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Service

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Draft Environmental Impact Statement

Los Padres National Forest
Tamarisk Removal Project

Los Padres National Forest
Kern, Los Angeles, Monterey, San Luis Obispo, Santa Barbara and Ventura Counties, California

Los Padres National Forest Tamarisk Removal Project
Draft Environmental Impact Statement
Kern, Los Angeles Monterey, San Luis Obispo, Santa Barbara and Ventura Counties, California

Lead Agency:	**USDA Forest Service**
Responsible Official:	**Robert Baird, Forest Supervisor** **Los Padres National Forest** **6750 Navigator Way, Suite 150, Goleta, CA 93117**
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Abstract

The Los Padres National Forest (LPNF) proposes to control the invasive species tamarisk in portions of the Piru Creek, Lockwood Creek, Cuyama River, Santa Ynez River, Sespe Creek, Sisquoc River, and Arroyo Seco River watersheds. This action will result in the improvement of riparian ecosystems that have been impacted by the invasion of tamarisk. Tamarisk has replaced the native riparian plant community of willows, cottonwoods and other desirable native riparian species. The water-consuming ability of tamarisk has reduced the surface water available to wildlife. The best management strategy is to enact control measures now before the tamarisk infestations become larger.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, is part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.

Send Comments to:	**Lloyd Simpson** **Los Padres National Forest** **1190 E. Ojai Ave, Ojai, CA 93023**
Date Comments Must Be Received:	**Within 45-days from the date the Notice of Availability (NOA) is published in the Federal Register. If the NOA is published June 10, 2016, then comments are due on July 25, 2016.**

Summary

The Los Padres National Forest is proposing to control tamarisk (*Tamarix sp*.) in portions of Piru Creek, Lockwood Creek, Cuyama River, Santa Ynez River, Sisquoc River, Sespe Creek, and Arroyo Seco River watersheds. The project is designed to eradicate current tamarisk infestations and to prevent its further spread. The project area is located along riparian zones of the above-mentioned waterways and proposes to treat approximately 368 linear miles along perennial and intermittent streams for an area of about 4,247 acres. Currently the infestations are composed of scattered tamarisk within riparian habitat conservation areas, congressionally designated Wilderness areas, and Wild and Scenic Rivers. The proposed project is located on all five Ranger Districts of the Los Padres National Forest. Treatments would occur only along identified reaches where it is present.

Tamarisk is a nonnative invasive tree-shrub that can grow in dense patches, out-compete native vegetation such as willows (*Salix* sp.) and cottonwoods (*Populus* sp.), change soil chemistry by depositing salts from deep ground water on the soil surface, and remove large amounts of water from streams and riparian areas via evapotranspiration through its foliage. The action will result in the improvement of riparian ecosystems that have been impacted by tamarisk invasion. By removing tamarisk before it becomes the dominant vegetation component, native plant communities would be maintained, and in turn will provide a benefit to aquatic resources dependent on healthy, properly functioning riparian areas.

Treatments would begin in 2016, and intensive treatment are expected to occur through 2021. Monitoring and maintenance treatments would continue thereafter to retreat existing infestations, and to treat new infestations discovered within the project area. It is anticipated that most of the project would be implemented over the next 10 years, with the most intensive treatments occurring during the first five years.

No major issues were raised during scoping beyond analysis already planned for multiple resources by the interdisciplinary team.

The proposed action developed by the agency includes hand pulling of tamarisk with hand application of an herbicide. The agency also developed alternatives to the proposed action including a no-action alternative, and a second action alternatives that includes hand pulling only.

Major conclusions include:

- The no action alternative would allow tamarisk to continue to spread
- The hand pulling only alternative would not eradicate the mature tamarisk that are responsible for spreading seed and spreading tamarisk further in the watersheds

Based upon the effects of the alternatives, the responsible official will decide whether or not to implement this project, either of the action alternatives, or modify the project based on public input and interdisciplinary analysis.

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Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this environmental impact statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This environmental impact statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.
- *Chapter 4. Consultation and Coordination:* This chapter 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.
- *Index:* The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Los Padres National Forest (LPNF) Supervisor's office.

Background

In 2004 an environmental analysis was completed for the eradication of tamarisk in the Piru creek area only. That analysis included the use of another herbicide triclopyr.

Since 2003, Habitat Works, a non-profit volunteer organization, has worked primarily in the Piru Creek watershed in an effort to remove tamarisk. This has all been hand work using simple tools to cut larger stems and hand pulling seedlings. As an Example in 2008, on March 1-2, August 30-31 and November 8-9, Habitat Works executed a series of invasive species control activities, focusing on tamarisk (*Tamarix sp*.) infestations on the Piru Creek watershed, on the southern LPNF, within the Mt. Pinos Ranger District. This work was performed on a three-mile section of Upper Piru Creek, between Snowy Creek and Buck Creek, including the Hardluck Campground area. This project utilized the support of 26 volunteers, generating 296 hours of "on the ground" habitat improvement over the six-day work period.

The work focused on cutting major tamarisk shrubs, trees and colonies to approximately six inches above ground, and removing the cut material to high ground, above the stream course. Tamarisk seedlings and small shrubs were pulled by hand. During the six-day work period, a total of 37 trees and 702 shrubs were cut down. An additional 1,588 seedlings were pulled by hand. Cutting the tops without pulling tamarisk or treating with herbicides allows it to regrow and it is still present in places along Piru creek and new analysis for that area is due.

Additional tamarisk inventories and reports have been complied for the watersheds in this EIS and even include aerial surveys for the entire Santa Ynez River. Volunteer groups are offering support to eradicate Tamarisk and want to partner with the LPNF in the hand-pulling of Tamarisk, particularly in areas designated as wilderness.

Purpose and Need for Action

Tamarisk (*Tamarix ramosissima, T. chinensis, T. gallica, T. parviflora*) is a nonnative invasive tree-shrub that can grow in dense patches, out-compete native vegetation, change soil chemistry by depositing salts in deep ground water on the soil surface, and remove large amounts of water from streams and riparian areas via evapotranspiration through its foliage. It has replaced the native riparian plant community of willows, cottonwoods and other desirable native riparian species. Its' water-consuming ability has reduced the surface water available to wildlife, and it can impact habitat for riparian dependent species such as the federally listed arroyo toad, California red-legged frog, and steelhead trout. The best management strategy is to enact control measures now before the tamarisk infestations become any larger.

The purpose of this initiative is to eradicate the noxious weed tamarisk from Piru Creek, Lockwood Creek, Cuyama River, Santa Ynez River, Sespe Creek, Sisquoc River, and Arroyo Seco River watersheds in a timely manner and with an approach that is pest-specific, cost effective, and safe for the human and aquatic environments. The analysis area covers 4,247 acres along 368 linear miles of perennial and intermittent streams; the current inventoried tamarisk infestation. Infestations of tamarisk occurring in these streams and their tributaries within the analysis area are targeted for removal.

This action responds to the goals and objectives outlined in the Los Padres National Forest Land Management Plan (LMP) for fish and wildlife, where direction is provided to maintain fisheries habitat for viable populations of native fish species and to prevent the destruction or adverse modification of habitat essential to threatened, endangered, or sensitive species. The LMP states that “management activities or practices may occur in riparian areas as long as habitat and species diversity of the area is maintained in a healthy state” and that “habitat improvement will enhance conditions for sensitive, threatened, and endangered species.” and helps move the project area towards desired conditions described in the plan.

Successful invasive species control programs are implemented at the landscape level, particularly within watersheds for species that colonize stream courses. Partnerships are especially important for accomplishing weed control. Volunteers have worked for many years on the Los Padres to remove and control tamarisk. They will continue to be part of this effort.

Tamarisk infestations have various impacts on a number of federally listed threatened (F-T) and endangered (F-E) species, as well as some Region 5 Forest Service Sensitive (R5-S) species. Federally listed endangered Least Bell's vireo and Southwestern Willow Flycatcher have been known to nest in large groves of habitat dominated by tamarisk, but this is not likely in the LPNF given the scattered nature of the present tamarisk populations. Tamarisk removal would restore

the area to natural habitats that can be used for these birds as well as arroyo toad (F-E), California red-legged frog (F-T), southwestern pond turtle (R5-S), two-striped garter snake (R5-S) and steelhead trout (both F-E and F-T) stocks.

Proposed Action

To meet the purpose and need, the LPNF proposes to control the invasive species tamarisk in portions of the Arroyo Seco River (Fig. 1), Cuyama River (Fig. 2, Fig. 3), Sisquoc River (Fig. 4), Santa Ynez River (Fig. 5), Piru Creek, Lockwood Creek, and Sespe Creek (Fig. 6) watersheds through a combination of hand treatments and herbicide applications. Herbicide treatments along with mechanical methods are the most effective and the most efficient control method currently available (Shafroth et al. 2005). Herbicide application will be restricted to ground-based, hand applications only and though effective, no aerial spraying is proposed. This action would result in the improvement of riparian ecosystems that have been impacted by the invasion of tamarisk. By removing tamarisk before it becomes the dominant vegetation component, native plant species presence will be maintained, and in turn will provide a benefit to wildlife dependent on these native plant communities.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions as documented in the Record of Decision:

- The decision maker will decide whether to implement this project or not.
- If action is to be taken, which alternative or modified alternative would be selected.

Public Involvement

The Notice of Intent (NOI) was published in the Federal Register on Thursday, February 16, 2012 (Federal Register Volume 77, Number 32). The NOI asked for public comment on the proposal for 45 days, until April 1, 2012. In addition, as part of the public involvement process, the agency contacted interested members of the public, tribes, and other government agencies with hard copies of the proposed action sent via mail with a request to comment.

The LPNF received comments in support of the project, others expressing no concerns, and two letters with recommendations and concerns (project record). The Santa Ynez Band of Mission Indians expressed concern about the use and application of herbicides, and requested clarification on the proposed action. To address these concerns and provide clarification, the LPNF responded to the Tribal Elders Council in writing on May 13, 2015. A letter was also received from the California Department of Fish and Wildlife (formerly Department of Fish and Game) providing recommendations for analyzing and minimizing impacts to sensitive biological resources.

Using the comments from the public, tribes, and other agencies (see *Issues* section), the interdisciplinary team developed a list of issues to address.

Issues

The Forest Service separated the issues into two groups: relevant and other issues. Relevant issues were defined as those directly or indirectly caused by implementing the proposed action. Other issues were identified as those: 1) outside the scope of the proposed action; 2) already

decided by law, regulation, LMP, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…".

As for relevant issues, the Forest Service identified the following during scoping:

Issue #1: Presence of Threatened or Endangered species or their habitats in the watersheds. Ways to limit impacts, such as timing of treatments and treatment methods, have been developed to respond to the needs of these species.

Issue #2: Use of herbicides. As a response to potential effects from the use of herbicides a non-herbicide alternative was developed. The action alternative with herbicide use has specific guidelines for the use of herbicides including buffers from water, no aerial spraying, and only applying directly to the trees on cut ends or by injection.

