintenance assigned in the Term Grazing Permit and a portion of the cost of construction of infrastructure improvements – approximately (3 yr avg. 7, 135 HMs x $1.35) $9,632 annually for grazing permit fees and an underdetermined amount for infrastructure. This alternative assumes there would be 995 head in the LIRA area grazing in all four allotments. This cost reduces the forage expenses to ranchers from $334,314 ($22.00/HM private land and 2.44$/day/head to feed hay) to approximately $30,354. This accounts for a small portion of the herd in Rhodes Creek and Toomey are put on feed for 30-45 day feeding period on private land within the grazing season (for specifics see Chapter 2). As discussed in the Assumptions section, the economic efficiency calculations use only the difference between private and public grazing fees. The actual consumer surplus of ranchers will be influenced by other costs associated with grazing.

Absorbing the Lone Pine allotment into the grazing rotation with Cow Creek, Rhodes Creek, and Toomey allotments would eliminate the opportunity for a new ranching family to obtain the Lone Pine allotment Term Grazing Permit or the opportunity for expansion of a current ranching family. This would have an indirect negative effect to Wallowa County by the potential loss of inhabitants and business's contribution to the local economy. It would however, allow opportunities for rest on the Cow Creek, Rhodes Creek, and Toomey Allotments for resource benefit which would benefit the present permittee by allowing more flexibility to the grazing rotation and reducing further the low risk of potential livestock number reduction to meet management goals into the long term.

Cumulative Effects

This alternative would not reauthorize the Lone Pine allotment as a stand-alone term grazing permit with a separate permittee. However, this alternative would likely increase the viability of grazing in the LIRA allotments for the current permittee by increasing flexibility in the grazing system amongst four allotments. The cumulative effect would be the potential loss of a ranching family (inhabitants and business income) from the economy of Wallowa County by not offering the opportunity to separate rancher for the Lone Pine Allotment Term Grazing Permit. The economic cumulative effects would be similar as described for Alternative B, only specific to the Lone Pine Allotment.

Alternative E

The Lone Pine Allotment would be utilized as a Forage Reserve through a Temporary Grazing Permit (R6/PNW FSH 2209.13) for permittees that have lost forage due to wildfire or are in voluntary resource protection non-use in their permitted allotment. This alternative was driven by the public, permittees, and multiple congressional inquiries regarding available forage due to losses from wildland fires in adjacent areas from 2006-2012. This alternative is also driven by the IDT to potentially provide rest to adjacent allotments in the Imnaha River Canyon, or summer grazed allotments with resource concerns. Under Alternative E the same management proposed in Alternative C would apply to the Cow Creek, Rhodes Creek, and Toomey Allotments.

Direct and Indirect Effects

Under Alternative E, grazing activity on the National Forest lands would support up to approximately 11 jobs (9 permanent and 2 temporary/seasonal assuming 4-6 months of labor) and approximately $248,868 (annually) permanent labor income and approximately $18,434 (annually) for the seasonal work force in the study area. Number of people employed would depend on whether the Lone Pine Allotment was being utilized as a forage reserve or not. During rest years in the Lone Pine Allotment there would be a decrease in an assumed annual labor income of 2 full time and 1 seasonal employee totaling $64,521.

This discussion relates specifically to the Lone Pine Allotment; see Alternative C for discussion of the Cow Creek, Rhodes Creek, and Toomey Allotments. The forage reserve would be utilized on a request basis. The Lone Pine Allotment would be rested one in every 4 years. Ranchers that request and are authorized use would be responsible for the range improvement maintenance assigned in the Temporary Grazing Permit and a portion of the cost of construction of infrastructure improvements – approximately (1,800 HMs x $1.35) $2,430 annually for grazing permit fees and an underdetermined amount for infrastructure. This cost reduces the economic efficiency of ranchers from ($22.00/HM private land, and 2.44$/day/head to feed hay for the non-summer range portion of the year) from $98,610 to $2,430 for the year the forage reserve is used for 300 head. As discussed in the Assumptions section, the economic efficiency calculations use only the difference between private and public grazing fees. The actual consumer surplus of ranchers will be influenced by other costs associated with grazing.

Cumulative Effects

If the Lone Pine Allotment was not utilized as a Forage Reserve because of no wildfires or need to rest other allotment pastures, economically, the loss of the utilization of the 1,833 HMs the Lone Pine Allotment provides may have an adverse and irreversible financial effect to the ranchers operations.

The ranchers may accrue the additional cost for private land grazing at a (potentially) variable rate; the rate would depend on available land and resources in the immediate vicinity. With an influx of cattle to the surrounding private lands; may lend to reason for a higher demand and higher private land grazing fees. Similarly if no land is available the rancher may have to incur another unexpected cost of transporting the animals to a location that makes it too financially demanding to continue operations. Other options include the rancher purchasing feed for their livestock for that grazing season at current prices which may fluctuate with the market, making it improbable to determine actual cost.

Summary of Effects

Table E-12 – Social and Economic Efficiencies by Alternative for the LIRA

Indicator	Grazing Viability Over 4 Years				
	A	B	C	D	E
Cow Calf Pairs LIRA	0	1,295	1,295	995	1,295
Annual x 4 Federal Accounting					
Federal Head Months (figured to cow-calf)	0	8,680	8,680	yr 1: 7,680 yr 2: 6,880 yr 3: 6,847 avg=7,135	yr 1: 8,680 yr 2: 8,680 yr 3: 8,680 yr 4: 0
Total Federal Grazing Fees ($1.35/HM) x 4 Yrs	0	$46,872	$46,872	$38,429	$46,872 maximum 3 out of 4 yrs
Federal Payments to Local Forests x 4 Yrs	$0	$11,718	$11,718	$9,607	$11,718
Annual Non-Federal Accounting					
Non-Federal Head Months / feed costs (private land grazed/hay) x 4 Years	105,696 HM / $3,544,128	25,062 HM/ $ 839, 577	25,062 HM $ 839,577	18,783 HM $ 629,819	25,062 HM $ 839,577
Total Head Months x 4 years	105,696	105,696	105,696	101,952	105,696
Total Annual Employment	0	7-10	7-10	7-8	7-10
Gross Annual Income (x 4 years) Generated	0	$995,472 permanent	$995,472 permanent	$774,256 permanent	$995,472 permanent $73,736 seasonal (if

from Livestock Minus grazing fees (Grazed on Federal Land and on Private Land)		$73,736 seasonal	$73,736 seasonal	$36,868 seasonal	not using Lone Pine reduce by $64,521 annually)
Economic Return to Wallowa County (x 4 years)	$12,105,660	$12,105,660	$12,105,660	$9,301,260	$12,105,660
Economic Viability Change	Substantial Change	No Change from current condition	No Change from current condition	Slight Change	No Change or Slight Change

Federal head months were based on number and duration of livestock within the allotment.

Non-Federal head months were assumed to be the number of livestock head months during the "off-season," and the head months not grazing on federal land. The current permittee runs their breeding herd on NFS Allotment during the summer months. Under Alternative A-E, livestock owners were assumed to retain ownership of 1,890 head of livestock (mixed classes) on an annual basis. To simplify calculations the forage replacement costs were calculated base off a per head basis, regardless of the class of livestock. Private grazing fees were calculated at $22.00 per HM. Feed costs were calculated on an average of $2.44/hd/day.

shows the consequences of the alternatives to economic efficiency. As discussed in the Assumptions section, these calculations only consider direct costs and benefits to the National Forest Lands grazing receipts) and the rancher's economic efficiencies. The social costs and benefits are not included.

Although annual administrative costs are not part of the total calculation in Table E-12 it is noteworthy to briefly discuss the cost to government for each alternative.

Annual Administrative costs of grazing include the managing official's and other employee's associated with the programs cost to government. In this instance daily cost to government, vehicles use, administrative activities and other related costs equate to $300.00/day for 15 days/ grazing season.

Alternative A would eliminate grazing on the National Forest Lands; no grazing revenues would be collected. However, Alternative A may also lower range program costs to a negligible factor compared to Alternatives B through E. Nevertheless administrative cost for the Forest Service may continue with possible unauthorized or trespass livestock use issues if they arise. This may result in law enforcement man hours and on the ground inspections which may require travel time, reports and other administrative activities associated with unauthorized or trespass use.

Proportionately Alternative B has a higher administrative cost ($300.00/day for 15 days/ grazing season) and the economic efficiencies value is higher, the permittee is the recipient of the profit and the government is burdened with the cost associated with the administration of the allotments.

Alternative C is similar to Alternative B; although it has additional elements incorporated into the alternative; proposed changes in the management of the Toomey Allotment may create the

need for more administration and monitoring until the permittees and livestock become familiar with the changed use.

Alternative D incorporates rest into some of the pastures on all of the allotments by combining the Lone Pine Allotment into the other three allotments as a pasture in the rotations. The result would be a reduction, but the administration monitoring may need to be increased until the permittees and livestock become familiar with the modified use.

Alternative E is unique in that it could have different permittees using it annually, depending on wildfire areas and other allotment needs. This use as a Forage Reserve may create the need for more administration and monitoring until the permittees and livestock become familiar with the allotment.

The social cost benefit analysis could change the calculations considerably. Presumably, the social efficiency analysis would show a positive present net value of grazing on the National Forest Lands; otherwise ranchers may not choose to graze their livestock on the National Forest Lands.

Williams, personal communication 2014 and Williams and Sorte 2005, suggests that the total effects to Wallowa County for every head of livestock that is produced would be an economic gain to Wallowa County of $2,337 per year (direct effect to ranchers, indirect effects to ranching support services, and induced effects to expenditures of ranchers/support services in the form of money that go back into the community). This is reflected in the second to last row in the following table as an economic return to Wallowa County.

Table E-12 – Social and Economic Efficiencies by Alternative for the LIRA

Indicator	Grazing Viability Over 4 Years				
	A	B	C	D	E
Cow Calf Pairs LIRA	0	1,295	1,295	995	1,295
Annual x 4 Federal Accounting					
Federal Head Months (figured to cow-calf)	0	8,680	8,680	yr 1: 7,680 yr 2: 6,880 yr 3: 6,847 avg=7,135	yr 1: 8,680 yr 2: 8,680 yr 3: 8,680 yr 4: 0
Total Federal Grazing Fees ($1.35/HM) x 4 Yrs	0	$46,872	$46,872	$38,429	$46,872 maximum 3 out of 4 yrs
Federal Payments to Local Forests x 4 Yrs	$0	$11,718	$11,718	$9,607	$11,718
Annual Non-Federal Accounting					
Non-Federal Head Months / feed costs (private land grazed/hay) x 4 Years	105,696 HM / $3,544,128	25,062 HM/ $ 839, 577	25,062 HM $ 839,577	18,783 HM $ 629,819	25,062 HM $ 839,577
Total Head Months x 4 years	105,696	105,696	105,696	101,952	105,696
Total Annual Employment	0	7-10	7-10	7-8	7-10
Gross Annual Income (x 4 years) Generated from Livestock Minus grazing fees (Grazed on Federal Land and on Private Land)	0	$995,472 permanent $73,736 seasonal	$995,472 permanent $73,736 seasonal	$774,256 permanent $36,868 seasonal	$995,472 permanent $73,736 seasonal (if not using Lone Pine reduce by $64,521 annually)
Economic Return to Wallowa County (x 4 years)	$12,105,660	$12,105,660	$12,105,660	$9,301,260	$12,105,660
Economic Viability Change	Substantial Change	No Change from current condition	No Change from current condition	Slight Change	No Change or Slight Change

Federal head months were based on number and duration of livestock within the allotment.

Non-Federal head months were assumed to be the number of livestock head months during the "off-season," and the head months not grazing on federal land. The current permittee runs their breeding herd on NFS Allotment during the summer months. Under Alternative A-E, livestock owners were assumed to retain ownership of 1,890 head of livestock (mixed classes) on an annual basis. To simplify calculations the forage replacement costs were calculated base off a per head basis, regardless of the class of livestock. Private grazing fees were calculated at $22.00 per HM. Feed costs were calculated on an average of $2.44/hd/day.

Table E-13 provides the economic impact estimates by alternative. Alternative A would support neither employment nor labor income in the local economy (related to grazing on the National Forest Lands). Alternatives B and C would support approximately 7-10 jobs and associated labor income, annually. Alternative D would not support full income and employment due to reduction in use across the LIRA area since the alternative proposes not issuing a separate stand-alone permit for the Lone Pine Allotment. Alternative E may not support full income and

employment depending on the need for the Lone Pine Allotment as a forage reserve and for the rest year.