Chapter 2. Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for the Los Padres National Forest Tamarisk Removal Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion caused by helicopter logging versus skidding).

Alternatives Considered in Detail

In addition to the no action and proposed action alternatives, the Forest Service developed a third alternative for detailed analysis in response to issues raised by the public and interdisciplinary team.

Alternative 1 – No Action

Under the no action alternative, current management plans would continue to guide management of the project area. Hand pulling or herbicide treatment of mature tamarisk plants would not be implemented. Limited treatments could occur where other management actions allow the removal of non-native plant species or to meet fuel reduction objectives.

Figure 1. Arroyo Seco River Project Area.

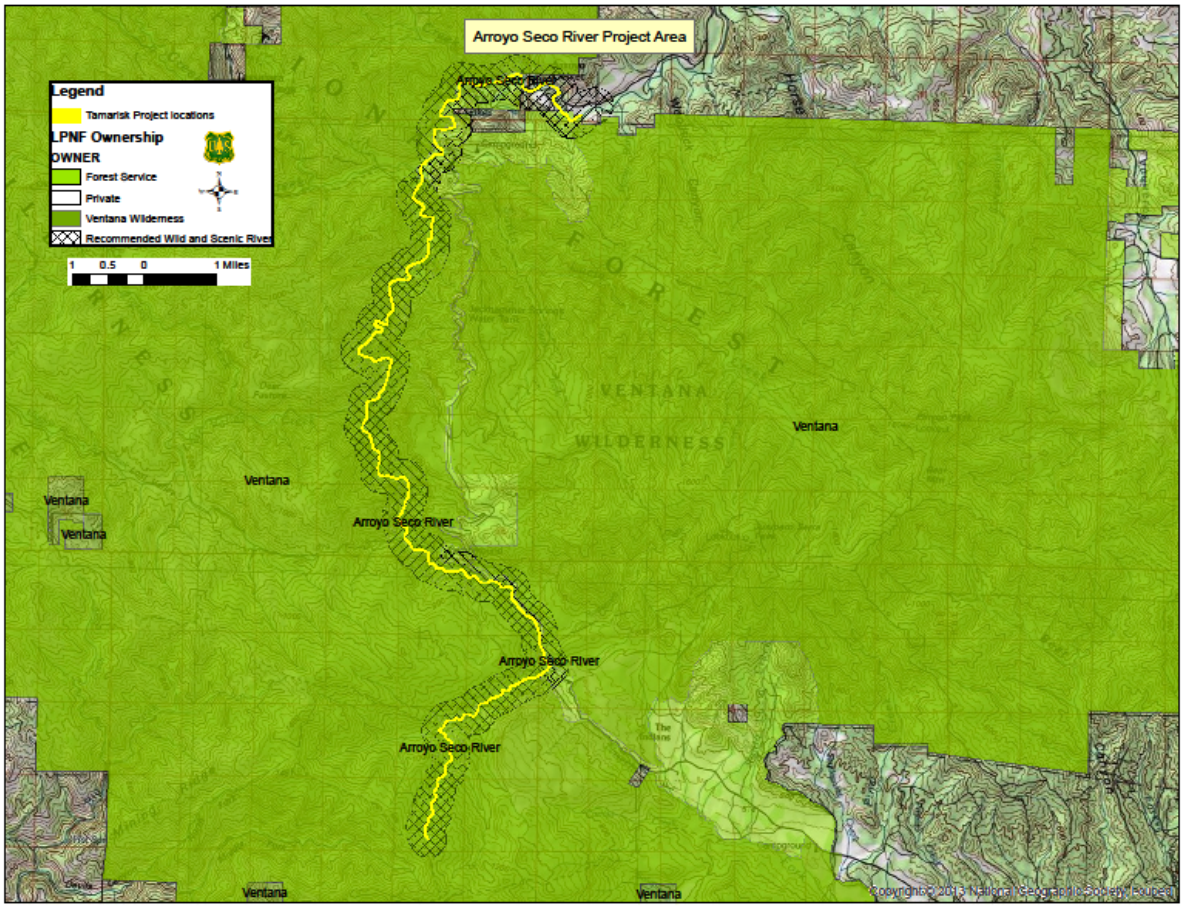


Figure 2. Lower Cuyama River Project Area.

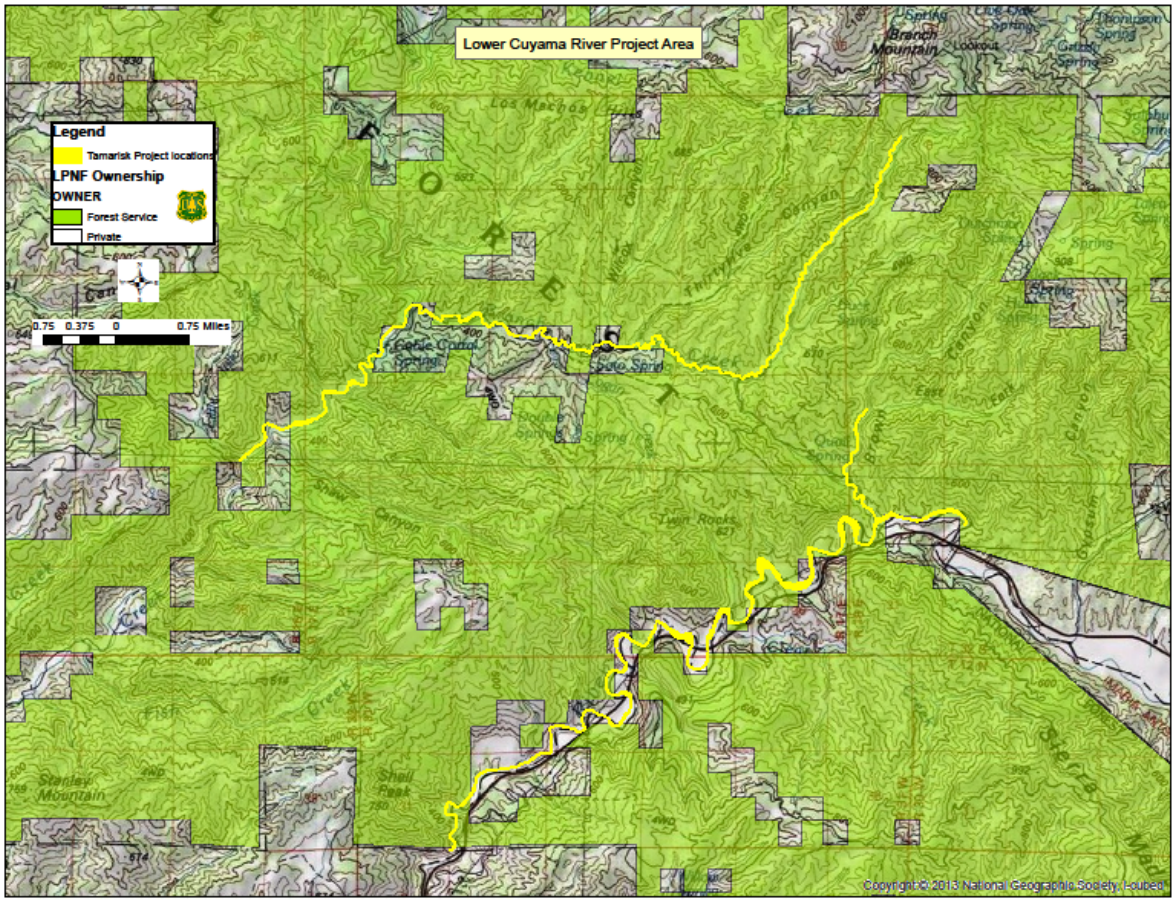


Figure 3. Upper Cuyama River Project Area.

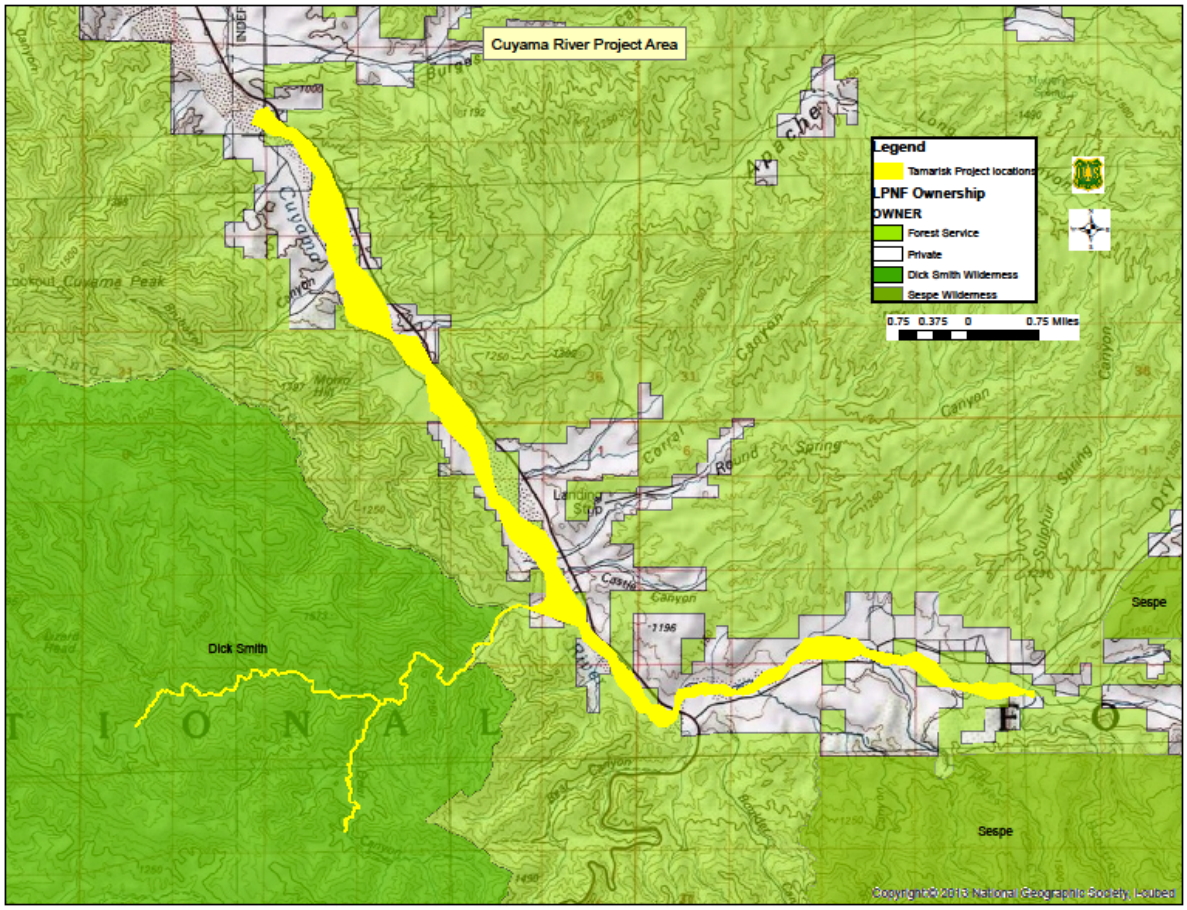


Figure 4. Sisquoc River Project Area.

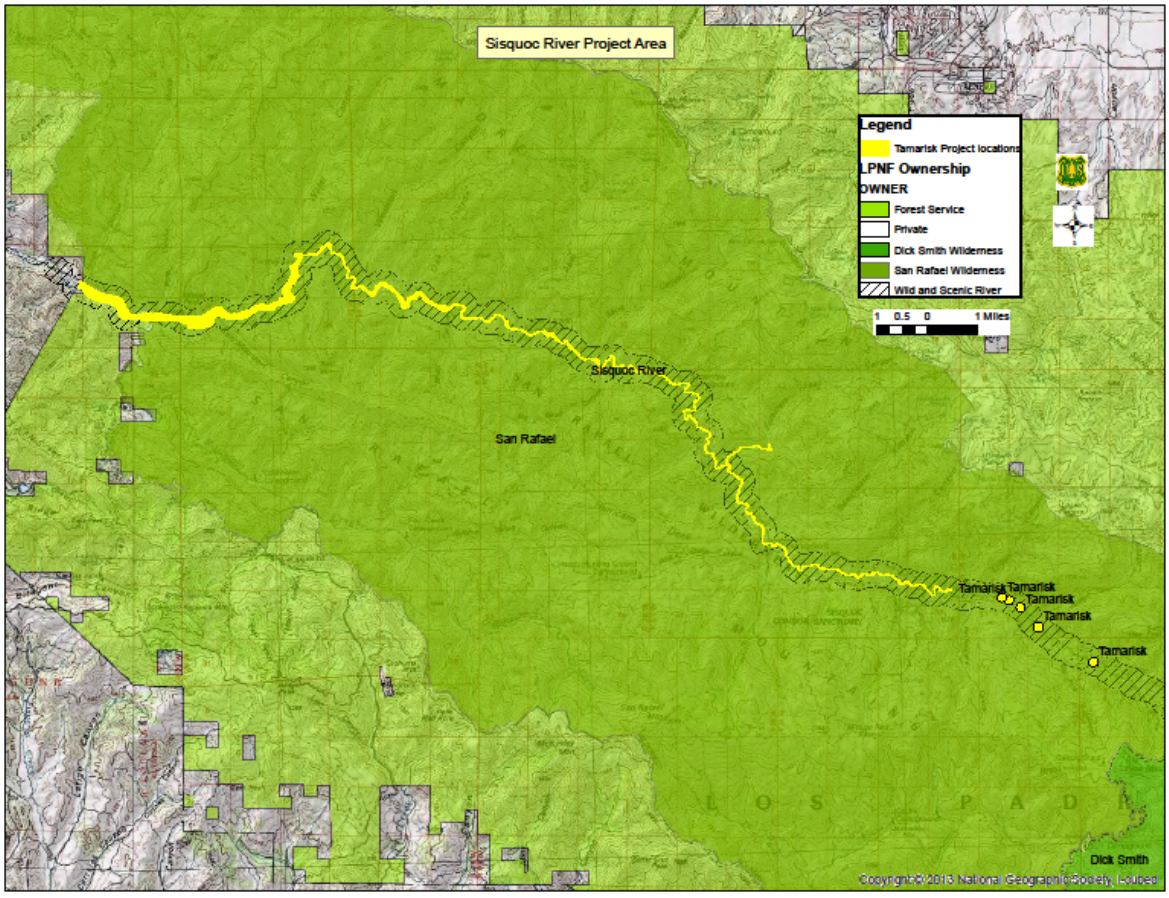


Figure 5. Santa Ynez River Project Area.

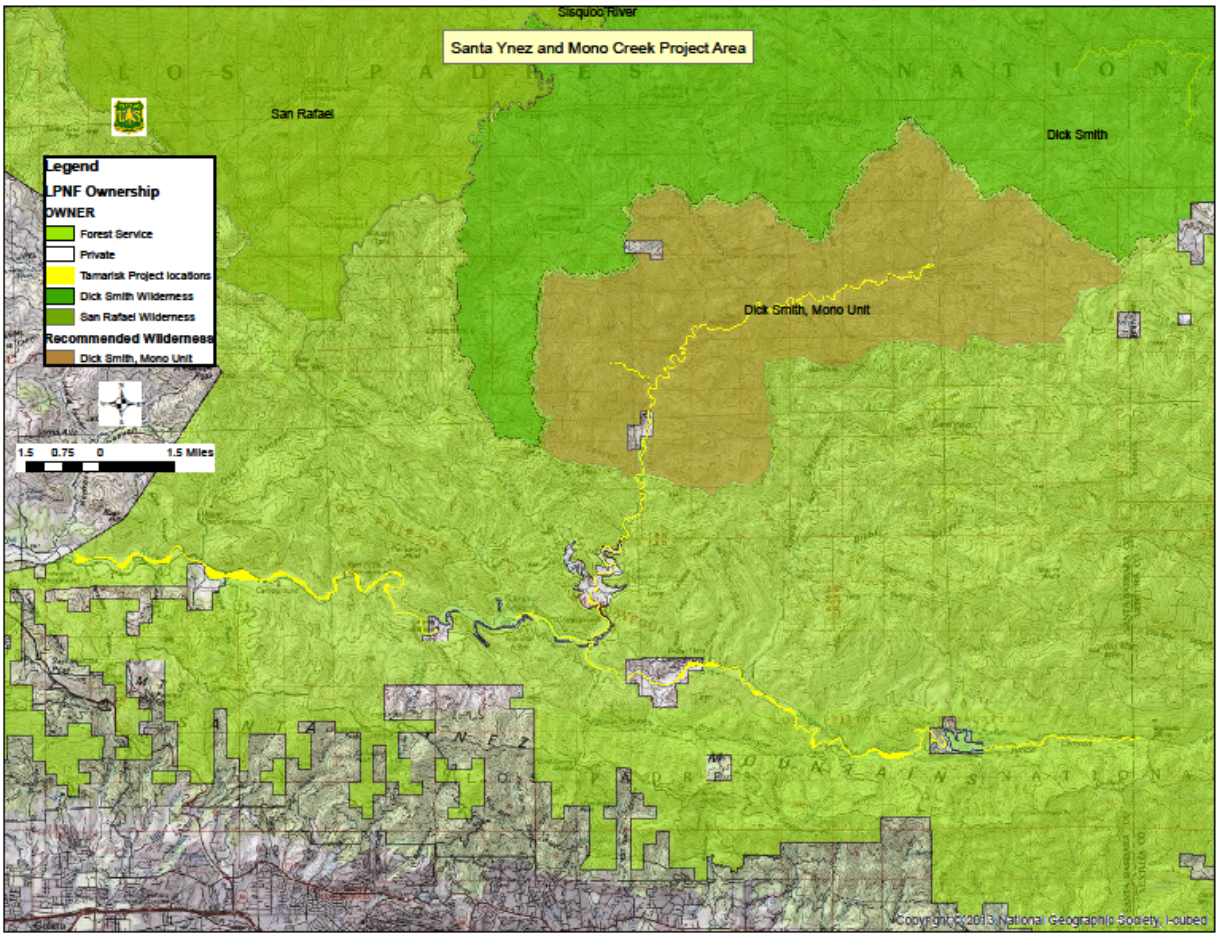
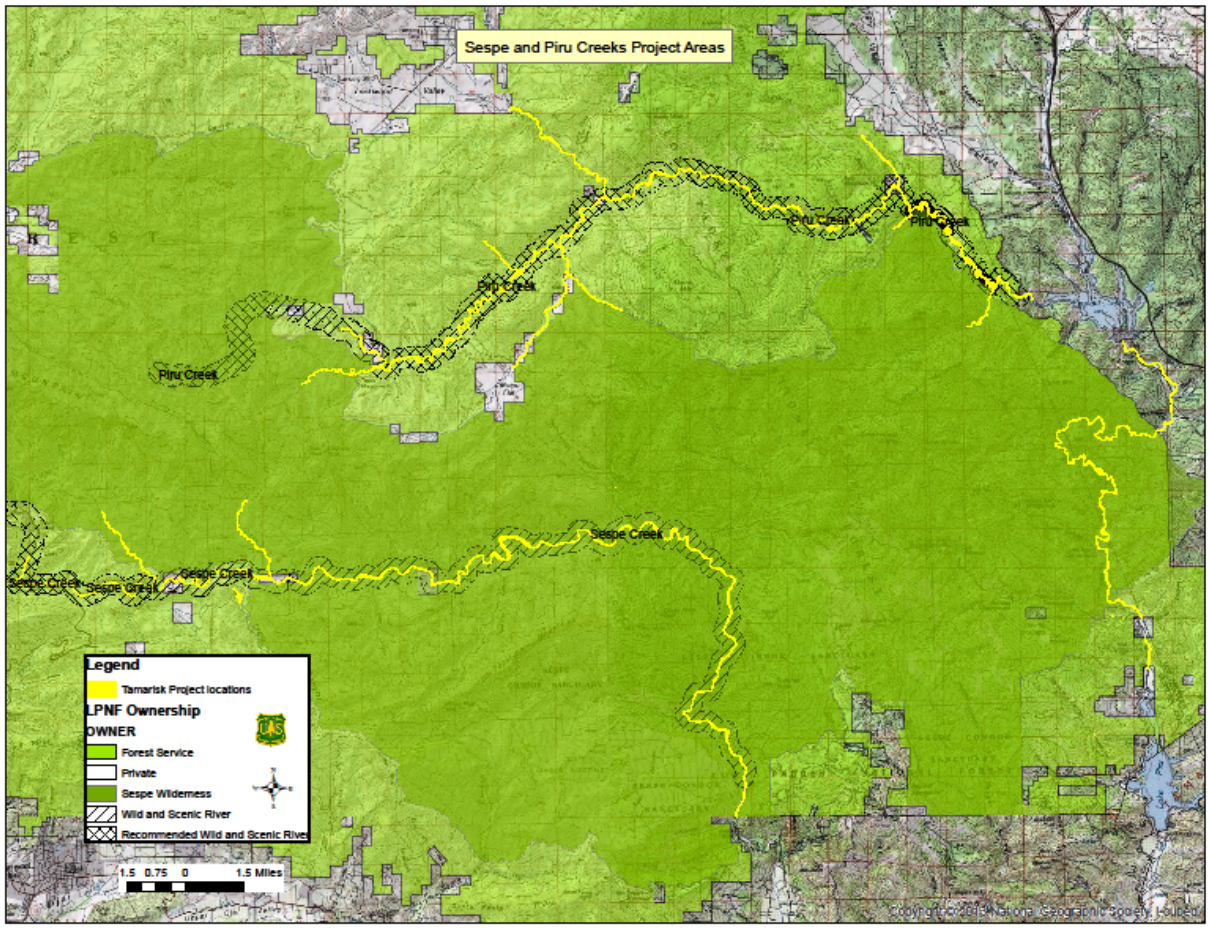


Figure 6. Lockwood, Piru, and Sespe Creeks Project Area.