Table E-13. Economic Impact of National Forest Land Grazing over 4 years

	Alt A	Alt B	Alt C	Alt D	Alt E
Employment	0	7-10	7-10	7-8	7-10
Labor Income (total permanent and seasonal)	$0	$1,069,208	$1,069,208	$811,124	Up to $1,069,208 when Lone Pine is grazed

Alternative A will have no labor income or employment associated with it due to the loss of authorized livestock grazing; conversely Alternatives B and C will continue to create employment and income at its current rate. Alternative D will incorporate the Lone Pine Allotment into the other 3 allotments. Alternative E when utilized as a Forage Reserve would continue to create employment and income at its current rate. However, if it were not utilized during the grazing season, it would have no labor income or employment associated with it. From a social and economic perspective, all action alternatives are very similar. The present employment and labor income estimates will vary between all alternatives.

All action alternatives would support social values of heritage and sense of place related to livestock grazing. However, these social values could still decline as a result trends outside the control of the Forest Service. Alternatives A and D would have social and economic consequences that diverge from current conditions, as would Alternative E if the Forage Reserve was not utilized. Ranchers who currently use forage from the National Forest Lands would need to either replace their public land forage with private forage or reduce herd size. In addition to the reduction in employment and labor income, management changes under Alternatives A and D would also affect social well-being, as would Alternative E if the Forage Reserve was not utilized. As presented in the discussion, the LIRA analysis area is highly dependent on agriculture in general and livestock grazing in particular. This dependence is both economic (i.e., employment and income) and social (e.g., lifestyle and heritage values). Based on the number of individuals involved in grazing on the National Forest, at least 10 households may be affected by the elimination of grazing on LIRA. Grazing provides profit to local counties and communities.

Specifically Required Disclosures

Cultural Resources

Cultural resource inventories within the LIRA area have identified cultural resource sites and isolated occurrences. Analysis of ongoing and potential future livestock-related impacts on cultural resources was completed. WWNF Heritage Resources Staff recommended a determination of No Adverse Effect provided the project decision implements the site-specific stipulations. The Oregon State Historic Preservation Office (SHPO) concurred with this finding on September 27, 2013 (SHPO Case No. 13-0557). The Forest finds that there are historic properties but the undertaking would be in compliance as defined by 36 CFR 800 16(i). Site-specific surveys would occur prior to implementation of any fencing or off-site water developments identified in Alternative 2. Any potential impacts would be mitigated through avoidance. If cultural resources are located or relocated during implementation of any action, work would be halted and the Wallowa Whitman Archaeologist would be notified. The cultural resource would be evaluated and a mitigation plan developed in consultation with the Oregon State Historic Preservation Office (SHPO) if necessary.

Native American communities have been contacted (Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Paiute, and Colville Tribes) and public comment encouraged.

Probable Adverse Environmental Impacts that Cannot Be Avoided

Grazing by any large ungulate, including deer, elk. or domestic livestock, can cause some degree of damage to forage or browse plants or to soil structure. Most, but not all of these impacts can be mitigated for use by livestock through implementation of the Forest Plan utilization standards and guidelines and riparian standards. In addition, intensification of management can ensure that impacts are kept to levels allowed by the Forest Plan.

Best Available Science

This analysis meets the advice for incorporating “best available science” in specialist reports for NEPA projects as given in the May 2, 2007 advice letter, (Advice on Documenting “Best Available Science”) and the clarification letter dated June 20, 2007, (Clarification of May 2, 2007, Advice on Documenting “Best Available Science”), issued by the Acting Director and Director for Ecosystem Management Coordination, respectively.

This analysis of effects was based on a combination of peer reviewed papers published in scientific journals, publications produce by Forest Service research, and resource professionals, as well as field surveys.

Relationship Between Short-Term Use and Long-Term Productivity

Forage harvest is a short-term use of resources that is permitted over a ten-year period, but is managed on an annual basis. The action alternatives promote long-term use and management

of the range vegetative and related resources under management standards that are designed to promote long-term health of the resources on the allotment.

Irreversible and Irretrievable Commitment of Resources

There are no irreversible or irretrievable commitments of resources associated with implementing the alternatives that are not already identified in the DEIS or the Forest Plan.

Potential Conflicts with Plans and Policies of Other Agencies

Implementation of any of the proposed alternatives would not result in conflicts between the provisions of the proposed activities and any goals or objectives developed for other government entities.

Tribal Treaty Rights

Certain rights and privileges are afforded members of the Nez Perce Tribe and Confederated Tribes of the Umatilla by virtue of the treaties of 1855. The LIRA allotments are located within lands covered by the June 11, 1855 Treaty between the Nez Perce Tribe, and the United States. Article 1 of the June 9, 1855 Treaty provides for the privilege of hunting, gathering roots and berries and pasturing stock on unclaimed lands in common with the citizens. Article 3 of the June 11, 1855 Treaty provides for the privilege of hunting, gathering roots and berries and pasturing stock on unclaimed lands in common with the citizens. If the Nez Perce requests to expand the expression of their rights, the Forest Service will comply with the extent required to exercise these rights.

The treaty provides that the Indians will retain the rights of taking fish in streams running through and bordering the reservations and at all other usual and accustomed stations in common with other citizens of the United States and of erecting suitable buildings for fish curing; the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands.

All of the alternatives provide the opportunity for Indian tribes to assert their rights for the pasturing of stock. When approached by a tribe for assertion of those rights, the Forest Service would work with existing livestock permittees to establish an area that would serve tribal needs. Tribal assertion of treaty rights related to pasturing of stock could be accommodated without further environmental analysis.

Effects of authorizing livestock grazing on fisheries are disclosed in the previous section on Fisheries and Aquatics. Tribal members would continue to be able to fish in accordance with reserved treaty rights, and those opportunities would not be diminished by the presence of livestock grazing.

Plants are actively gathered within the region by tribal members, but no specific knowledge about activity within the project area is known. Vegetation of the Blue Mountain Province of the Columbia basin physiographic area includes and is within the LIRA area: ponderosa pine, grand fir, Douglas fir, and western larch. Bunch-grasses: bluebunch wheatgrass, Idaho fescue, prairie

junegrass, sand dropseed, and red threeawn. Berries: serviceberries, gooseberries, huckleberries, current, chokecherries. Roots: camas, biscuit root, sego and mariposa lilies, bitterroot, wild carrot, wild onion.

The fauna include evidence of elk and deer, bighorn sheep, coyote, wolves, cougar, and multiple varieties of birds within the LIRA area.

In the absence of specific information, it is assumed that native species in the project area would continue to be represented in approximately the same locations over time, and culturally important flora and fauna would not be adversely affected by the continued presence of livestock grazing. This assumption is based on the conclusion that all action alternatives would cause rangeland conditions to move toward or remain in satisfactory condition.

Prime Farmland, Rangeland, and Forestland

Adverse effects on prime farmland, rangeland and forestland not already identified in the DEIS for the Forest Plan are not expected from implementing any of the action alternatives.

Energy Requirements

There would be no unusual energy requirements for implementing any of the action alternatives.

Wetlands and Floodplains

Refer to the Hydrology effects in Chapter 3. Activities included in LIRA area do not propose to occupy or modify any floodplain or wetland, and the LIRA area does not intersect with, or is not within, a municipal watershed. Implementation of action alternatives proposed in the LIRA area is consistent with Executive Orders 11988 and 11990 for floodplain management and protection of wetlands, respectively.

Civil Rights, Women, Minorities, and Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-include populations.

On March 24, 1995 the Department of Agriculture completed an implementation strategy for the executive order. Where Forest Service proposals have the potential to disproportionately adversely affect minority or low-income populations, these effects must be considered and disclosed through the NEPA analysis.

Hispanic or Latino populations occupy the largest sector of the minorities in Wallowa County (2.2%). The next sector includes those who identified themselves as mixed race at 2.0%. Wallowa County is also represented by and American Indian-Alaska Native population of .6%. All other minorities sectors exhibit populations less than 1%. The Forest Service does not maintain records on the minority status of permit holders and does not discriminate in the

permitting process. This project would not generate disparate impacts to civil rights, women or minorities. The project alternatives would not result in any disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Incomplete or Unavailable Information

The Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR 1502.22) require that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS. If information is essential to be a reasoned choice amongst alternatives, it must be included or addressed in the EIS.

Knowledge is, and always will be, incomplete regarding many aspects of terrestrial and aquatic species and their habitats, geology of specific areas, and the economy. However, the LIRA area has been studied for many years, and a substantial amount of credible information is known. The alternatives were evaluated using the best available information. No missing information was deemed to be essential to a reasoned choice amongst alternatives being considered.

Chapter 4 - Agencies and Persons Consulted

Recipients of the Draft EIS

The following list contains the recipients of the LIRA Draft Environmental Impact Statement. The list includes those who requested copies, responded to the scoping efforts; permittees affected by the proposal, and required agencies.

Agencies

Advisory Council on Historic Preservation
Department of the Interior, Office of Environmental Policy and Compliance
Environmental Protection Agency, Region 10
FAA, Northwest Mountain Region
Federal Highway Administration
National Marine Fisheries Service, Habitat Conservationists Division
    National Marine Fisheries Service, Renee Coxen
National Park Service
Natural Resources Conservation Service
NOAA Office of Policy and Strategic Planning
Northwest Power Planning Council
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon State Department of Economic Development
Oregon State Parks, Wallowa Lake State Park
Oregon State University Extension Service
U.S. Army Engineer, Northwest Division
U.S. Coast Guard, Marine Environmental and Protection Division
U.S. Navy, Office of Chief of Navy Operations, Environmental Protection Division
United States Fish and Wildlife Service
    USFWS, Gretchen Sausen
USDA APHIS Wildlife Resources
USDA National Agricultural Library
USDI Office of Environmental Policy and Compliance

News Organizations

Wallowa County Chieftain

Organizations

Hells Canyon Preservation Council
NW Holistic Resource Management
Oregon Wild
Wallowa County Natural Resources Advisory Committee
Wallowa Resources

Individuals

Dwayne Voss
McClaran Ranch

State Officials and Local Government

Mike Hayward, Wallowa County Board of Commissioners

Tribes

Aaron Miles, Nez Perce Tribe
Angela Sondenaa, Nez Perce Tribe
Christine Bradbury, Nez Perce Tribe
Dave Johnson, Nez Perce Tribe Executive Council
Mike Lopez, Nez Perce Tribe
Silas C. Whitman, Nez Perce Tribe Executive Council Chairman
Audie Huber, CTUIR Department of Natural Resources Intergovernmental Affairs Manager
CTUIR Board of Trustees
Eric Quaempts, CTUIR Department of Natural Resources Director
Gary Burke, Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Chairman
Arrow Coyote, Confederated Tribes of the Colville
Diane Teeman, Burns Paiute Tribal Council Chairman

Preparers

The following agency personnel participated in the preparation of the Final Environmental Impact Statement. All personnel are employees at the Wallowa Mountains Office or Wallowa-Whitman National Forest Supervisor's Office of the Wallowa-Whitman National Forest.

Kelly Birkmaier – Former Range Conservationist
AS in Biology, BS Animal Science, and MS Range Management. 6 years Forest Service employment. Provided rangeland input (2009-2012).

Michele Chapin – Soils Scientist
BS Environmental Science, MS Soil Science; 11 years Forest Service employment and 11 years FS/ pvt soil science contractor. Prepared Soils and Biological Crust Resource Reports.

Dan Ermovick – Forest Recreation Specialist

BS Range Management, 30 years Forest Service employment (15 yrs in Range Management, 15 in Recreation Management). Prepared Wild and Scenic River Report.

Jerry Hustafa –Botanist
BA Botany, BA Biology; 26 years Forest Service Experience. Prepared Botanical Resources Specialist Report and Weeds Input.

Patricia Johnson – Wildlife Biologist
BS Biology, MS Entomology; 13 years Forest Service experience. Prepared Wildlife Resources Specialist Report.

Tony King – Archaeologist
BS Anthropology (Archaeology Emphasis), MS Anthropology (Archaeology Emphasis) Registered Professional Archaeologist (RPA) since 2006, 12 years Forest Service Employment. Prepared Cultural Resources Report.

Maura Laverty – Forest Range Program Manager
BS in Range Management. 27 years Forest Service employment. Provided Economics Report.

Donna Mattson – Forest Landscape Architect
BS Landscape Architecture, 24 years Forest Service employment. Prepared Scenery Resources Report.

Jamie McCormack – Range Management Specialist
BS in Rangeland Ecology and Management. 10 years Forest Service employment. Provided Rangeland Resources Report.

Alan Miller – Fisheries Biologist
BS Fisheries Science, MS Fisheries Science; 14 years Forest Service Employment. Prepared Aquatic Resources Specialist Report.

Dana Nave – Hydrologist
BS Biopsychology, MS Hydrology; 11 years Forest Service employment. Prepared Hydrology Specialist Report and contributed to Aquatics Report.

Beckijo Smergut-Wall – Invasive Species Specialist
BS Rangeland Resources; 14 years Forest Service employment (9 yrs Invasives). Prepared Invasives Species Resources Report.

Kris Stein – Hell's Canyon National Recreation Area Manager
BS Recreation Resource Management, MS Forest Management. 26 years Forest Service Employment. Served as line officer.

Brent Stroud – Recreation Specialist
BS Forest Management, 10 years Forest Service employment. Prepared Recreation-Wilderness Report.

Support and Review

Dan Ermovick – Forest Recreation Specialist

David Salo – Forest Hydrologist/Soils

Gene Yates – Forest Botanist
Mark Penninger – Forest Wildlife Biologist
Maura Laverty – Forest Range Program Manager
Sabine Mellman-Brown- Forest Ecologist
Sarah Crump – Forest Archeologist
Sophia Millar – Forest Environmental Planner

Mitch Bulthuis – Retired Forest Range Mgmt. Program Manager

Susan Geer – Ecologist/Botanist, Whitman RD

Glossary:

Adaptive management: Defined in 36 CFR220.3, is a system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.

Affected Environment: The natural, physical and human-related environment that would be sensitive to changes from implementation of the alternatives. Used interchangeably with the term Existing Condition.

Allotment Management Plan (AMP): A long-term operating plan for a grazing allotment document prepared in consultation with the permittees involved that specifies the program of action for implementation of the forest plan as related to livestock grazing activities. Each allotment on National Forest System lands is required to have an Allotment Management Plan.

Allotment: Rangeland and /or forestland area designated for the use of a prescribed number and kind of livestock under a specific plan of management

Allowable use: The degree of utilization considered desirable and attainable on various parts of a ranch or allotment considering the present nature and condition of the resource, management objectives, and levels of management [cited: NRCS, National Range and Pasture Handbook, Glossary]

Allowable Utilization: The degree of use estimated to be proper until proper use is known. A baseline utilization percentage established in a Forest Plan.

Alternative: A mix of management prescriptions applied to specific land areas to achieve a set of goals and objectives. Each alternative represents a different way of achieving a set of similar management objectives.

Analysis Area: One or more capability areas combined for the purpose of analysis in formulating alternatives and estimating various impacts and effects.

Animal Unit Month (AUM): The amount of feed or forage required by an animal unit for one month.

Animal Unit: Considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to six months of age, or their equivalent, based on a standardized amount of forage consumed (26 lbs/day).

Annual Operating Instructions (AOI): A set of instructions developed by the US Forest Service and given to the Grazing Permittee on an annual basis, that explains the specific pastures to be used, and adjustments to the Allotment Management Plan for the current year.

Apparent Trend: An interpretation of trend based on observation and professional judgment at a single point in time (see Trend).

Aquatic Resources: Plants and animals that live within or are entirely dependent upon water to live; living resources of aquatic habitats (fish, invertebrates, amphibians); aquatic species.

Available Forage: That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

Bankfull: A specific location on a streambank that corresponds to the water level with a recurrence interval of two years or less. Bankfull discharge largely controls the form of the watercourse. It is at this discharge level that stream waters just begin to flow over the banks and into the floodplain.

Bare Ground: All soil surface not covered by vegetation, rock or litter. The combination of bare soil and erosion pavement.

Best Management Practices (BMP): A [practice or combination of practices that are the most effective and practical means of achieving resource protection objectives (primarily water quality protection) during resource management activities.

Big Game: Those species of large mammals normally managed as a sport hunting resources.

Biological Assessment: An assessment or study required by the Endangered Species Act of 1973 to determine the potential effects of a proposed management action on threatened and endangered species or their habitats. The U.S. Fish and Wildlife Service review Biological Assessments and requests that all threatened, endangered, proposed threatened or endangered, and Category 1 “candidate species be addressed.

Biological crusts: Microorganisms (e.g. lichens, algae, cyanobacteria, microfungi) and non-vascular plants (e.g., mosses, lichens) that grow on or below the soil surface. Synonym: microbiotic crust or crypotgamic crust.

Biological Evaluation: The legal record of finding for Pacific Northwest Regional Forester sensitive species.

Biotic Integrity: is the capacity of the biotic community (plants, animals, and microorganisms occurring both above and below ground) to support ecological processes within the normal range of variability expected for the site, to resist a loss of capacity to support these processes, and to recover this capacity when losses do occur.

Browse: Leaf and twig growth of shrubs, woody vines, and trees available for use by animals.

Candidate Species: Any species of fish, wildlife, or plant considered for possible addition to the list of endangered and threatened species. These are taxa for which the NOAA Fisheries or USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

Canopy Cover: The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread by foliage of plants. Canopy cover is measured along a line intercept transect. Small openings within the canopy are included. The sum of canopy cover of several species may exceed 100 percent. (syn. Crown Cover).

Capability: is defined as the potential of an area to produce resources under an assumed set of management practices at a given intensity.

Carrying capacity: The number of animals or plants that can be maintained over a specific period of time on a specified amount of land without damage to either organisms or the habitat. [CMP, 2003] Carrying capacity may vary from year to year on the same area due to fluctuating forage production.

Channel Morphology: Form and structure of streambank which is that portion of the channel bank cross-section that controls the lateral movement of water. Includes channel dimensions, patterns, and profile.

Climax Community: The final or stable biotic community in a successional series; it is self-perpetuating and in equilibrium with the physical habitat. The assumed end point in secondary succession. Determined primarily by climate but also influenced by soil, topographic, vegetative, fire and animal factors.

Community Type: An aggregation of all plant communities with similar structure and floristic composition.

Community: A general term for an assemblage of plants and/or animals living together and interacting among themselves in a specific location.

Composition. The proportions of various plant taxa in relation to the total on a given area. It may be expressed in terms of cover, density, or weight. (syn. Species Composition).

Condition and Trend Monitoring (C&Ts): Long term vegetation monitoring protocol, developed in the 1950s as a way to determine vegetative trend on rangelands.

Consultation: A process between the Services and a Federal agency or applicant that: (1) determines whether a proposed Federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat; (2) begins with a Federal agency's written request and submittal of a complete initiation package; and (3) concludes with the issuance of a biological opinion and incidental take statement by either of the Services. If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required (except when the Services concur, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat). [50 CFR §402.02, 50 CFR §402.14]

Continuous Grazing: Grazing an area without rest periods or rotation.

Cover/Frequency: Long term trend monitoring method used to provide quantitative measurements of canopy cover and ground cover. Canopy cover, species composition, frequency of species, and ground cover are attributes attained from this method.

Cover: The area covered by the combined aerial or basal parts of plants and mulch expressed as a percent of the total area, percentage of ground area covered by aerial parts of live plants, litter, gravel and rocks.

Critical Habitat: As defined under the Endangered Species Act, Critical Habitat is the area determined necessary for a listed species to make a successful recovery. Within the geographical area constituting critical habitat are the physical or biological features essential for the conservation of a species.

Cultural Resource: Archaeological and cultural places of prehistoric and historic human activity including aboriginal mounds, forts, buildings, earth works, village locations, burial grounds, ruins, caves, petroglyphs, pictographs or other locations which are the source or prehistoric cultural features and specimens.

Cumulative Effect: The impact on the environment resulting from the incremental impact of the action added to other past, present or future actions. They can also result from individually minor but collectively significant actions taking place over a period of time.

Deferment: Delay of livestock grazing on an area for an adequate period of time, to provide for plant reproduction, establishment of new plants, or the restoration of vigor in existing plants. Generally defined as delay of grazing until the seed of the key forage species is mature.

Deferred Grazing: The use of deferment in grazing management of a management unit.

Deferred Rotation: Any grazing system that provides for a systematic rotation of deferment among pastures. Moving grazing animals to various parts of a range in succeeding years or seasons to provide for seed production, plant vigor, and for seedling growth.

Density: The number of individuals per unit area. It is not a measure of cover.

Desired Condition: The future condition of rangeland resources on a landscape scale that meet management objectives. Desired condition is based on ecological (such as desired plant community) social, and economic considerations during the land and resource management planning process. First and most important in reaching a desired future condition is to define what is achievable**.** Achievable means that the site can grow the desired vegetation. Desired condition is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, age and size classes of species) and desired soil qualities (conditions of soil cover, erosion, compaction, loss of soil productivity).

Desired Future Condition: The future condition of rangeland resources on a landscape scale that meet management objectives. Desired future condition is based on ecological (such as desired plant community) social, and economic considerations during the land and resource management planning process. Desired future condition is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, age and size classes of species) and desired soil qualities (conditions of soil cover, erosion, compaction, loss of soil productivity)

Direct Effect: Effects on the environment that occur at the same time and place as the initial cause or action.

Dominant: Plant species or species groups, which by means of their number, coverage, or size, have considerable influence or control upon the conditions of existence of associated species. Also, those individual animals which, by their aggressive behavior or otherwise,

determine the behavior of one or more animals resulting in the establishment of a social hierarchy. always less than canopy cover.

Drought: An extended period of below normal precipitation which causes damage to crops and rangelands; diminishes natural stream flow; depletes soil and subsoil moisture; and because of these effects, causes social, environmental, and economic impacts. To further define drought in quantitative terms that can be used to trigger the onset of drought, the use of the Society for Range Management's definition is recommended: "Prolonged dry weather when precipitation is less than 75% of the average amount"

Ecological Site Descriptions: Description of the soils, uses, and potential of a kind of land with specific physical characteristics to produce distinctive kinds, and amounts of vegetation.

Ecological Site: A kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management.

Ecological Site: a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management. Synonymous with ecological type used by the USDA Forest Service.

Ecological Status: The present state of vegetation of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree to which the kinds, proportions, and amounts of plants in a community resemble that of the potential natural community. Described in ecological terms, which are early seral, mid seral, and late seral.

Ecosystem: Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.

Effect Determination - Likely to Adversely Affect (LAA): This determination is the appropriate finding in a biological assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial (see definition of "is not likely to adversely affect"). In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made. An "is likely to adversely affect" determination requires the initiation of formal section 7 consultation.

Effect Determination - May Affect, Not Likely to Adversely Affect (NLAA): This determination is the appropriate conclusion when a proposed action may pose any effects on listed species or designated critical habitat. When the Federal agency proposing the action determines that a "may affect" situation exists, then they must either initiate formal consultation or seek written concurrence from the Services that the action "is not likely to adversely affect" listed species.

Effect Determination - No Effect (NE): A determination of NE is applicable if (a) there are no listed or proposed species or designated or proposed critical habitat occurring in the area, or (b) the project will have no impacts on the species (documentation of this is required). A NE determination is only appropriate when the proposed action will have no direct or indirect effect whatsoever on listed or proposed species.

Effects Determination – No Impact (NI): is similar to a no effect call, however it pertains to sensitive species.

Effects: The results expected to be achieved from implementation of actions relative to physical, biological, and social (cultural and economic) factors resulting from the achievement of outputs. Examples of effects are tons of sediment, pounds of forage, person-years or employment, and income. There are direct effects, indirect effects, and cumulative effects.

Endangered Species: Any animal or plant species in danger of extinction throughout all or a significant portion of its range as designated by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under provisions of the Endangered Species Act.

Environment: The aggregate of physical, biological, economic, and social factors affecting organisms in an area.

Environmental Analysis: An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, economic, social, and environmental design factors and their interrelations.

Environmental Consequences: A situation that naturally or logically follows as a result of an action. Commonly used in environmental impact statements for discussions about how the human environment, which includes the natural and physical environment and the relationship of people with that environment, is influenced by the government as actions.