Alternative 2 – The Proposed Action

The proposed action is a combination of tamarisk treatment methods designed to be as light on the land as possible and at the same time cost and labor efficient. The LPNF proposes to control the invasive species tamarisk in portions of the Piru Creek, Lockwood Creek, Cuyama River, Santa Ynez River, Sespe Creek, Sisquoc River, and Arroyo Seco River watersheds through a combination of hand treatments and herbicide applications. This action will result in the improvement of riparian ecosystems that have been impacted by the invasion of tamarisk.

Tamarisk seedlings and young plants will be hand-pulled where possible and removed from the riparian area and placed in the sun minimizing soil contact with the roots. Experience with hand pulling has shown that only plants 1 foot tall or less can be successfully removed. The project would begin with removing the younger plants on the boundaries of infestations and do as much as possible each year. Large tamarisk within 10 horizontal feet of standing or running water will be treated with imazapyr (Habitat or similar formulation). For plants beyond the 10 horizontal feet of standing or running water, another herbicide, triclopyr (Garlon 4 or similar formulation) may be used. Treatment type will depend on size of the individual tamarisk plant and the access available to do the treatment. Cut plant material will be removed from the waterway but left in small piles as wildlife habitat.

Herbicides are essential to meet the project objectives. Tamarisk will re-sprout if simply cut down and/or burned. Herbicide treatments are the most effective and the most efficient control method currently available, and will be restricted to ground-based, hand applications only; no aerial spraying is proposed. Herbicide use will be consistent with the Forest Service Pesticide Use Policy, will be in compliance with state and federal regulations, will follow Region 5 Best Management Practices (BMPs) for Vegetation Manipulation, the Region 5 Supplement for Pesticide-Use Management and Coordination, and the LMP guidance including the Supplement to Soil and Water Conservation Practices FSH 2509.22-2005-1.

The methods of tamarisk eradication have several constraints in this project: (1) Many treatment areas are very steep, making access and logistics difficult. There is no motorized access to most of the project area, much of it is in Congressionally designated Wilderness. All supplies and equipment must be packed in. Pile-burning cut tamarisk stems is not feasible due to the logistics of getting crews and suppression resources down into the canyons to do it. (2) There are few suitable areas to relocate tamarisk stems for disposal via burn piles. (3) There is habitat known for Least Bell's Vireo and Southwestern Willow Flycatcher, two federally endangered birds in the Piru creek watershed. The habitat area contains scattered tamarisk within the riparian vegetation.

Treatments would begin in 2016, and intensive treatment are expected to occur through 2021. Monitoring and maintenance treatments would continue thereafter to retreat existing infestations, and to treat new infestations discovered within the project area. It is anticipated that most of the project would be implemented over the next 10 years, with the most intensive treatments occurring during the first five years.

Herbicide Treatment methods:

Cut Stump Treatment: Tree trunks are cut near ground level with handsaws or chainsaws and then stumps are hand coated with the herbicide, surfactant and colorant using sponge brushes. The mixture is quickly absorbed by the plant's water-conducting tissue (phloem) and transported to the root; if the herbicide mixture is applied immediately (2-10 minutes), 85-95% control is possible.

Frill Treatment: With this method, a hatchet is used to cut downward into the phloem of standing trees. This treatment would be done using a Hypo-Hatchet tool to directly inject a pre-set amount of herbicide directly into the tree. Usually one injection is made for every inch of stem diameter evenly spaced around the circumference.

For plants beyond the 10 horizontal feet of standing or running water, another herbicide, triclopyr (Garlon 4 or similar formulation) may be used. Triclopyr is not labeled for use around water and would only be used on upland plants.

Treatments would be similar to imazapyr and based on plant size. Cut material will be disposed of in the same way as the cut riparian tamarisk described earlier.

Mitigation Specific to the Proposed Action

1. Applicators would avoid walking or stepping in water, to the maximum extent possible. They would also avoid spilling herbicide on footwear and clothing to prevent inadvertent contamination if contact with water occurs. A complete list of applicable BMPs specific to Alternative 2 is located in the Chapter 3, Hydrology section, Design Features and Mitigation Measures subsection.

2. Herbicides will be applied by hand directly to cut material or stems; no aerial spraying will occur. Only formulations of imazapyr and triclopyr that are approved by the U.S. Forest Service and the Environmental Protection Agency will be used during tamarisk treatments. A diluted concentration of imazapyr will be used on larger plants with thick bark that are within ten feet of standing or running water, and applied by either a sponge brush or frill treatment. Triclopyr will be used only on upland plants with application on cut stumps and by frill treatment. Herbicides will only be applied to tamarisk plants found on dry ground and will not be applied to wildlife foods.

3. Treatment would not occur during rainfall, or preceding forecasted rainfall.

Alternative 3

Alternative 3 is the same as the proposed action with the exception of not using herbicides to treat large tamarisk trees.

Mitigation Common to All Action Alternatives

The Forest Service also developed the following mitigation measures to be used as part of all of the action alternatives:

Water Quality: Water quality would be protected following measures described in the Region 5 Water Quality Management Handbook (FSH 2509.22 (10)). BMPs would be implemented during all activities associated with this proposed action. BMPs are measures developed cooperatively with the Forest Service and the California State Water Quality Control Board to control non-point source pollution on National Forest System lands. Many BMPs are available for use and can be tailored to accommodate site-specific conditions. A monitoring protocol for this project will be included in the project implementation plan.

Wildlife and Fisheries: A biological assessment/evaluation of all threatened, endangered, and sensitive wild life and fish species that potentially occur in the project has been completed to provide an assessment of the impacts of the proposed action. The BMPs above will minimize or eliminate the exposure of wildlife and fisheries to pesticides. The primary effect on federally

listed or Forest Service sensitive species will be the physical presence to work crews in occupied habitat. The following resource protection measures would be carried out during project implementation to protect federally listed and R5 Forest Service sensitive species:

1. The Forest Service will implement BMPs to reduce the risk that wildlife will be exposed to herbicides during and after treatments. Applicable BMPs have been identified in the Hydrology section on pages 35-37.

2. The proposed project will occur during low stream flow or no stream flow periods of the year. All project personnel will avoid walking or stepping in water to the maximum extent possible. They will also avoid spilling herbicide on footwear and clothing to prevent inadvertent contamination if contact with water does occur (Alternative 2 only).

3. A qualified biologist will instruct project personnel in California red-legged frog and arroyo toad identification, their habitats, Endangered Species Act provisions, and designated access routes in and out of project areas. For consideration as a qualified biologist, the person must obtain training on the identification and life history of the California red-legged frog and arroyo toad. All project personnel participating in the removal of invasive species will be provided with information regarding the California red-legged frog, arroyo toad, and other sensitive resources in the area. Photos and other information will be shared to ensure the greatest potential for detection and protection of any California red-legged frogs that may be present in the project area.

4. Within occupied arroyo toad or California red-legged frog habitat or within areas designated as their critical habitat, tamarisk seedlings will be pulled by hand but only if the seedlings are young enough to have a tap root that can be removed without removing the soil. Only treatments such as pulling small seedlings, and cut/stump/stem with follow-up spraying/daubing type treatments (Alternative 2 only) will be allowed in order to avoid soil disturbance to help protect arroyo toads that are burrowed.

5. Within two weeks of the onset of project activities, a biologist or a worker trained and qualified by a biologist will thoroughly survey all treatment sites within California redlegged frog and arroyo toad habitat for presence of California red-legged frog and arroyo toads at each site and identify access routes to be used by workers that will minimize the impacts to biological resources. This biologist or person trained in biological issues will be required to stay with the treatment crew in California red-legged frog occupied or critical habitat during the breeding season (February I to September 30) and at all times in arroyo toad occupied or critical habitat.

6. If California red-legged frogs are observed during project implementation, activities will cease until the frog has left the work area and is no longer in danger of being adversely affected by project activities.

7. At any time of the year when work occurs in arroyo toad occupied or critical habitat, if arroyo toads are observed where they could be impacted by the project, activities will cease in that reach of habitat until there is sufficient cold weather (night temperatures below 50 degrees Fahrenheit) to allow for treatment when toads are known to be underground.

8. If project personnel encounter aquatic wildlife species other than California red-legged frogs and arroyo toads during project implementation they will allow the animal(s) to flee to safe areas out of the work sites or physically move the animals to a safe location.

9. In order to minimize effects to least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo, treatments would occur after the breeding season (April 1 to July 30) for these species.

Sensitive Plants: A biological assessment/evaluation of all threatened, endangered, and sensitive plant species that potentially occur in the project has been completed to provide an assessment of the impacts of the proposed action. The BMPs above, and the large-tree targeted application methods being used in this project would minimize the exposure of Forest Service sensitive plant species to herbicides (Alternative 2 only).

Noxious Weeds: Require cleaning of any tools carried into or out of the project area to reduce the risk of noxious weed spread.

Heritage Resources: Areas requiring flagging and avoidance would be identified by a qualified heritage resources manager to the project planner prior to any implementation of project work. In compliance with the section 106 of the NHPA and the Regional PA, no treatments shall displace more than one cubic meter of undisturbed soil per acre.

Preferred Alternative

The requirement of 40 CFR 1502.14(e) and FSH1909.15 ch.16 states the need to identify the agency’s preferred alternative. Alternative 2, which allows for the targeted treatment of large tamarisk trees with herbicides is the preferred alternative. Alternative 2 best meets the purpose and need by removing the large trees that are reproducing and the seedlings.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action did not provide suggestions for alternative methods for achieving the purpose and need. Some of the comments suggest considering a range of alternatives, but do not offer any specifics. There were questions about the use of Imazapic, surfactants, and protection measures with their use. Surfactants are not proposed in any alternative.