Environmental Impact Statement (**EIS):** The documentation of environmental effects and action required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

Erosion: The wearing away of the land's surface by water, wind, ice, or other physical processes. It includes detachment, transport, and deposition of soil or rock fragments.

Floodplain: The area adjacent to the active stream channel which is inundated during flows that exceed bankfull level. The floodplain acts as an energy dispersion zone during flood flows, and functions as an area of deposition.

Forage Production: Weight of forage produced within a designated period of time on a given area.

Forage: All browse (shrubs) and herbage (grasses and forbs) that is available and acceptable to grazing animals or that may be harvested for feeding purposes. [cited: NRCS, National Range and Pasture Handbook, Glossary]

Forb: Any broad- leafed, herbaceous plant other than those in the Poaceae (grass) Cyperaceae (sedge) and Juncaceae (rush) families.

Functioning (proper functioning condition)**:** Riparian-wetland areas are functioning properly when adequate vegetation, landforms, or large woody debris is present to (1) dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; (2) filter sediment, capture bedload, and aid floodplain development; (3) improve flood-water retention and ground-water recharge; (4) develop root masses that stabilize streambank against cutting action; (5) develop diverse ponding and channel characteristics to provide the habitat and water depth, duration and temperature necessary for fish production, waterfowl breeding, and other uses, and (6) support greater biodiversity (USDI Bureau of Land Management 1995).

Functioning-at-Risk (proper functioning condition)**:** Riparian-wetland areas that are in a functional condition but an existing soil, water, or vegetation attribute categorizes them with a reversible loss in capability and increased vulnerability to irreversible degradation based upon evaluation of current conditions and processes.

Geographic Information System (GIS): A computer software platform designed to facilitate the assembly and analysis of diverse data sets pertaining to specific geographic areas using spatial locations of the data as the basis for the information system

Goal: The desired state or condition that a resource management policy or program is designated to achieve. Narrower and more specific than objectives, goals are usually not measurable and may not have specific dates by which they must be reached. Objectives are developed by first understanding one's goals.

Gradient: The steepness of a slope as measured in degrees, percentage, or as a distance ratio (rise/run).

Graminoid: Grasses (family Gaminaae or Poaceae) and grasslike plants such as sedges (Cyperaceae) and rushes (Juncaceae).

Grass: Plants of the Gramineae family, usually herbaceous plants with narrow, parallel-veined, two-ranked leaves.

Grassland: Lands on which the vegetation is dominated by grasses, grasslike plants, and/or forbs.

Grazing Allotment: An area where one or more livestock operators graze their livestock. An allotment generally consists of federal land but may include parcels of private or state-owned land.

Grazing Management: The manipulation of grazing animals to accomplish desired results when considering of animal, plant, land, or economic responses.

Grazing Permit: Official written permission to graze a specific number, kind, and class of livestock for a specified time period on a defined rangeland.

Grazing Season: (1) On public land, an established period for which grazing permits is issued. (2) The time interval when animals are allowed to utilize a certain area.

Grazing system: A specialization of grazing management, which defines the periods of grazing and non-grazing. Grazing system should consist of at least the following: the number of pastures, number of herds, length of gazing period; length of non-grazing periods for any given unit (pasture) in the system. Examples are deferred rotation and rest rotation. Also defined, integrated combination of animal, plant, soil, and other environmental components and the grazing method(s) by which the system is managed to achieve specific results or goals. [Cited: Terminology for Grazing Lands and Grazing Animals, 1991]

Grazing: Consumption of native forage from rangelands or pastures by livestock or wildlife.

Greenline: The first perennial vegetation from the water's edge. Riparian areas that are in high seral status with stable stream banks will exhibit a continuous line of vegetation at the bankfull discharge level. Rocky stream types may have a significant amount of rock causing breaks in the vegetation. This rock is considered part of the green line. Other breaks may occur in the first perennial band of vegetation (watercourses or bare ground). The amounts of these (perennial vegetation, rock, and bare ground) should be recorded.

Ground Cover: The percentage of material, other than bare ground and erosion pavement, covering the land surface. It may include live vegetation, standing dead vegetation, litter, crytograms, and rock over ¾ inch. Ground cover plus bare ground would total 100 percent.

Habitat Type: The collective area which one plant association occupies or will come to occupy as succession advances. The habitat type is defined and described on the basis of vegetation and its associated environment. Habitat type is similar in concept to ecological site depending on hoe specifically plant associations are defined. Habitat is commonly misused to refer to classification of vegetation or wildlife habitat rather than a land classification.

Head-months (HM): A HM is a unit of measure that counts one animal for 30.4 days. A cow-calf pair qualifies as one animal in these calculations if the calf is 6 months of age or less.

Herbaceous: Vegetation growth with little or no woody components, such as graminoids and forbs.

Herding: A strategy for managing livestock where the manager maintains the animals in a “herd” and moves them from area to area as a group.

Herding: A strategy for managing livestock where the manager maintains the animals in a “herd” and moves them from area to area as a group.

Hydrologic function: The capacity of an area to capture, store, and safely release water from rainfall, run-on, and snowmelt, to resist a reduction of this capacity, and recover this capacity when a reduction does occur.

Impacts: The effect of one thing upon another. Impacts may be beneficial or adverse. See Environmental Consequences.

Indicator Species: A species selected because its population changes indicate effects of management activities on the plant and animal community. A species whose condition can be used to assess the impacts of management actions on a particular area.

Indirect Effects: Secondary effects which occur in locations other than the initial action, significantly later in time, or to one resource that in turn, affects another resource. i.e.: effects to vegetation that may reduce prey species for a raptor.

Infiltration Rate: Rate of absorption and downward movement of water into the soil layer.

Interested Public: An individual, group or organization that has submitted a written request to the authorized officer to be provided an opportunity to be involved in the decision making process for the management of livestock grazing on specific grazing allotments or has submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment.

Interpreting Indicators of Rangeland Health (IIRH): A qualitative approach to analyze the health of the biotic, hydrologic and soils of a rangelands using 17 indicators, a team of professional ecologists, and references to pristine rangeland conditions for the site evaluated.

Invasive Species: A species that has become particularly abundant in an ecosystem as a result of human activities in the eco system. Invasive species can be native or exotic to the area.

Issue: An “issue” is defined as a point of discussion, debate, or dispute about the environmental effects of the proposed action. It may represent an “unresolved conflict.”

Key Area (Key Grazing Area): A relatively small portion of a pasture or management unit selected because of its location, use, or grazing value as a monitoring point for grazing use. It is assumed that key areas will reflect current grazing management over the pasture or management unit as a whole. [cited: NRCS, National Range and Pasture Handbook, Glossary]

Listed Species: Any species of fish, wildlife, or plant determined to be endangered or threatened under Section 4 of the ESA.

Litter. The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

Low Stress Herding Techniques – A strategy for herding livestock where regularly around mid-day, permittees ride and move cattle that are congregating in riparian areas to areas away from streams.

Macroinvertebrate: An invertebrate animal (animal without a backbone) large enough to be seen without magnification.

Management Indicator Species: A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes on an indicator species are believed to indicate effects of management activities on a number of other wildlife species.

Migratory Bird: All birds, whether or not raised in captivity, included in the terms of the [migratory bird] conventions between the United States and any foreign country.

Mitigation Measures: Planning actions taken to avoid an impact altogether, to minimize the degree or magnitude of the impact, reduce the impact over time, rectify the impact, or compensate for the impact (40 CFR 1508.20). Mitigation is defined as “measures designed to reduce or prevent undesirable effects” and is used to reduce adverse environmental effects below the “significance” level and resolve issues and concerns raised by the public and the ID team.

Moderate Grazing: A comparative term which indicates that the stocking rate of a pasture is between the rates of other pastures. Often erroneously used to mean proper use, heavy and light grazing.

Monitoring: (Grazing Activities) the practice of tracking the utilization rates and overall effects of grazing over time, through repeated collection of data. Food plants are examined and measured to determine what percentage has been eaten, trampled, or lost to other causes. Other plants in the area (e.g., willows and other woody species) are examined, and observations are recorded regarding trampling or other damage. Records are maintained of livestock stocking rates (number of cattle per unit of area per unit of time), and all changes are recorded. Significant climatological events are noted (e.g., hard freezes, heavy rains, floods, droughts, high temperatures).

National Environmental Policy Act (NEPA): The Act which declared a National policy to encourage productive and enjoyable harmony between humans and their environment, to promote efforts that will prevent or eliminate damage to the environment and biosphere, to stimulate the health and welfare of humans, to enrich our understanding of the ecological systems and natural resources important to our Nation; and to establish a Council on Environmental Quality.

National Forest Management Act (NFMA): A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act, which requires the development of Regional and Forest plans and the preparation of regulations to guide that development.

National Forest System: All National Forest land reserved or withdrawn from the public domain of the United States; all National Forest lands acquired through purchase, exchange, donation, or other means; the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

Native Species: Species that are a part of the original fauna or flora of an area.

Neotropical Migratory Birds: Birds that breed in the United States and Canada and later migrate south to Central and South America, Mexico, and the Caribbean islands. These birds include almost half of the bird species that breed in the United States and Canada.

NEPA Analysis: Analysis conducted during the preparation of documents required under the National Environmental Policy Act, particularly environmental assessments and environmental impact statements.

No Action Alternative: An alternative where no activity would occur, or where current management practices would continue unchanged. The development of a no action alternative is requested by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The no action alternative provides a baseline for estimating the effects of other alternatives.

Non Point Source Pollution: NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include: excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; sediment from improperly managed crop and forest lands, and eroding streambanks; salt from irrigation practices and acid drainage from abandoned mines; bacteria and nutrients from livestock, and other animal wastes.

Non-Functioning (proper functioning condition)**:** Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed under properly functioning condition. The absence of certain physical attributes (where they should be located), such as floodplain, is an indicator of a nonfunctioning condition. A condition where a rangeland has lost the capability across the landscape for ecological resilience. Non-functioning rangeland health occurs when the desired condition is not being met and short-term objectives are not being achieved to move the rangeland toward the desired conditions.

Noxious Weed: the term “weed” includes all plants defined as “noxious weeds” by Forest Service policy: “plants designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof.” (FSM 2080.5)

Overgrazing: Continued heavy grazing that exceeds the recovery capacity of the community and creates a deteriorated range.

Palatability: The relish an animal shows for a particular plant as forage. This varies with succulence, fiber content, nutrient and chemical content, and morphological features such as spines or thorns. Palatability and preference are sometimes incorrectly used interchangeably.

Parker 3-Step: A "point" sampling procedure used extensively by land management agencies for monitoring trends in range condition. The basic concept behind this procedure is essentially the same as that of quadrat frequency except that a point is used as the sample or sub-sample unit rather than a quadrat. In fact, data collected with point sampling methods can be evaluated as frequency data; i.e. the number of hits on a plant species as a percentage of the total number of points read. However, because a point is essentially dimensionless, the data are

usually used as absolute measures of cover, basal area or whatever the criteria used for determining "hits".

Perennial (Plants)**:** One with a life cycle of three or more years.

Perennial Stream: Perennial stream means a well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year. Groundwater is the primary source of water for a perennial stream, but it also carries stormwater runoff. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water.

Permittee: Any entity that has been issued a grazing permit. [cited: FSM Range Management, 2230.5 Definitions]

Plant Association: A kind of climax plant community consisting of stands with essentially the same dominant species in corresponding layers.

Plant Community: An assemblage of plants occurring together at any point in time, thus denoting no particular ecological status.

Preferred Alternative: The alternative that is disclosed by the selecting official as the alternative that is most likely to be selected for implementation, when a Draft Environmental Impact Statement is submitted to the public.

Prescribed Fire: Prescribed fire (Rx fire) is defined as fire applied in a knowledgeable manner to forest fuels on a specific land area under selected weather conditions that produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives to accomplish predetermined, well-defined management objectives.

Prescription: Management practices selected to accomplish specific land and resource management objectives.

Project Area: Area of analysis for this proposal.

Project Design Criteria: Actions intended to reduce or prevent undesirable effects to rangeland resources by livestock grazing and/or provide the progression of existing conditions towards desired conditions.

Project File: An assemblage of documents that contain all the information developed or used during an environmental analysis, and is summarized in an Environmental Impact Statement. The file is part of the administrative record.