Since no other alternatives were developed from scoping or the interdisciplinary team, no other alternatives were considered and either dismissed or added to the project analysis.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 1. Comparison of Alternatives.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Proposed Action Without Herbicide Use
Meet purpose and need to Eradicate Tamarisk, improve riparian habitats	No, only some ongoing treatment is occurring in the Santa Ynez River area would continue.	Yes	Partially, only treats small plants, but leaves large plants able to produce seed.
Effects from Herbicide	None	Limited to cut ends/injects to large trees	None
Water quality	None	Limited to localized soil disturbance where tamarisk is pulled. Herbicide use is limited to application on cut ends of tree stumps or injected directly. No spraying or use of surfactants are proposed.	Limited to localized soil disturbance where tamarisk is pulled
Effects to heritage resources	None	Mitigations in place to minimize impacts – avoidance of sites	Mitigations in place to minimize impacts – avoidance of sites
Effects to Threatened and Endangered species	No direct impacts, indirect impacts possible from ongoing loss of habitat from tamarisk	Possible short term as trees are removed, goal is for long term habitat improvement/ maintenance, mitigations in place to minimize impacts	Possible short term as trees are removed, goal is for long term habitat improvement/ maintenance, mitigations in place to minimize impacts
Wilderness	Natural condition: Long-term impact	Untrammeled and Solitude: Short-term impact. Natural condition: Benefit – more than Alt. 3	Untrammeled and Solitude: Short-term impact. Natural condition: Benefit – less than Alt. 2.
Wild and Scenic Rivers	Scenery, botanical, fish and wildlife habitat, ecological values: Long-term impact	Recreation, solitude, wilderness-orientated activities, scenery: Short-term impact. Fish and wildlife habitat, scenery (long-term): Benefit – more than Alt. 3	Recreation, solitude, wilderness-orientated activities, scenery: Short-term impact. Fish and wildlife habitat, scenery (long-term): Benefit – less than Alt. 2.

Chapter 3. Affected Environment and Environmental Consequences

Introduction

Invasive nonnative species are ecological indicators whose presence is a warning of an ecosystem potentially in decline. In many situations, invasive species are the symptoms, not the cause, of decline. When the cause is not remedied, populations of invasive species typically increase, resulting in further ecosystem degradation.

Based upon the Weed Risk Assessment for the 2006 LMP FEIS, riparian communities, chaparral, coastal sage scrub, desert woodland and scrub, Monterey coastal communities, montane conifer forests, and oak savannas are ecosystems in decline as a result of previous human disturbances, natural processes, or lack of natural processes. These vegetation communities are currently affected by invasive species, have a high probability of being affected by the proposed action, or both.

Riparian ecosystems are among the most susceptible to invasion by nonnative species. In many southern California streams, native plants and animals were adapted to a dynamic equilibrium, which included flood disturbance that maintained diverse structure, age classes, and community composition. Today, development, dams, water diversions, groundwater extraction, stream channelization, grazing, roads, and recreation use have modified many of these streams and created conditions that favor some of the most aggressive invasive species (DeLoach et al. 2000). Humans have either accidentally or deliberately introduced most of the invasive species that are present.

Tamarisk (*Tamarix racemosa, T. parviflora, T. gallica,* and *T. chinensis*) has been documented in at least 60 foothill and desert streams in the planning area (Stephenson and Calcarone 1999). Although it inhabits disturbed locations, tamarisk also invades locations not regulated by dams or affected by grazing. Its deep roots enable it to extract water from great depths and to grow farther back on the bank than other riparian species. Tamarisk tolerates salt levels of 18,000 to 36,000 ppm (salt tolerance of cottonwood and willows is 1,500 to 2,000 ppm) and excretes salt in leaves that fall and accumulate on the ground, preventing growth of native vegetation (DeLoach and others 2000). The large water usage of tamarisk (200 gallons per day) contributes to a lowering of water tables that can cause springs to dry up and permanent streams to become intermittent. Over time, high salt concentration and reduced water levels result in tamarisk thickets that preclude re-establishment of native species. Stephenson and Calcarone (1999) list primary watersheds where arundo and tamarisk are present.

Hydrology

Affected Environment

The information for this section is based on the Hydrology Report for the Los Padres National Forest Tamarisk Removal Project (Arias 2012).

The analysis area is located in different floodplain areas throughout the Forest, with the northernmost floodplain at Arroyo Seco River approximately 192 miles from the southernmost point at the Piru Creek. Watersheds in the project area are located within two California Regional Water Quality Control Board (RWQCB), the Central Coast and Los Angeles Regions. The proposed treatment area is limited to floodplain zones adjacent to six major stream complexes: the Arroyo Seco, Cuyama, Sisquoc, and Santa Ynez Rivers within the Central Coast RWQCB, and the Piru and Sespe Creeks within the Los Angeles RWQCB.

Climate is diverse due to the spatial extent of the project area. The Arroyo Seco is the northernmost point with the closest climate station located in the Big Sur State Park, 16 miles northwest from this watershed at about 220 feet above sea level (Climate Station # 040790, Western Regional Climate Center, 2012). Average annual minimum temperature is 46 ºF, and average annual maximum 69 ºF. . Climate data indicate that average annual precipitation is about 41 inches. No snowfall is recorded in the area. The wettest month, on average, occurs in January while the driest month occurs in July. The Big Sur State Park Station climate data is representative of a lower elevation near the ocean shore area, reflecting significantly higher precipitation. Values for inland precipitation were estimated using WEPP, Rock:Clime data (Elliot et.al., 1999). Results showed annual precipitation averages of 21 inches.

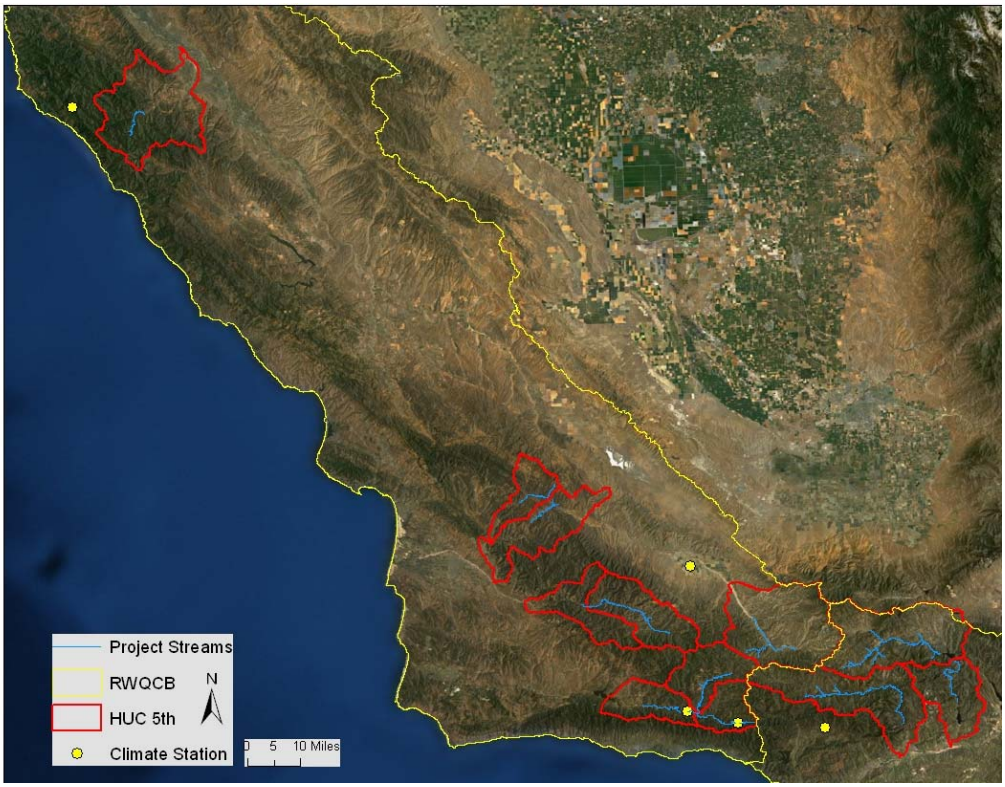


Figure 7. HUC 5th watersheds and California Regional Water Quality Control Boards (RWQCB)

In the center of the project area, 14 miles northwest from the Cuyama River, the Cuyama, CA climate station is located at about 2240 feet above sea level (Climate Station # 042236). Average annual minimum temperature is 40 ºF, and average annual maximum 75 ºF. Climate data indicate that average annual precipitation is about 6 inches. The area receives approximately 0.9 inches of snow annually with the majority falling in January. The wettest month, on average, occurs in February while the driest month occurs in July. The Cuyama Station climate data is

representative of the lower elevation areas within the project area, but does not reflect the significantly higher precipitation at higher elevations. Values for higher elevations/ higher precipitation areas were estimated using WEPP, Rock: Clime data (Elliot et.al., 1999). Results showed annual precipitation averages in higher elevations of up to 11 inches.

Southernmost climate stations include Ojai (Station # 046399), Juncal Dam (Station # 044422), and Gibraltar Dam (Station #043402). Averaged data from these stations provide an annual minimum temperature of 45 ºF, and average annual maximum 78 ºF. Climate data indicate that average annual precipitation is about 26.1 inches. The area receives approximately 0.3 inches of snow annually with the majority falling in January. The wettest month, on average, occurs in February while the driest month occurs in July. The Ojai, Juncal Dam and Gibraltar Station climate data also represents lower elevation areas therefore values for higher elevations/ higher precipitation areas were estimated using WEPP, Rock: Clime data (Elliot et.al., 1999). Results showed annual precipitation averages in higher elevations of up to 23 inches.

Precipitation in the area is commonly induced by orographic air masses moving inland from the Pacific Ocean. Precipitation is heavier in geographic areas closer to the coast such as the northern Arroyo Seco area and southern Santa Ynez, Sespe and Piru watersheds as evidenced by data from the climate stations and streamflow rates. Lighter precipitation rates on the eastern slopes affect the Cuyama watershed water availability. Circulation of marine air has a strong influence on temperature, with areas closer to the coast experiencing a stable equable regime, while areas inland having great variability.

The geology of the Arroyo Seco area is characterized by northwest to southeast trending faults within the tectonically active Central Coast Range geologic province. The remaining watersheds are located south where the Central Coast Ranges meet the east-west trending Transverse Ranges. Elevation within the project area ranges from a low of 874 feet at the southwest portion of the Santa Ynez River to over 5,032 feet in the Cedar Creek, tributary to the Piru Creek. Landslides and upland surface erosion are the primarily sources of natural sediment to the streams. Most areas are naturally erosive with a high runoff potential. Slopes within the project area are relatively flat ranging from 1 to 2 percent in the floodplain areas.

Watershed and Stream Characteristics

The Hydrologic Unit Code 5 (HUC 5th) sub watershed was used to define watershed analysis boundaries. Twelve sub watersheds are within the analysis area and displayed in Table 2.

Table 2. Watershed characteristics in the Los Padres Tamarisk Project Area

HUC 5th Code	HUC 5th Name	Total Stream Miles	Project Miles	Percentage to be treated
1806000513	Arroyo Seco	882	19	2
1806000701	Headwaters Cuyama River	1045	22	2
1806000704	Alamo Creek	260	12	5
1806000706	Lower Cuyama River	452	13	3
1806000801	Upper Sisquoc River	544	27	5
1806000803	Middle Sisquoc River	368	2	0
1806001001	Mono Creek	402	19	5
1806001002	Headwaters Santa Ynez River	206	16	8
1806001004	Redrock Canyon-Santa Ynez River	272	17	6
1807010205	Upper Piru Creek	788	50	6
1807010206	Lower Piru Creek	401	18	5
1807010207	Sespe Creek	804	42	5

Arroyo Seco Complex

The Arroyo Seco River watershed is located in the northern portion of the project area. The River flows east to northeast mostly through the Ventana Wilderness until its confluence with the Salinas River. Terrain within the floodplain area is generally flat and narrow, enclosed by moderately rugged and steep-sided ridges. Drainages follow fault lines within an association of basement rocks known as the Salinan block. Rocks from this block are metamorphic including gneiss, schist, quartzite and marble and granitic primarily quartz diorite. Mass wasting in the form of shallow debris slides dominates the landscape. Eroded material is derived from highly unstable Cretaceous sandstones overlaying the Salinan block. Debris slides typically occur on long steep slopes, affected by fire and/or heavy rainfall (USDA, 2000a).

Floodplain width is 100 feet throughout the length of the Arroyo Seco segment proposed for treatment. Approximately 119 acres of Arroyo Seco floodplains are within the analysis area. The Arroyo Seco River is an unregulated, wild and scenic river candidate, fed by multiple Ventana wilderness tributaries which ultimately maintain the Arroyo's perennial flow through the summer. Figure 8 shows the mean monthly flows from the Arroyo Seco USGS station located approximately 20 miles downstream from the project area. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in September.

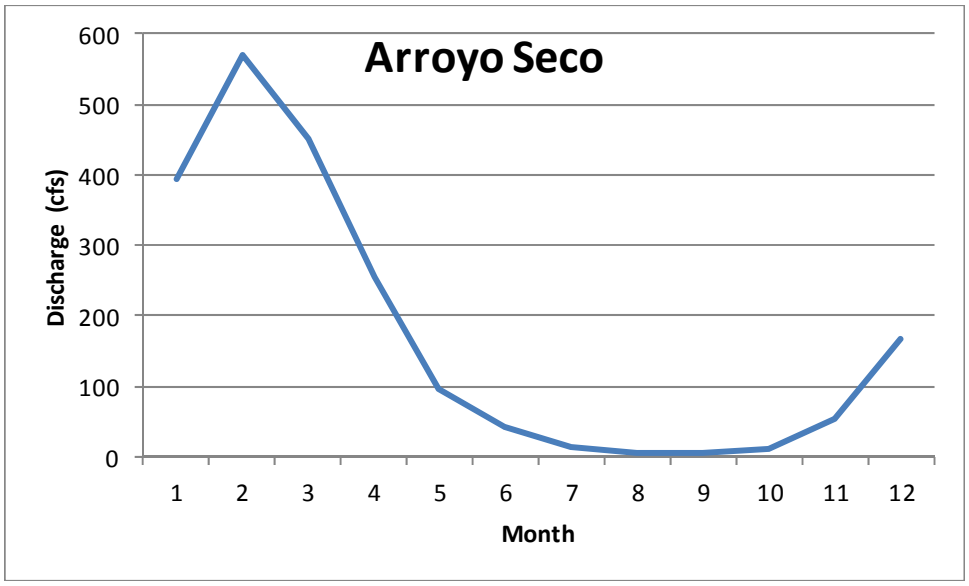


Figure 8. Arroyo Seco USGS Station 11152000 Mean Monthly Streamflow

Cuyama Complex

The Cuyama River flows on an east direction through different terrain including wide-open valleys and rugged sideslopes. The River flow is regulated by the Twitchell Reservoir located approximately 12 miles downstream from the analysis area. The mainstem of the Cuyama River is divided in two segments in the project area. The downstream portion closer to the Reservoir includes the Cuyama River, the Alamo Creek and its tributary Branch Creek. Alamo Creek confluence with the Cuyama River is adjacent to the Reservoir and influenced by changing water levels. Approximately 1853 acres of Cuyama and Alamo floodplains are within the analysis area. The Rancho Nuevo Creek is also a major tributary to the Cuyama located inside the project area.

The terrain in this area is moderately rugged with steep-sided ridges, and floodplain widths vary from 65 to 380 feet. Eroded material is primarily derived from Cretaceous and Tertiary sandstones. Weathered sediment is primarily transported and delivered to channels via landslides and/or overland flow. The project area along the channel floodplain has mapped terraces formed in alluvium (Jennings et al, 1977).

The upstream portion flows through the Cuyama Valley between the Caliente and Sierra Madre mountains. Here the floodplain is widest for the entire analysis area at approximately 2,300 feet wide. Also in this section of the Cuyama River, the Rancho Nuevo Creek and its tributary Deal Canyon flow into the Cuyama River Valley. Both of these streams are part of the analysis area.

Figure 9 shows the mean monthly flows from the Cuyama River USGS station located approximately 4 miles from the upstream segment. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in August. Even though the Cuyama River flow is regulated by the Reservoir, the magnitude is so small that the River often goes dry during the summer.

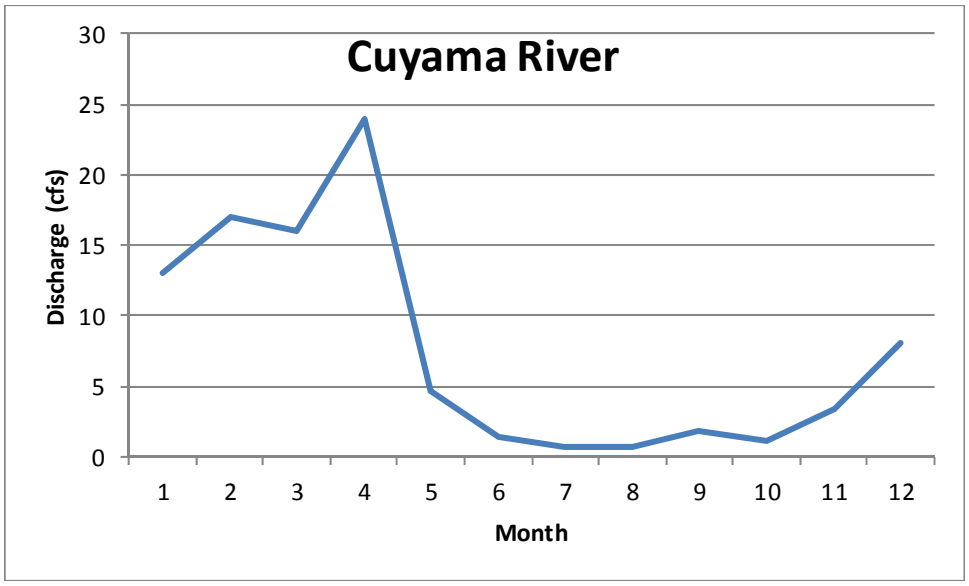


Figure 9. Cuyama USGS Station 11136500 Mean Monthly Streamflow

Sisquoc Complex

The Sisquoc River flows westward mostly through the San Rafael Wilderness until its confluence with the Cuyama River. The River is bounded by the Sierra Madre to the North and the San Rafael Mountains to the South. The floodplain area is limited in width and ranging from 100 to 450 feet, enclosed by moderately rugged and steep-sided ridges. Approximately 632 acres of floodplains are within the analysis area. Faulting and folding are the main processes influencing lithology. The Rinconada fault separates the Sierra from the San Rafael Mountains, while folded Late Cretaceous sandstones cover the entire project area (USDA, 2000c).

The Sisquoc River is a free-flowing, designated National Wild and Scenic River. Figure 10 shows the mean monthly flows from the Sisquoc River USGS station located approximately 18 miles downstream from the project area. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in September. The stream flow magnitude is relatively small and goes dry during the summer.

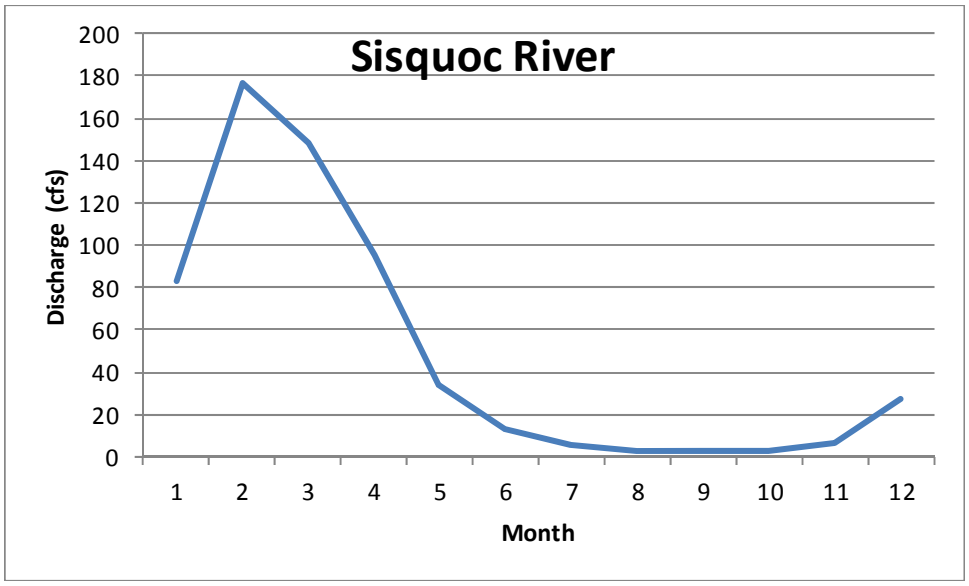


Figure 10. Sisquoc USGS Station 11138500 Mean Monthly Streamflow

Santa Ynez Complex

The Santa Ynez River watershed is located in the southern portion of the project area. The River flows west through the Santa Ynez Valley draining portions of the Santa Ynez Mountains and San Rafael Mountains until its confluence with the Pacific Ocean. Terrain within the floodplain area is generally flat and narrow, enclosed by moderately rugged and steep-sided ridges. Floodplain width is variable ranging between 50 to 450 feet throughout the length of the Santa Ynez segment proposed for treatment. Approximately 893 acres of floodplains are within the analysis area. The Mono Creek is the only major tributary to the Santa Ynez located inside the project area.

The Santa Ynez River is a regulated by three reservoirs, two within project area boundaries. Figure 11 shows the mean monthly flows from the Santa Ynez USGS station located within the project area at the Gibraltar reservoir. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in September.