Proper Functioning Condition (PFC): Refers to riparian or wetland areas. A riparian or wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to: 1) dissipate stream energy; 2) filter sediment, capture bedload, aid in floodplain development; 3) improve flood-water retention and ground-water recharge; 4) develop root masses that stabilize streambanks; 5) develop diverse ponding and channel characteristics to provide habitat for wildlife; and 6) support greater biodiversity.

Proposed Action (PA): In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency proposes to implement or undertake. The PA is sent to the public, and interested agencies for their review and comment. Comments are then used to develop alternatives to the proposed action.

Public Land: Land owned by the federal government with multiple uses and intended for public use.

Qualitative: observational data derived from visual observations and recorded descriptively but not measured (e.g., descriptive or non-numerical data)

Quantitative data: data derived from measurements, such as counts, dimensions, weights, etc., and recorded numerically; may include ratios or other values. Qualitative numerical estimates, such as ocular cover and production estimates, are often referred to as "semi-quantitative"

Range Allotment: A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands and associated lands administered by the Forest Service.

Range condition: A generic term relating to present status of a unit of range (pasture) in terms of specific values or potentials. Specific values or potentials must be stated. Also defined as the present status of vegetation of a range site in relation to the climax (potential natural community) plant community for that site.

Range development (or improvement): Any activity or program on/or relating to rangelands which is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for livestock and wildlife. The term includes but is not limited to, structures, treatment projects, and use of mechanical means to accomplish the desired results (Public Rangelands Improvement act of 1978, 43 U.S.C. 1902). [cited: FSM Range Management, 2240.5 Definitions]

Range Improvement (Nonstructural): Practices and treatments undertaken to improve range or facilitate livestock management, excluding structural improvements. such as seeding, spraying, and chaining

Range Improvement (Structural): Improvements requiring construction or installation to improve the range or facilitate livestock management. such as fences, wells, reservoirs, pipelines, and stock tanks

Range Management: The science and art of planning and directing rangeland use in order to obtain maximum sustained economic livestock production consistent with the conservation and/or improvement of the related natural resources: soil, water, vegetation, wildlife and recreation. Scientific range management stands on the premise that the range resources can be improved and grazed perpetually by domestic stock and, at the same time, produce high-quality watershed, wildlife, recreation and, where suitable, forest products.

Range Of Variability (Also called the historic range of variability or natural range of variation.)- The components of healthy ecosystems fluctuate over time. The range of sustainable conditions in an ecosystem is determined by time, processes (such as fire), native species, and the land itself. For instance, ecosystems that have a 10 year fire cycle have a narrower range of variation than ecosystems with 200-300 year fire cycle. Past management has placed some ecosystems outside their range of variability. Future management should move such ecosystems back toward their natural, sustainable range of variation.

Range or Rangeland: All land-producing or capable-of-producing native forage for grazing and browsing animals and lands that have been revegetated naturally or artificially to provide a forage cover that is managed like native vegetation. It includes all grasslands, shrublands, and those forest lands which continually or periodically, naturally or through management, support an understory of herbaceous or shrubby vegetation that provides forage for grazing or browsing.

Rangeland Health: The status or stage of condition of an area based on what is expected of the area. The condition is based in biotic, hydrologic and soil factors.

Rangeland Project Decision. A project level NEPA decision. Refer to FSH 2209.13, section 93.

Reach: An expanse of a stream channel.

Record of Decision (ROD): A concise public document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible (decision making) official's decision (and rationale for the decision) about the alternatives assessed in the environmental impact statement, and the alternative chosen to implement.

Recovery Plan: A document drafted by the US Fish & Wildlife Service or other knowledgeable individual or group, that serves as a guide for activities to be undertaken by Federal, State, or private entities in helping to recover and conserve endangered or threatened species. Recovery plans typically include a listed species life history and current status, habitat requirements and availability, factors which limit the species survival, conservation measures currently in place, and specific management objectives that will facilitate recovery of the species.

Redds: Most salmonids deposit their eggs in nests called redds, which are dug in the streambed substrate by the female. Most redds occur in predictable areas and are easily identified by an experienced observer by their shape, size, and color (lighter than surrounding areas because silt has been cleaned away). Spawning surveys utilize counts of redds and fish carcasses to estimate spawner escapement and identify habitat being used by spawning fish. Annual surveys can be used to compare the relative magnitude of spawning activity between years.

Rest: Leaving an area ungrazed, thereby foregoing grazing of a forage crop. Normally, rest implies absence of grazing for a full growing season.

Rest-rotation: A grazing management scheme in which rest periods for individual pastures, generally for the full growing season, are incorporated into a grazing rotation. [cited: SRM Rangeland Glossary of Terms used in Range Management]

Rill: A very small steep sided channel carrying water. This landscape feature is intermittent and forms for only a short period of time after a rainfall.

Riparian Area: Area with distinctive soils and vegetation located between a stream or other body of water and the adjacent upland. It includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. Riparian ecosystems are distinguished by the presence of free water within the common rooting depth of native perennial plants during at least a portion of the growing season. Riparian ecosystems are normally associated with seeps, springs, streams, marshes, ponds, or lakes. The potential vegetation of these areas commonly includes a mixture of water (aquatic) and land (phreatic) ecosystems.

Riparian Vegetation: Plant communities dependent upon the presence of free water near the ground surface (high water table).

Rosgen Stream Type A: Very steep to steep, deeply entrenched, high energy debris transport associated with depositional soils. Very stable if bedrock or boulder dominated channel.

Rosgen Stream Type B: Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

Rosgen Stream Type C: Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

Rosgen Stream Type E: Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

Rotation grazing: a type of grazing system that involves moving grazing areas from one pasture to another to achieve a desired management objective [cited: NRCS, National Range and Pasture Handbook, glossary]

Runoff: The topographic flow of water from precipitation to stream channels located at lower elevations. Occurs when the infiltration capacity of an area's soil has been exceeded. It also refers to the water leaving an area of drainage. Also called overland flow.

Salting: Providing salt as a mineral supplement for animals. Placing salt on the range in such a manner as to improve distribution of livestock. [cited: NRCS, National Range and Pasture Handbook, Glossary]

Scoping: The Council on Environmental Quality (CEQ) defines scoping as "…an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40CFR 1501.7). Among other things, the scoping process is used to invite public participation, to help identify public issues, to obtain public comment at various stages of the analysis process, and to determine the range of actions, alternatives, and impacts to be addressed; identification of significant issues related to a proposed action; and the depth of environmental analysis needed.

Season of Use: The time during which livestock grazing is permitted on a given range area, as specified in the grazing permit.

Sediment Yield: The amount of sediment removed from a watershed over a specified period, usually expressed as tons, acre-feet, or cubic yards of sediment per unit of drainage area per year.

Sediment: Solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site or origin by air, water, gravity, or ice.

Sensitive Species: All species that are under status review, have small or declining populations, or live in unique habitats. May also be any species needing special management. Sensitive species include threatened, endangered, and proposed species as classified by the Fish and Wildlife Service. In the Forest Service, sensitive species are designated by regional foresters.

Seral Stages: The developmental stages of an ecological succession.

Seral: Pertaining to the successional stages of biotic communities.

Shrub: A plant with persistent, woody stems and relatively low growth. Generally produces several basal shoots (stems) and many branches.

Soil and Site Stability: The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water

Soil Compaction: A physical change in soil properties that results in a decrease in porosity and an increase in soil bulk density and soil strength.

Soil Productivity: the capacity of a soil, in its normal environment, to support plant growth.

Soil/site stability: The capacity of an area to limit redistribution and loss of soil resources by wind and water.

Spawning: Spawning is the production or depositing of eggs by aquatic organisms. Depending on the species many fish spawn in different methods and at different times of the year.

Species Composition: Proportions of various plant species in relation to the total on a given area. Proportions may be expressed in percentages based on weight, cover, density, etc.

Stability: The ability of the channel banks and bottom to resist the erosive powers of flowing water. Inherent stability refers to the potential stability of a riparian system.

Stable: The condition of little or no perceived change in plant communities that are in relative equilibrium with existing environmental conditions; describes persistent but not necessarily culminating stages (climax) in plant succession. Implies a high degree of resilience to minor perturbations.

State: A state is comprised of an integrated soil and vegetation unit having one or more biological communities that occur on a particular ecological site and that are functionally similar

with respect to the three attributes (soil/site stability, hydrologic function, and biotic integrity) under natural disturbance regimes.

Stock driveway: A strip of land specifically designated for the controlled movement of livestock. [cited: NRCS, National Range and Pasture Handbook, Glossary]

Stocking level (rate): The relationship between the number of animals and the grazing management unit utilized over a specified time period [Cited: Terminology for Grazing Lands and Grazing Animals, 1991]

Stream Bank: Sides of the stream channel.

Stream Channel: Long trough-like depression that is normally occupied by the water in a stream.

Stream Discharge: A river or stream's rate of flow over a particular period of time. Usually measured by a current meter and expressed in cubic meters per second. Stream discharge depends on the volume and velocity of the flow.

Stream Flow: The flow of water in a river or stream channel.

Stream Gradient: The change in elevation from a stream's headwaters to its mouth expressed in degrees, percentage, or as a distance ratio (rise/run).

Stream Substrate: The mineral and/or organic material that forms the bed of the stream. The composition of the streambed (substrate) is an important factor in understanding how a stream functions. It influences channel form and hydraulics, erosion rates, sediment supply, and habitat conditions for fish and other aquatic organisms. Simply put, steep mountain streams with beds of boulders and cobbles will act differently than low-gradient streams with beds of sand or silt. Therefore, measurement of every sample point should include a basic characterization of bed material.

Structure: How the parts of ecosystems are arranged, both horizontally and vertically. Structure might reveal a pattern, or mosaic, or total randomness of vegetation.

Stubble Height: Residual vegetation/stubble height is that measure of the herbaceous vegetation remaining at the end of the growing season just prior to winter dormancy. Stubble height is the average height measured from the soil surface to the height of actively growing leaves. A 4-inch stubble height is a direct measurement indicating that a forage plant is clipped off or broken at 4 inches above the ground. Stubble height can serve as an indirect indicator of trampling, soil compaction, streambank damage, and shrub browsing, as well as a direct measure of herbaceous plant defoliation.

Substrate: Inorganic materials that comprises the bottom and banks of a watercourse.

Successional Stage: A phase in the gradual supplanting (replacement) of one community of plants by another. Stages are described as early, mid, late in relation to the potential natural community that would occur over a long period of minimal grazing, fire, or mechanical disturbance.

Suitability: The appropriateness if applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone (passed). A unit of land may be suitable for a variety of individual or combined management practices.

Suitable Habitat: Land or habitat accessible to a specific kind of animal and which is conducive for growing, consuming and/or is used as covers for a species.

Summer Range: Range that is grazed during the summer months.

Term Grazing Permit: Document authorizing livestock to use National Forest System lands or other lands under Forest Service control for livestock production. [cited: FSM Range Management 2230.5, Definitions] Official written permission to graze a specific number, kind, and class of livestock for a specified time period (usually for a ten-year term) on a defined rangeland, in which the land (allotment) contains only federal land.

Term Private Land Grazing Permit: Issued to persons who control grazing lands adjacent to National Forest System lands who waive exclusive grazing use of these lands to the United States for the full period the permit is to be issued. Term of the permit may not exceed 10 years or the term of the lease. [cited: FSM Range Management 2231.13, Term Private Land Grazing Permit]

Terrestrial: Living on land.

Threatened and Endangered species (TES): Species identified by the Secretary of Interior in accordance with the 1973 Endangered Species Act, as amended.

Threatened Species: Any plant or animal species likely to become endangered within the foreseeable future throughout all or a part of its range as designated by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under the Endangered Species Act. See Endangered Species.

Threshold: A transition boundary that an ecosystem crosses resulting in a new stable state that is not easily reversed without significant inputs of resources.

Total Maximum Daily Load (TMDL): The sum of the individual waste load allocations for point sources and load allocations for both nonpoint sources and natural background sources established at a level necessary to achieve compliance with applicable water quality standards [75-5-103(32) MCA]. In practice, TMDLs are water quality restoration targets for both point and nonpoint sources that are contained in a water quality restoration plan or in a permit.

Transition: a shift between two states. Transitions are not reversible by simply altering the intensity or direction of factors that produced the change. Instead they require new inputs such as revegetation or shrub removal. Practices, such as these, that accelerate succession (USDA 1997) are often expensive to apply.