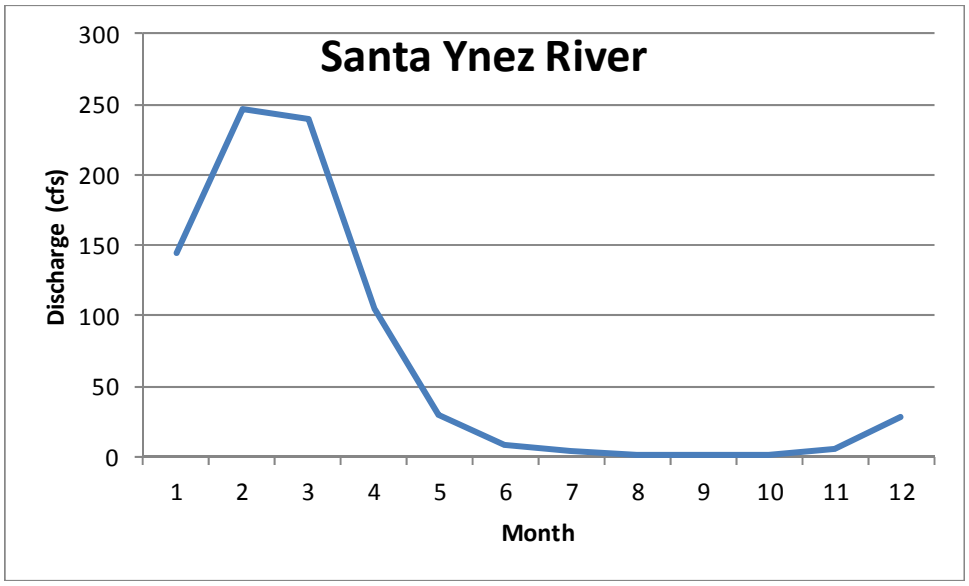


Figure 11. Santa Ynez USGS Station 11123000 Mean Monthly Streamflow

Piru Complex

The Piru Creek flows eastward in the project area for approximately 25 miles, changing its course south towards its confluence with the Santa Clara River. The River originates from springs on the Pine Mountain Ridge. Major tributaries included in the project area are Mutau and Lockwood Creek. The floodplain area is variable in width and ranging from 50 to 550 feet, enclosed by moderately rugged and steep-sided ridges. Approximately 739 acres of floodplains are within the analysis area. Faulting and folding are the main processes influencing lithology. Dominant rocks are sandstones with a small influence of gneiss and granodiorites.

The Piru Creek, although dammed twice along its course, still maintains natural characteristics and is designated as National Wild and Scenic River. Figure 12 shows the mean monthly flows from the Piru Creek USGS station located approximately two miles downstream at the Lake Piru reservoir. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in September.

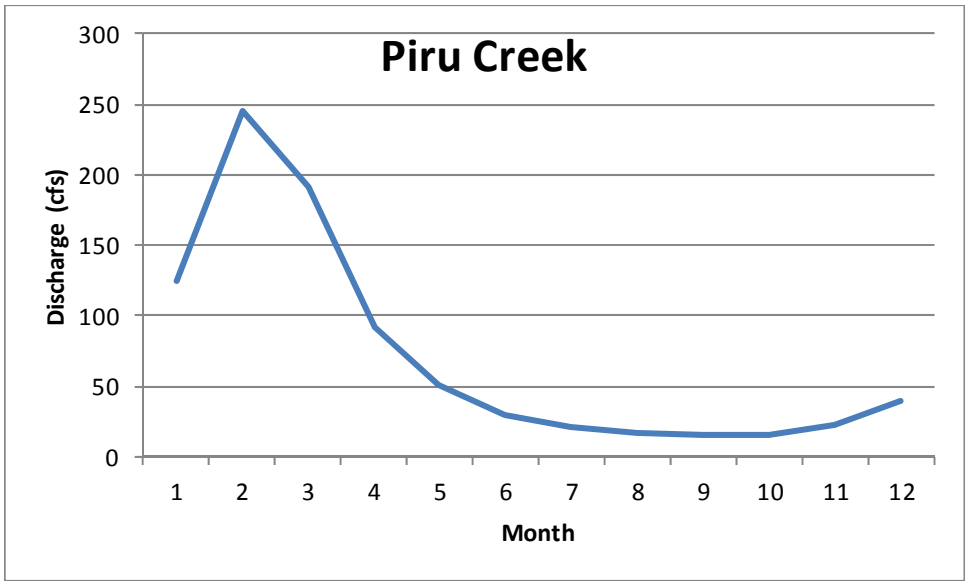


Figure 12. Piru USGS Station 11109600 Mean Monthly Streamflow

Sespe Complex

The Sespe Creek flows eastward in the project area for approximately 18 miles, changing its course south towards its confluence with the Santa Clara River. The River originates on the northern slopes of the San Rafael Mountains. Major tributaries included in the project area are Rock and Piedra Blanca Creek. The floodplain area is variable in width and ranging from 50 to 350 feet, enclosed by moderately rugged and steep-sided ridges. Approximately 559 acres of floodplains are within the analysis area. Flooding in early spring in the Sespe is prominent and contributes to approximately 40% of the Santa Clara River flow. The Sespe drainage has an unusually high concentration of perennial creeks fed by numerous springs and seeps (USDA, 1997). Faulting and folding are the main processes influencing lithology. The area is tectonically active with fault zones such as Big Pine, San Andreas, San Gabriel and others running through the watershed. Sediment is transported via landslides and upland surface erosion.

The Sespe Creek is a free-flowing, designated National Wild and Scenic River. Figure 13 shows the mean monthly flows from the Sespe Creek USGS station located within the project area at the Sepse Creek mouth. Peak flows in the project area result primarily from winter rainfall runoff. Low flows generally occur during late summer-early fall, with the lowest flows occurring in September. The stream flow magnitude is relatively small and goes dry during the summer.

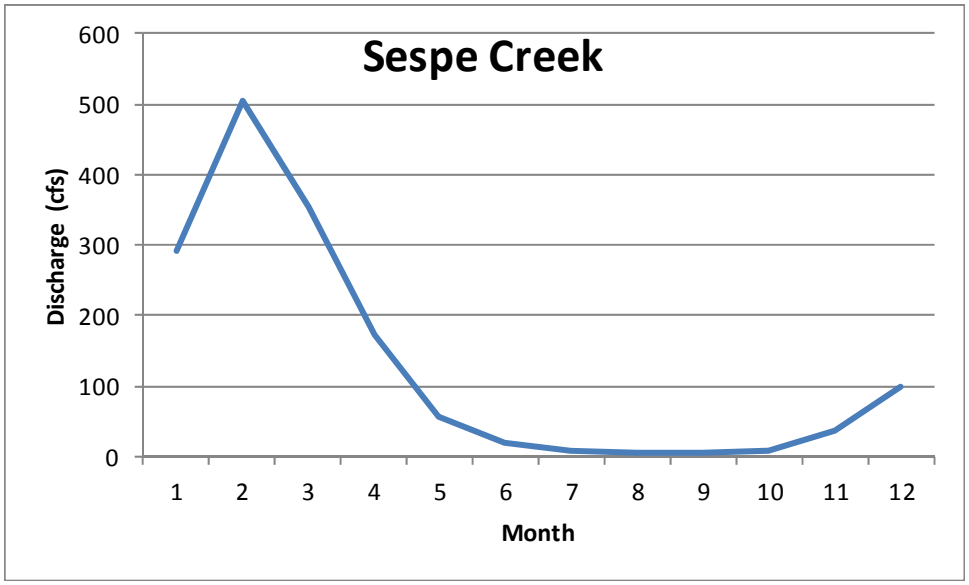


Figure 13. Sespe USGS Station 11113000 Mean Monthly Streamflow

Stream Channel Conditions

Channels in the 5th level HUC project area watersheds have been classified as Rosgen "B" and "C" type channels. Type B channels are medium energy, low order streams with gradients greater than 2 percent and sideslopes which can exceed 50 percent. These channels function largely as transport channels in the project area, which transport fine sediment, and organic material to downstream portions of the channel system. Slope instability can occur because of the steep sideslopes. Where stream channel gradients are less than 2 percent, Rosgen "C" channel types dominate. These higher order stream channels are mildly entrenched, and sinuosity is typically moderate. The majority of channels in the project area fall in this category.

The existing condition of the project area channels morphology is a declining one. Previous studies suggest that tamarisk spread has significant effects on river channel morphology including the ability to decrease channel width, widen channel-side bars, increase overbank flooding, stabilize sand bars at river bends, and enlarge and stabilize islands (Graf, 1978). The extensive root system of Tamarisk is more stable and resistant to erosion than most native riparian trees and shrubs. When stream channels are stabilized, they become more immobile and inflexible (Graf 1978). The project area has naturally unstable, and highly erosive channels with frequent stream course alterations due to slides on outside curves or undercut slopes. The channel stabilization from Tamarisk may restrict the channel's naturally frequent realignment.

During the past 100 years, channel conditions in the project area have also been affected by grazing, wildfires, road building, and vegetation treatments. Fires have historically triggered the highest upland erosion and sediment transport in the area. These activities are believed to have increased overland flow and sediment loads compared to pre-development conditions.

Riparian

Fully developed riparian zones are present within major stream complexes. Reference to abundant riparian complexes and rich biodiversity is recognized in the literature for the Santa Ynez River as well as valuable riparian vegetation for the Sespe, Piru, and Sisquoc corridors (USDA, 2005). Moisture-loving vegetation, in the form of willow, cottonwood and tamarisk, are

present where the water table is closer to the ground surface. While the literature does not present conclusive evidence regarding higher transpiration rates or higher water consumption from tamarisk, the existing condition as observed in the field of native riparian plants is unfavorable due to the aggressive infestation of tamarisk. Tamarisk extensive stands in the project area collectively consume more water, reduces biodiversity, and stress native vegetation. Figure 14 represents the condition of Tamarisk density along riparian areas in the project area (Native Range, 2008). The map shows the equivalent to approximately four acres of tamarisk mapped along the Santa Ynez River.