Trend: The direction of change in a plant community or a measured attribute of that plant community as observed over time. The change in direction could be in vegetation, ground cover, or noxious plants, non-native invasive plant species features over time. Most of the time

trend should be described as "meeting", "moving toward", or "not meeting" a desired plant community.

Unsatisfactory Range Condition: Unsatisfactory Range Condition exists when the desired condition is not being met and short term objectives are not being achieved to move the range toward the desired condition.

Uplands: Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the foot slope zone of the hill slope continuum.

Use: (1) The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole, degree of use. (2) Utilization of range for a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

Utilization Standards: Standards established to guide the use and removal of forage and measured in terms of the percent of the plant that is removed.

Variable stocking: The practice of varying the stocking rate through the plant growing season with the objective of utilizing forage at a rate similar to its growth rate. This can be done by either varying the number of animals on a set acreage (pasture) or varying the acreage offered to set number of animals. [cited: NRCS, National Range and Pasture Handbook, Glossary]

Vector: Literally 'a carrier'. An animal, vehicle, wind, water course, etc. carrying seeds of noxious weeds.

Vegetation Management: Activities designed primarily to promote the health of forested and non-forested vegetation for multiple-use purposes.

Vegetation Type: A plant community with distinguishable characteristics.

Vegetation: Plants in general, or the sum total of the plant life above and below ground in an area.

Vegetative: Relating to nutritive and growth functions of plant life, in contrast to reproductive functions. Should not be confused with vegetation.

Viability: Capability of living things of normal growth and development.

Vigor: Relates to the relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing.

Water Quality: The physical, biological and chemical components of stream or lake waters and the degree to which their combined characteristics support beneficial uses.

Water Table: Top surface of groundwater. The top of an unconfined aquifer; indicates the level below which soil and rock are saturated with water. The upper surface of the saturation zone.

Watershed: A topographically discrete unit or stream basin that includes the headwaters, main channel, slopes leading to the channel, tributaries and mouth area. The land area from which surface runoff drains into a stream, channel, lake, reservoir, or other body of water; also called a drainage basin.

Weed: Any unwanted or undesirable plant, whether grass, forb, shrub or tree.

Wet Meadow: A meadow where the surface remains wet or moist throughout the growing season, usually characterized by sedges and rushes.

Wild Ungulate: Hoofed animals such as deer, big horn sheep and elk)

Winter Range: Range that is grazed during the winter months.

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Appendix A: Scoping Comments Tracking

Number	From	Comment	Response in DEIS
1	Mike Hale	Determine ecological sites prior to assessing rangeland health. Site descriptions are available for reference and new sites could be developed. If sites are recognized and roughly delineated, then a similarity index could be used to rate site as a departure from PNC. This along with health assessments (observed apparent trend/soil surface factors) comprise the qualitative assessment matched with the qualitative data from C&T plots.	See Range Resources Section in Chapter 3
2	McClaran Ranches	The Permittee expressed concerns with the fact that catchfly has been found in numerous places on their allotments and how this may affect their grazing operation.	See Range Resources and Botanical Resources with Special Status Plants Section in Chapter 3
3	McClaran Ranches	From at least 100 years ago until 2005, this land has been grazed with more livestock than what is currently grazed. Considering the abundance of the catchfly in these allotments, is grazing really impacting the viability of this species? Could current management actually be increasing the abundance of catchfly?	See Botanical Resources with Special Status Plants Section in Chapter 3
4	McClaran Ranches	There are numerous allotments that are not grazed in the HCNRA, and these allotments have not been inventoried for Catchfly. For this reason, it seems that there is not any information to say how abundant this species is, and what affects of livestock management is to this species in Hells Canyon.	See Botanical Resources with Special Status Plants Section in Chapter 3
5	McClaran Ranches	Historically, these allotments (Toomey, Rhodes, and Cow) were grazed by different individuals and each had livestock on them throughout the winter (typically November through May). The McClaran family is currently removing unneeded fences and strategically reconstructing fences to improve management on the Allotments, and to allow each allotment to be used in a rotational manor with the other allotments, decreasing the long-term grazing management that was prevalent in the past. Please consider this information for your analysis.	See Range Resources Section in Chapter 3

Number	From	Comment	Response in DEIS
6	EPA	Include analysis of environmental effects and measures to mitigate potential impacts. This would involve delineation and description for the affected environment, indication of impacted resources, the nature of the impacts, and a listing of mitigation measures for the impacts.	See Chapter 1, and 3 in the DEIS
7	EPA	Livestock grazing practices may result in adverse impacts to a variety of resources, including water, soil, vegetation, wildlife and their habitat, and biodiversity. These and other potential impacts should be reduced to protect human health and the environment.	See Chapter 3 in the DEIS
8	EPA	The EA must identify 303(d) listed water bodies that could be impacted by the proposed action, the nature of potential impacts, and specific pollutants likely to affect those waters.	See Water Resources Section in Chapter 3
9	EPA	The EA should describe existing restoration and enhancement efforts for those waters, how the proposed project will coordinate with on-going protection efforts, and any mitigation measures that would be necessary to avoid further degradation of impaired waters.	See Water Resources Section in Chapter 3
10	EPA	The FS should ensure that the proposed action would meet state and tribal water quality standards	See Water Resources Section in Chapter 3
11	EPA	The EA should identify all: a) source water protection areas within the project area, b) activities that could potentially affect source water areas, c) potential contaminants that may result from the proposed project, d) measures that would be taken to protect the source water protection areas.	See Aquatic Resources and Water Resources Section in Chapter 3
12	EPA	The EA should include a detailed discussion of the cumulative effects from this and other projects on the hydrologic conditions of the project area. The EA should clearly depict reasonably foreseeable direct, indirect and cumulative impacts to groundwater and surface resources. For groundwater, identify affected groundwater aquifers and analyze any potential for impacts to groundwater quality, quantity, recharge areas, or subsidence as well as impacts to springs or other open water bodies and biological resources.	See Aquatic Resources and Water Resources Section in Chapter 3
13	EPA	Information on habitat and vegetation types where grazing will be permitted should be used to develop a grazing management strategy that ensures sustainable use of rangelands.	See Range Resources Section in Chapter 3
14	EPA	The EA should contain information on the standards for vegetation management and a discussion on how the permittees will use grazing guidelines.	See Chapter 2 and the Range Resources Section in Chapter 3

Number	From	Comment	Response in DEIS
15	EPA	The EA should describe the current quality and potential capacity of habitat, its use by fish and wildlife on and near grazing areas, and identify known fish and wildlife corridors, migration routes, and areas of seasonal fish and wildlife congregation.	See the Wildlife and Aquatic Resources Sections in Chapter 3
16	EPA	If impacts to fish and wildlife, aquatic, and terrestrial habitats would be significant, than the EA would need to include mitigation measures to minimize the impacts.	See the Wildlife and Aquatic Resources Sections in Chapter 3
17	EPA	The EA should include maps of native and rare plant locations and indicate how management of their sites would ensure their protection.	See Botanical Resources with Special Status Plants Section in Chapter 3
18	EPA	The EA should indicate any existing actions within the grazing allotments what aims to restore or protect native plant communities and cryptogrammic crusts.	See Rangeland Resources, Botanical Resources, and Biological Soil Crust Section in Chapter 3
19	EPA	The status of noxious weed projects within the allotments be described and weed monitoring and control features identified.	See Noxious Weed Section in Chapter 3
20	EPA	The EA should include stringent guidelines for grazing in riparian zones on the allotments to promote biodiversity	See Aquatic and Range Resource Sections in Chapter 3
21	EPA	The EA for the proposed grazing should identify endangered, threatened, and candidate species under ESA, and other sensitive species in the analysis area. This evaluation should describe the critical habitat for the species, identify any impacts continued grazing would have on the species and their critical habitats, and how allowed grazing will meet all requirements under ESA including consultation with the USFWS and NOAA.	See Botanical Resources with Special Status Plants, Aquatics Resources, and Wildlife Resources Sections in Chapter 3
22	EPA	The EA may need to include a biological assessment and description of the outcome of consultation with USFWS and NOAA. The FS actions should promote the recovery of species in the project area.	See Botanical Resources with Special Status Plans and Aquatic Resources Section of Chapter 3

Number	From	Comment	Response in DEIS
23	EPA	The proposed grazing action should assess impacts over the entire area of impact, including effects of other past, present, and future projects both in and near the project areas together with the proposed action. This should include where and how much grazing has occurred in the project area and where the extent to which it is occurring now.	See resource by resource analysis in Chapter 3
24	EPA	Where adverse cumulative impacts may exist, the EA should disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.	See resource by resource analysis in Chapter 3
25	EPA	Under Cumulative Impacts Section, the EA should indicated resources analyzed, which ones were not, and why.	See resource by resource analysis in Chapter 3
26	EPA	For each resource analyzed for Cumulative effects, the EA should identify: a) Current condition of the resource as a measure of past impacts, b) Trend in the condition of the resource as a measure of present impacts, c) Future condition of the resource based on an analysis of the cumulative impacts of reasonably foreseeable projects or actions added to existing conditions and current trends, d) Cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives, e) Parties that would be responsible for avoiding, minimizing, and mitigating adverse impacts, f) Opportunities to reduce impacts, including working with other entities.	See Chapter 3 and resource by resource analysis in Chapter 3
27	EPA	The EA should consider how resources affected by climate change could potentially influence the proposed project and vice versa, especially with sensitive areas.	See resource by resource analysis in Chapter 3
28	EPA	The EA should describe the process and outcome of government to government consultation between FS and each of the tribal governments affected by the project, issues raised by tribes, and how the FS addressed them.	See Chapter 1
29	EPA	The EA should include an evaluation of environmental justice populations within the geographic scope of the project, if these populations exist, address the disproportionate adverse impacts to minority and low-income populations, and approaches used to foster public participation by these populations.	See Socioeconomics Section in Chapter 3
30	EPA	Assessment of the project's impact on minority and low-income populations should reflect coordination with other affected populations.	See Socioeconomics Section in Chapter 3
31	EPA	Include an environmental inspection and mitigation-monitoring program to ensure compliance with all mitigation measures and assess their effectiveness.	See Chapter 2

Number	From	Comment	Response in DEIS
32	EPA	The EA should describe the monitoring program and indicate how FS will use it as an effective feedback mechanism to allow project adjustments to meet environmental objectives throughout the authorized grazing period.	See Chapter 2
33	HCPC	The FS must prepare an EIS for all major federal actions that "may significantly affect the quality of the human environment"	The NOI to go from an EA to an EIS was completed in December of 2013, LIRA will be analyzed as an EIS
34	HCPC	Include consideration of the unique characteristics of the geographic area, public controversy, the uncertainty of the project's possible effects, and whether the action may adversely affect an endangered or threatened species or critical habitat.	See Chapter 1, See Botanical Resources with Special Status Plants, Aquatics Resources, and Wildlife Resources Sections in Chapter 3
35	HCPC	Provide a detailed evaluation of alternatives to the proposed action.	See Chapter 2 and 3
36	HCPC	The FS must "rigorously explore and objectively evaluate all reasonable alternatives" in order to "restore and enhance the quality of the human environment and avoid or minimize any possible effects of the agency's actions upon the quality of the human environment." Provide a detailed evaluation of alternatives to the proposed action.	See Chapter 1 and 2
37	HCPC	The FS should consider in detail, an alternative that would reduce grazing levels, implement a rest-rotation schedule, and other management techniques that would prioritize the management and enhancement of natural resources, listed species, water quality, and streamside areas, over the reallocation of "excess forage," as required by the WWNF Forest Plan and HCNRA CMP.	See Chapter 2
38	HCPC	The EA or EIS should assess the impacts of large amounts of livestock waste deposited on the land, with nutrients, coliform bacteria and other disease organisms washing into downstream waters.	See Aquatic and Water Resources Sections of Chapter 3
39	HCPC	This assessment should determine the amount of vegetation available to slow down water and nutrient runoff into stream systems.	See Aquatic and Water Resources Sections of Chapter 3

Number	From	Comment	Response in DEIS
40	HCPC	Any new grazing plan must be accompanied by a much more protective level of utilization, trampling standards, and other mandatory, measureable use standards. This should include mandatory, quantifiable standards for riparian area use, such as stubble heights, bank damage/stability standards, riparian browse standards, width to depth ratios, and the use of these standards to trigger livestock removal from pastures or riparian areas.	See Chapter 2
41	HCPC	Indicate what, if any, water bodies within the analysis area are listed on the State of Oregon's 303(d) list. Please include this information in the EA or EIS, whether any corresponding TMDLs have been established, and address any proposed compliance measures. In the event the area does contain 303(d) listed streams, the FS must insure that its proposed adaptive management approach does not lead to violations of the CWA.	See Water Resources Section in Chapter 3
42	HCPC	Address adverse impacts from livestock on sensitive riparian areas.	See Aquatic Resources and Water Resources Section in Chapter 3
43	HCPC	The FS must monitor both RMOs and the rate of recovery. The EA or EIS must provide quantitative monitoring data demonstrating the effectiveness for meeting PACFISH/INFISH standards	See Aquatic Resources and Water Resources Section in Chapter 3
44	HCPC	The EA should address how the further spread of invasive weeds will be avoided or mitigated under each proposed alternative	See Noxious Weed Section in Chapter 3
45	HCPC	The EA should engage in a thorough analysis of soils and native vegetation and the effects of the proposed grazing on the soils and vegetation within the planning area.	See Rangeland and Soils Resource Section in Chapter 3
46	HCPC	Monitoring data for the presence of TES species must be gathered prior to environmental analysis and incorporated into that process.	See Botanical Resources with Special Status Plants, Aquatics Resources, and Wildlife Resources Sections in Chapter 3

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47	HCPC	The FS must demonstrate that project level surveys have been conducted ant current population data gathered for forest plan MIS.	See Botanical Resources with Special Status Plants, Aquatics Resources, and Wildlife Resources Sections in Chapter 3
48	HCPC	The FS should include a cost/benefit analysis in its NEPA document that encompasses the socio-economic impacts to the broader public, the owners of public lands, and not just a small minority of grazing permittees.	See Socioeconomics Section in Chapter 3
49	HCPC	The EA must present evidence that the FS has complied with Section 106 of the National Historic Preservation Act in its implementing regulations.	See Heritage Resources Section in Chapter 3
50	HCPC	The EA must contain information that demonstrates the FS adequately consulted with members of the interested public, including potentially affected tribes or tribal members concerning cultural resources.	See Chapter 1
51	Mark Porter (Wallowa Resources)	Via phone conversation - Worth thinking about treating medusahead in the LIRA project area. Containment of Medusahead is really important. WR does not want to see invasive annuals prevent permittees from grazing. Medusahead has been in Johnson Canyon since at least the early 1990's. WR has been managing the outside perimeter/areas of medusahead. This species is being contained with active management. WR would like to see the FS have commitment to manage medusahead. WR requests the FS to take an active and lead roll in management of this species.	See Noxious Weed Section in Chapter 3
52	Mark Porter (Wallowa Resources)	WR requests that the FS considers spring burning of Medusahead in the project area.	See Noxious Weed Section in Chapter 3
53	NPS	The National Park Service is concerned with potential impacts to surface and subsurface cultural resources as Dug Bar. We also believe that the FS should consider potential impacts to the extent Historic Structures onsite, though those are outside the mission of the Nez Perce NHP.	See Heritage Resources Section in Chapter 3
54	NPS	We are concerned about how grazing , and the associated fencing or livestock movement may impact (1) visitor access to the site, (2) the visitor experience at the site, and (3) the ability for visitors to receive and reflect upon the received interpretive message (development of visitor interpretive facilities, including wayside panels is scheduled to begin in FY 2012).	See Recreation and Wilderness Resources Section in Chapter 3

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55	NPS	From a trailhead along the road into Dug Bar, and leading over Lone Pine Saddle, is a trail demarking what is reputed to be original footbed of the walwa-ma route to Dug Bar. Trail improvements for erosion control, and more importantly, evidence of past fire suppression activities have altered the appearance of the trail in various segments. It may well be that grazing managed to reduce biomass may actually reduce the likelihood of further alteration resulting from fire suppression efforts, but this should be analyzed in the EA.	See Recreation and Wilderness Resources Section in Chapter 3
56	NPS	Are there alternatives which will reduce the impact of cattle trails (existing and new) to the visitor experience, including their wayfinding ability?	See Chapter 2
57	NPS	How will cattle grazing in the area affect the public's ability to access and safely enjoy the trail?	See Recreation and Wilderness Resources Section in Chapter 3
58	NPS	Buckhorn overlook and Indian Village are not within the area under consideration by this analysis, however, impacts to the viewshed and visitor experience at these sites under the alternatives developed for this plan merit analysis.	See Scenery Resources Section in Chapter 3
59	NPS	NPS believes that this analysis needs to address how grazing impacts (adversely or otherwise) communities of culturally significant flora and continued and new tribal member access to these resources.	See Heritage Resources Section in Chapter 3
60	NPS	It appears that the FS already intends to address the increased impairment of the landscape under continued cattle grazing, as least so far as erosion on north-facing slopes is concerned. The NPS agrees with that concern and would also like to see an analysis of how grazing may further impact the viewshed for recreational visitors throughout the area.	See Scenery Resources Section in Chapter 3
61	NPS	*Walwa-ma* participated in the changing economy of the inland pacific northwest through cattle and horse production. Given the national interest and significance of this history, and the degree to which it would place the potential continuation of grazing into a longer, more informal historical perspective, and tie cattle grazing directly to other uses and resources of the study area, it seems appropriate that this analysis consider how interpretation might help enhance or minimize impacts resulting from cattle grazing.	See Scenery Resources Section in Chapter 3

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62	Oregon Wild	HCNRA contains suitable and/or occupied habitat for state-listed gray wolves, listed fish, inventoried and un-inventoried roadless areas, all of which indicate potentially significant effects on the environment and the need for an EIS	See Wildlife Resources, Aquatic Resources, and Recreation and Wilderness Resource Sections in Chapter 3
63	Oregon Wild	Private grazing on public lands must meet the highest standards of care and should be significantly scaled back (in terms of livestock numbers and season) to be compatible with the ecological situation.	See Chapter 2 and the Range Resources Section in Chapter 3
64	Oregon Wild	Reducing conflicts with wolves is essential. Livestock operators must be required to actively manage their herds and provide shelter for their herds at night. When telemetry data is available, ranchers should be required to move livestock away from locations where wolves are known to be currently active.	See Wildlife Resources
65	Oregon Wild	The Lower Imnaha is not only occupied by wolves, but it is also a likely corridor through which wolves are likely to move from population centers in Idaho and Oregon. So these allotments should be managed to be as wolf-friendly as possible.	See Wildlife Resources
66	Oregon Wild	Be sure that the NEPA analysis is site specific , with clear descriptions of problem areas (and proposed solutions) on each allotment.	See resource by resource analysis in Chapter 3
67	Oregon Wild	Describe wetland and stream impacts on a reach by reach bases. Conduct the effects analysis so that the public and the decision-maker can clearly determine compliance with the PACFISH/INFISH standards.	See Water and Aquatic Resources in Chapter 3
68	Oregon Wild	The NEPA analysis should provide site-specific analysis of known problem areas in terms of livestock management and other areas have high ecological value and potential adverse impacts from livestock, such as wet meadows, floodplains, and key stream reaches.	See Water Resources Section in Chapter 3
69	Oregon Wild	Grazing should be eliminated or grazing season should be very short in order to prevent irreversible damage to drought-stressed plants and it will significantly impact the ability of plants to set seed.	See Rangeland Resource section in Chapter 3
70	Oregon Wild	Please provide for long-term viability of native plants by allowing plants to fulfill their full lifecycle including flowering, seed set, and sexual or asexual reproduction without significant interference by livestock grazing.	See Rangeland Resource section in Chapter 3

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71	Oregon Wild	"Improving livestock distribution" is not necessarily a good thing as improved grazing homogenizes grazing effects and expands the ecological stress caused by livestock grazing. Maybe it would be better to just limit livestock numbers.	See Rangeland Resource section in Chapter 3
72	Oregon Wild	Fencing has ecological consequences that should be considered and minimized or avoided with possible. Fences can kill or harm birds another wildlife. Fences fragment the forest landscape adversely impacting landscape connectivity and is harmful to wildlife. Fencing is very expensive and difficult to impossible the maintain. Remember the option of removing livestock instead of building fences.	See Chapter 2 and Rangeland Resource section in Chapter 3
73	Oregon Wild	Consider and avoid impacts to wildlife, including big game, ground nesting birds, uncommon plants, and aquatic species. Ensure that livestock grazing is not impairing the maintenance of viable populations including well-distributed plant and animal communities with healthy age-class distributions. Focus on species that are sensitive to livestock grazing such as aspen and other highly palatable plants, and animals that live near the ground such as ground nesting birds, amphibians, mollusks etc.	See Wildlife Resource Section in Chapter 3
74	Oregon Wild	Take to heart current policy requiring agencies to avoid actions that would slow attainment of aquatic objectives. Riparian vegetation that is ungrazed will provide better shade, better bank stability, better nutrient cycling. Riparian areas that are grazed will have more erosion, less bank stability, less shade, less tightly coupled nutrient cycles, lower water quality, more soil compaction and faster run-off.	See Aquatic Resources Section in Chapter 3
75	Oregon Wild	Other important public policy objectives near streams include protection of beneficial uses of water, conserving ESA listed fish and wildlife, avoiding further listings by maintaining viable populations of native species, and meeting treaty obligations related to fish and wildlife.	See Aquatic Resources and Wildlife Resource Sections in Chapter 3
76	Oregon Wild	The FS has not prepared a legally adequate grazing suitability analysis based on economic and environmental considerations as required by NFMA (Heiken, 1995).	See Chapter 3, Rangeland Resource section
77	Oregon Wild	The FS needs to help mitigate climate change by managing all living systems to capture and store optimal levels of carbon.	See resource by resource analysis in Chapter 3

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78	Oregon Wild	To avoid cumulative impacts from the combination of climate stress and anthropogenic stresses such as grazing, the FS needs to reduce anthropogenic stress from livestock grazing. In the absence of livestock grazing, streambanks will be better protected by plant roots and plants will be able to store more energy reserves which help them be more resistant and resilient in the face of climate change.	See Rangeland and Aquatic Resources Section in Chapter 3
79	Oregon Wild	OW strongly encourages the FS to make contingency plans that require the removal of livestock during droughts, and after droughts. The agency should provide for long periods of rest and recovery before livestock are allowed to return so that plants can rebuild soil cover, and energy stores both above and below ground.	Drought planning is a planning process outside of this analysis
80	Oregon Wild	The agency should protect and restore biotic soil crusts that help prevent erosion, fix nitrogen, cycle nutrients, and increase site productivity. Livestock grazing conflicts with the maintenance and recovery of biotic soil crusts.	See Biological Soil Crust Section in Chapter 3
81	Oregon Wild	Weeds are a slow motion explosion that are adversely effecting native plant communities and entire ecosystems. By reducing the vigor of native plants, reducing soil cover, and exposing mineral soil, livestock grazing as a strong tendency to spread invasive weeds and exacerbate this problem. The FS should limit or exclude livestock in order to help prevent the spread of weeds.	See Noxious Weed Section in Chapter 3
82	Oregon Wild	Do not allow livestock grazing in existing ecosystems that are healthy and largely ungrazed. Please take steps to permanently terminate grazing authorizations in existing vacant or inactive allotments.	See Chapter 2 and Rangeland Resource section in Chapter 3
83	Oregon Wild	The analysis in the FEIS for the applicable RMP is no longer current and adequate to support this proposed grazing decision. The FS cannot tier to that document because things have changed significantly, such as climate change and forest health concerns which are now paramount and were not addressed in the plan.	Not applicable
84	Oregon Wild	Livestock are naturally prone to cause adverse impacts because they spend a disproportionate amount of time in sensitive areas such as meadows, wetlands, and riparian areas. Livestock don't move when we want them to. It takes significant resources to ensure that range conditions are monitored and livestock are moved. If the FS and the permittee fail to commit necessary resources for range monitoring and moving animals, livestock grazing should be terminated.	See Rangeland and Aquatic Resources Section in Chapter 3
85	Oregon Wild	Please mitigate all the significant ecological impacts of livestock grazing described in Fleischner (2010).	See resource by resource analysis in Chapter 3

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86	Oregon Wild	The FS is not required to allow livestock grazing everywhere, not everywhere they have historically or currently allowed grazing. The FS's highest priority is to meet the requirements of substantive requirements of the Clean Water Act and Endangered Species Act even if it means curtailing grazing.	See Aquatic and Water Resource Sections in Chapter 3
87	Oregon Wild	Consider the grazing standards in Appendix 2 of AFSEEE's 1995 Grazing Suitability Report. We consider these to be a minimum to meet the FS's legal requirements.	The analysis considers all applicable laws, regulations and policies (See Chapter 3)
88	NPT	Consider making an effort to continue to improve the land that the Forest Service is purchasing from TNC, especially those parcels located within the LIRA project area.	Kelly
89	NPT	There is some interest in Tribal Treaty Rights 1855 to use the Lone Pine Allotment	Since this comment letter was received Nez Perce Tribal grazing has begun, it is addressed in the LIRA DEIS in several locations through the document
90	NPT	There is concern that the historical terraces are still being used and causing detrimental impacts to Nez Perce artifacts today.	See the Rangeland and Soil Resource Sections in Chapter 3
91	NPT	In areas were there is a high density of Nez Perce artifacts, there also tends to be high impact of recreational activities. Please limit livestock use in these areas to decrease yet another impact on these sites	See Heritage Resources Section in Chapter 3
92	NPT	Liked the ideas that Tony had for decreasing impacts to a site west of the Imnaha River bridge, but would like to see surveys and possibly protection of sites that may be located on the east side of the bridge, especially because changes to the west side of the bridge may increase impacts on the east side of the bridge.	The area referred to is not actively grazed by livestock and is not applicable to the LIRA analysis
93	NRAC	We want to see the range condition to improve and to retain grazing. We want a useful, viable allotment. AMP is where you set how that allotment is going to work and we look at it from a different perspective and might catch something.	See Rangeland Resource section in Chapter 3

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94	NRAC	Please bring a project update monthly to the NRAC Technical Committee Meeting.	As updates have occurred the NRAC Technical Committee has been informed, refer to the project file for more details
95	NRAC	Would like to be involved in the planning process and be a representative for the permittees	NRAC was invited to be part of the public scoping process, and will receive the copy of the Draft EIS
96	NRAC	There are not many permittees that have USFS grazing permits in the winter so using Lone Pine as a grassbank for those who can't graze their allotment in the winter because of resource concerns (fire, overuse etc.) is a small percentage of the permittees that would be able to use it	See Chapter 2, Rangeland Resource and Economic Section in Chapter 3
97	NRAC	If the Lone Pine allotment is not grazed every year the fire fuels increase and since this area already has a high percentage of fires, there may be an increase in this percentage.	See Fire and Fuels section in Chapter 3
98	NRAC	Would like to see how the grassbank in the Lone Pine Allotment would be managed and the timeline for grazing	See Chapter 2
99	NRAC	The Lone Pine allotment is of special concern. The act rating the Hells Canyon National Recreation Area identified ranching, grazing, farming, timber harvest and the occupation of homes and lands associated with as Traditional and Valid uses of the recreation areas in Section 13.	Valid and traditional uses of the HCNRA is highlighted throughout the DEIS, see Chapter 1 and resource by resource sections in Chapter 3
100	NRAC	Listed below are recommendations we would prefer for the Lone Pine allotment:	See below
101	NRAC	1. This allotment should not be closed	See Chapter 2
102	NRAC	2. This allotment should not be left vacant	See Chapter 2
103	NRAC	3. This allotment should be re-issued to a local permittee using the most current allotted number.	See Chapter 2
104	NRAC	4. Do not use this allotment as a grass bank	See Chapter 2

Number	From	Comment	Response in DEIS
105	NRAC	5. The "cow creek bridge" name should be retained	Not applicable
106	NRAC	6. Separate the Dug Bar facility from the Lone Pine permit for other use except when permittee requires use.	Not applicable
107	NRAC	We feel that utilization of the Lone Pine allotment is far superior to closing or leaving it vacant. Grazing activity on the allotment will provide an economic value not only to the producer but to the County as well and grazing, when appropriate, assists in reducing fire fuels.	See Chapter 2
108	NRAC	We do not feel that grass banking this area is an appropriate use as it is a winter grazing permit. Using the canyon as a winter grazing permit with 'new' cattle an a producer new to the Canyon each year would be problematic. Access for the producer and proper distribution and utilization by cattle would be difficult to achieve.	See Chapter 2, Rangeland Resource and Economic Section in Chapter 3
109	NRAC	We do not believe, at this time, that Elk hazing is an issue for forage availability in the area due to lack of reliable proof that the Zumwalt prairie hazing has moved the elk herds onto the project area.	See Wildlife Resources section in Chapter 3
110	NRAC	The rest of these allotments are under one ranch that has operated successfully in the areas; now going into the 4th generation and we believe their input into this process is vital for success and would encourage you to work diligently with them to complete this document.	See Chapter 1, and more details of correspondence with the permittees in the project file
111	NPT	Considering adaptive management is a concern to NPT because it requires lots of staff time. Currently, we are in a time of shrinking budgets, so using this strategy may not be best. Adaptive management can look good on paper, but hard to do.	See Chapter 2
112	NPT	Past abuses on Archaeology sites, how is Forest addressing these issues?	See Heritage Resources Section in Chapter 3 for sites applicable to the project area and proposed activities
113	NPT	Canyon grasslands fescue found on north aspects in drier canyons this is also where Silene is found. How is Forest handling this issue?	See Chapter 2, Rangeland Resource and Botanical Resource with Special Plant Status Sections in Chapter 3

Number	From	Comment	Response in DEIS
114	NPT	The highly compromised Silene sites should be monitored as plants can be longer lived than we anticipate.	See Chapter 2 and the Botanical Resource with Special Plant Status Sections in Chapter 3
115	NPT	Limit invasive weed recruitment into the Silene areas	See Botanical Resources with Special Plant Status and Noxious Weed Sections in Chapter 3
116	NPT	Monitor all Silene sites.	See Chapter 2 and the Botanical Resource with Special Plant Status Sections in Chapter 3
117	NPT	Consider eliminating livestock grazing in areas where silene is occurring.	See Chapter 2
118	NPT	Consider burning Medusahead in Silene sites	See Chapter 1 and Chapter 2
119	NPT	Make sure the Forest is considering shared use treaty right of springs and proposed water developments. Continue as planned with the new development in Rhodes Creek Allotment, but at least acknowledge the Tribal right is there and consider use perspective.	See Chapter 3
120	NPT	When developing a new water site ensure there are not any plant issues in wet areas (TES and cultural plants).	See Chapter 2 and the Botanical Resource with Special Plant Status Sections in Chapter 3
121	NPT	The proposed action should be to leave the Lone Pine Allotment vacant.	See Chapter 2
122	NPT	Eliminate grazing in area with sensitive plants	See Chapter 2 and the Botanical Resource with Special Plant Status Sections in Chapter 3
123	NPT	Streams and riparian areas need to be protected fro the impacts of livestock	See Aquatic Resources Section in Chapter 3

Number	From	Comment	Response in DEIS
124	NPT	What will be done to restore stream crossings and damage that have been done to wetlands?	See Aquatic and Water Resource Sections in Chapter 3
125	NPT	How extensive will the fencing be on Eureka Bar Trail?	See Chapter 2
126	NPT	Cow Creek/ Imnaha Bridge has a high amount of recreation which is causing damage - need to find ways to improve the condition of this area.	Not applicable, not related to grazing within the LIRA area
127	NPT	Dug Bar Crossing - need to find ways to improve the condition of the area	Not applicable, not related to grazing within the LIRA area
128	NPT	Alternatives that move livestock away from the streams and wetlands, and eliminate crossings should be considered as the preferred alternative.	See Chapter 2
129	NPT	To protect water quality and fish habitat, we encourage the FS to implement alternatives that provide more fencing project for sensitive or heavily damaged riparian areas to protect water quality.	See Aquatic and Water Resource Sections in Chapter 3
130	NPT	What type of new pasture development is planned? Where will this me located? Why is it needed?	See Chapter 2
131	NPT	Rotational grazing systems are generally the most efficient way to get the best utilization of pastures, maximum beef production per acre, and cause less damage to the forage plants and landscape. We strongly encourage the Forest Service to work with permittees to institute rotational grazing techniques to help minimize damage to sensitive areas and disperse livestock across the landscape.	See Chapter 2 and Rangeland Resource section in Chapter 3
132	NPT	FS allotment permits have seasonal turn out dates and end dates. The turn out and end dates exist to reduce the impacts that cattle have on the landscape. Resource damage occurs with extended use. We strongly encourage the FS to implement alternatives that aggressively enforce set turn out and end dates.	See Chapter 2
133	NPT	Who is responsible for monitoring both permits and the landscape? Who is responsible for keeping livestock out of sensitive areas?	See Chapter 2
134	NPT	What considerations are being given for the Tribe's treaty-reserved grazing rights?	See Chapter 3

Number	From	Comment	Response in DEIS
135	NPT	In damaged or sensitive areas, the FS should promote and/or require off site water system to protect riparian resources	See Chapter 2, and the Water Resources Section in Chapter 3
136	NPT	The FS plans development of springs and potentially other water development - NPT is concerned about protection of these areas.	See Chapter 2
137	NPT	How many acres are suitable or capable for grazing in these allotments?	See Range Resource Section in Chapter 3
138	NPT	What percent use or other factors are carrying capacity based upon?	See Range Resource Section in Chapter 3 and in the project file
139	NPT	We strongly recommend that alternatives that emphasize monitoring and maintenance of fences be chosen as the preferred alternative and aggressively implemented	See Chapter 2
140	NPT	What are the different ways being considered to move cows up and down the allotments? How will this protect streams and fish?	See Chapter 2
141	NPT	Have any other alternatives that move cows away from stream systems been explored?	See Chapter 2
142	NPT	NPT encourages the FS to consider and implement alternatives that closely monitor sites with more soil disturbance and adjust the use by livestock accordingly.	See Chapter 2, and Range and Soil Resource Sections of Chapter 3
143	NPT	What other project exist in the drainages (both on and off FS land), and how will this continue or add to cumulative effects within these watersheds? This needs to be fully explored.	See Chapter 3
144	NPT	District Ranger has suggested creating an adaptive management plan - this suggestion is an concern for NPT staff. A solid plan that protects resources needs to be developed and implemented upfront.	See Chapter 2

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145	NPT	The LIRA proposal appears to lie within the Deep Creek, Dug Bar-Snake River, Lower Cow Creek, Lower Lightning Creek, Sleepy Creek, Thorn Creek, and Upper Lightning Creek Watersheds. Dug Bar - Snake River, Lower Cow Creek, and Thorn Creek - the Imnaha River is shown as "Functioning at risk" on the FS watershed condition and prioritization map. Information included with the maps indicates that the water quality and aquatic habitat condition are currently rated as poor to fair for these watersheds. Clean cool water that is of good quality is imperative for fish species. What will be done to ensure the LIRA proposal does not further diminish the conditions of these watersheds? What will be done to contribute to improved conditions of these watersheds? This needs to be fully analyzed.	See Aquatic Resources Section in Chapter 3
146	NPT	Deep Creek, Lower Lightning Creek, Sleepy Creek, and Upper Lightning Creek are shown as Functioning Properly yet aquatic habitat condition and riparian/wetland vegetation conditions are currently rated as poor to fair for each of these watersheds. The streams in these areas are listed as critical habitat for steelhead and bull trout. What will be done to ensure the LIRA proposal contributes to improved conditions of these watersheds? How will this contribution be monitored? This needs to be fully analyzed.	See Aquatic Resources Section in Chapter 3
147	NPT	The Lone Pine allotment is an example of an allotment that is vacant, and ten to fifteen years ago the Forest Supervisor promised the Tribe that allotments that become vacant would be considered for retirement. NPT staff is not aware that this has occurred for any allotment on the WWNF, and NPT staff asks that this promise be upheld. This allotment may be an opportunity for that step and under formal consultation the Tribe expects to fully evaluate that opportunity, while at the same time ensuring full protection of the Nez Perce treaty-reserve rights and resources.	Lone Pine is proposed for closure in Alternative A, see Chapter 2
148	NPT	Currently vacant allotments may serve as restoration projects and provide an opportunity to evaluate the restorative impacts of that management scenario.	Outside the scope of the LIRA analysis.
149	NPT	Important to find an alternative route fro moving cattle to and from the LIRA allotments to keep cattle from using the Tributary of Tulley Creek as a trail	See Water Resources Section in Chapter 3