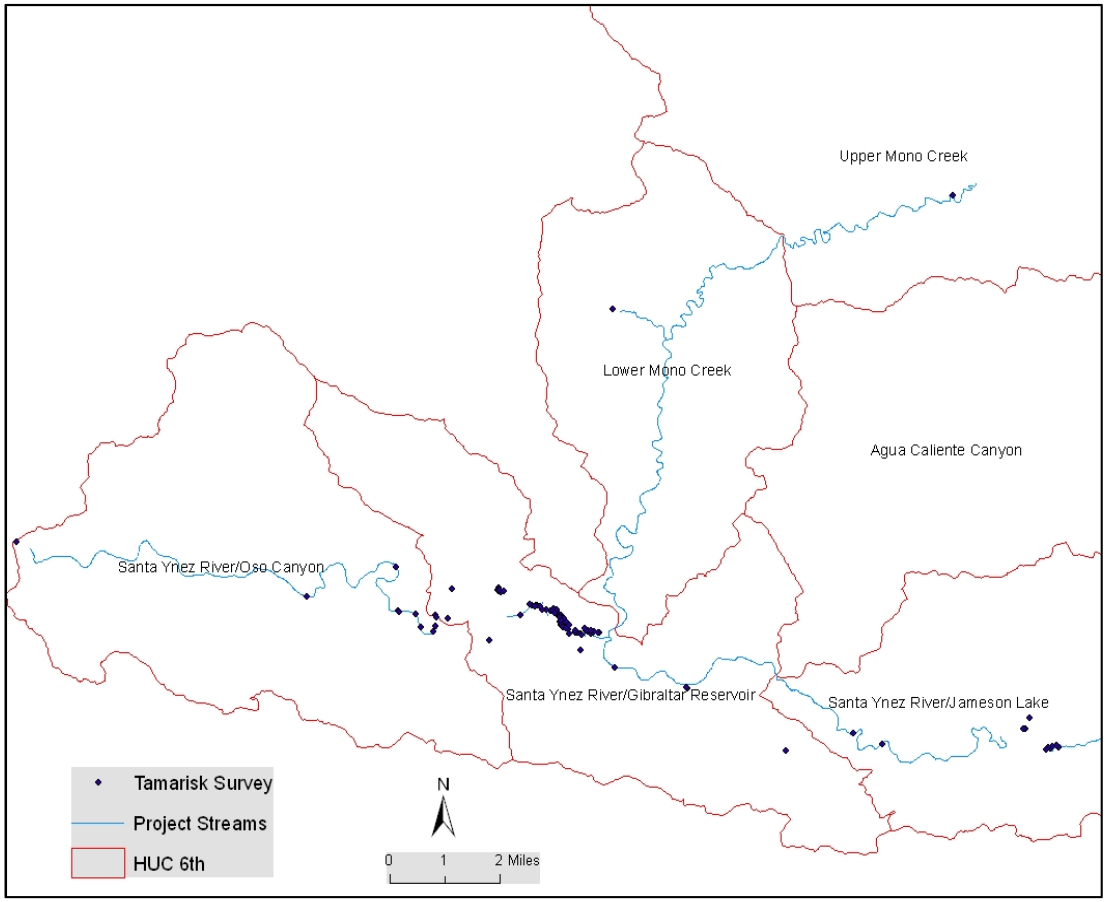


Figure 14. Tamarisk survey along the Santa Ynez River

Water Quality

Water quality in the project area is regulated using guidelines established by the Central Coast and Los Angeles Regional Boards (http://www.waterboards.ca.gov/). The Clean Water Act directs that where water quality is limited, state agencies develop total maximum daily load (TMDL) plans to improve water quality to support the beneficial uses of water. The most recent listing was approved for California in 2010, which compiles all the information from each of the regional water boards. This information was reviewed in context of the project area boundary.

According to the 2010 Clean Water Act, Section 303(d) list of water quality limited segments for California (http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml), there are approximately 121 miles of limited segments within the project area. These water quality-limited streams and the pollutants they are listed for are shown in Table 3.

Table 3. Water quality impaired streams within the project area

Waterbody	Pollutant	Stream Miles
Piru Creek	Chloride	49
Sespe Creek	Chloride	37
Arroyo Seco	Fecal Coliform	10
Cuyama River	Boron	25

In addition to the impaired waters, the Upper Santa Clara River is TMDL listed. Both the Piru and Sespe Creek confluence with the Upper Santa Clara River is 6 and 8 miles respectively downstream of the project area. The causes of this listing come from the chloride contained in the imported source water, and chloride added by domestic uses (CEPA, 2008).

Municipal Watersheds

The Sespe Creek provides municipal water supply to the residents of Ventura County. The Piru Creek has two reservoirs, Pyramid Lake and Lake Piru, both providing water to the California Aqueduct and the western Los Angeles basin. The Santa Ynez has two reservoirs within the project area. Gibraltar and Jameson Lake both provide municipal water to the central portion of Santa Barbara County via the Santa Ynez River Water Conservation District.

Desired Condition

The establishment of invasive species in riparian areas threatens the physical integrity of these ecosystems. Several streams in the project area have designation or are eligible for National Wild and Scenic River status. The goals and objectives outlined in the LMP for the project area are focused on maintaining the ‘wild’ nature of these streams and allowing the forces of nature to operate except where work is needed to protect soil, water and wildlife habitat and to maintain overlooks and vistas. In respect to riparian areas, the LMP states that “management activities or practices may occur in riparian areas as long as habitat and species diversity of the area is maintained in a healthy state” and that “habitat improvement will enhance conditions for sensitive, threatened, and endangered species”.

The Pacific Fish Strategy (PACFISH) amended the 1988 Los Padres National Land and Resource Management Plan in 1995 (USDA and USDI, 1995). This document established stream, wetland and landslide-prone area protection zones called Riparian Habitat Conservation Areas (RHCAs), setting standards and guidelines for managing activities that potentially affect conditions within the RHCAs. These include applying herbicides, pesticides, and other toxicants, and other chemicals, in a manner that does not retard or prevent attainment of Riparian Management Objectives (ROMs) and avoids adverse effects on listed anadromous fish / inland native fish. ROMs provide guidance with respect to key habitat variables.

The 2006 LMP has been divided the forest into a series of geographical units called 'Places.' The desired condition for these places is that exotic aquatic species and noxious weeds are controlled or reduced. Any combination of methods proposed to meet the reduction of tamarisk will be consistent with the Forest Service Pesticide Use Policy, in compliance with state and federal regulations, will follow Region 5 BMPs for Vegetation Manipulation, the Region 5 Supplement for Pesticide-Use Management and Coordination, and the LMP guidance including the Supplement for Soil and Water Conservation Practices FSH 2509.22.

Environmental Consequences

Alternatives have been established using a combination of tamarisk treatment methods designed to be as light on the land as possible and at the same time cost and labor efficient. Treatment methods include a combination of hand treatments and herbicide. Alternative 2 has the most aggressive management using ground-based/ hand applications of herbicides and hand-pulling. Alternative 3 omits herbicide application, addressing infestations through hand-pulling. Water contamination risk from herbicide drift, runoff or leaching is low based on evaluation using GLEAMS modeling. The following sections discuss the methodology and general effects of treatments on water resources.

Methodology

The FS contracts with SERA to conduct human health and ecological risk assessments for herbicides that may be proposed for use on National Forest system lands. The information contained in this report, and in the EIS, relies on these Risk Assessments. Herbicide effects to stream aquatic resources were analyzed in risk assessments for each of the two herbicides included in the Proposed Action. The risk assessments considered worst-case scenarios including accidental exposures and application at maximum reported rates.

The GLEAMS model is a computer model used to estimate an herbicide concentration after herbicide application on an agricultural field. This model is well validated for agricultural use and is the best available at this time. The SERA Risk Assessment analysis takes the herbicide concentration provided by GLEAMS and uses them in a dilution model for a stream or pond to get the water contamination rates for specific scenarios.

Certain limitations to the modeling exist. As the GLEAMS model was originally an agriculture model all parameters used are not compatible with treatments on Forest. The model assumes broadcast treatment along a small perennial stream. The treatment is 50 feet wide and 1.6 miles long. This would overestimate herbicide in streams on the project area as no broadcast treatment is proposed. However, many treatment areas are larger than 10 acres. In steeper areas, the model may underestimate the herbicide delivery as it assumes a 10 percent slope. Very little treatment would be conducted on 10 percent slopes as the Los Padres project targets gentle floodplain areas. The model also assumes even rainfall every ten days.

To overcome some of the limitations mentioned above, the spreadsheets developed for the SERA Risk Assessments were modified for the type of herbicide, herbicide application rates, soil texture and rainfall conditions found at treatment sites on the LPNF (a complete overview of parameters modified is located in the project file). These were run for the specific herbicides to be used at these sites to estimate the potential herbicide concentrations in streams after treatment. The results from the modified spreadsheets where compared with the results provided in the SERA Risk Assessments. While no treatment area was over a threshold of concern for sensitive fish or human consumption established in the SERA Risk Assessments, there were model parameters that do not accurately reflect parameters at treatment sites, adding uncertainty to modeled results.

Spatial and Temporal Context for Effects Analysis

Effects analysis for this project considers direct, indirect and cumulative effects. The area of analysis for potential direct, and indirect, and cumulative effects is displayed in **Error! Reference source not found.**-6. Spatially, effects are analyzed within the boundaries of the 5th level HUC watersheds where any treatments or project-associated activities would occur.

Intensive treatment of tamarisk would be phased through 2017, which was used as the temporal scale for project effects.

General Effects of Manual Treatment

Manual treatment would be limited to hand-pulling seedlings and young plants one foot tall or less. Pulling weeds along stream banks could destabilize the banks in highly infested areas. Manual treatments within riparian areas could accelerate sediment delivery to streams through ground disturbance. Removal of soil cover would be very small under these circumstances therefore effects are considered minimal. Modification of surface ground cover can also change the timing of run-off. For all alternatives, treatment areas comprise a small portion of any watershed so no effects to stream flows are plausible.

General Effects of Herbicide Treatments

Treating invasive plants would improve riparian stability where invasive plants have colonized along stream channels and out-competed native species. All invasive plant treatments carry some risk. A primary issue for this analysis is the potential for herbicides to enter streams and impact domestic water sources and/or aquatic organisms. The routes for herbicide to contaminate water are; direct application, runoff from a large rain storm soon after application, and leaching through soil into shallow ground water or into a stream. This section addresses each of these delivery routes.

No direct application of herbicide to water is intended in any alternative. No emergent plants would be treated under any alternative. Herbicide will be restricted to ground-based/ hand applications spot treatments only. No aerial spraying is being proposed. Herbicide will only be applied to tamarisk plants found on dry ground.

The GLEAMS model was used to estimate the amount of herbicide that may potentially reach a reference stream via runoff. SERA risk assessments evaluated the hazards associated with each herbicide based on the concentrations of herbicide predicted by the GLEAMS model using these parameters.

Hand and spot treatments are inherently far less likely to deliver herbicide to water because the herbicide is applied to individual plants, so drift, runoff and leaching are greatly minimized. Small amounts of some herbicides can trans-locate from the plant to the soil or an adjacent plant, but the concentrations of herbicide that may be delivered to streams from this mechanism is much less than GLEAMS predictions, which models broadcast spraying of herbicide next to the stream with no buffer between the spraying and the stream.

Berg's (USDA, 2004) compilation of monitoring studies on herbicide treatments with various buffer widths showed that any buffer helps lower the concentration of herbicide in streams adjacent to treatment areas. Berg reported that herbicide applied in or along dry ephemeral or intermittent stream channels may enter streams through run-off if a large post-treatment rainstorm occurred soon after treatment. If a large rainstorm occurs after herbicide application, sediment contaminated by herbicide could be carried into streams. Herbicide application would occur in the summer through fall, which is the driest time of the year, thus reducing the probability of a large rainstorm soon after application of herbicides. Additionally, herbicide will only be applied to tamarisk plants found on dry ground.

Accidental Spill

Concentrations of herbicides in the water as a result of an accidental spill depend on the rate of application and the stream ratio of surface area to volume. The persistence of the herbicide in

water depends on the length of stream where the accidental spill took place, velocity of stream flow, and hydrologic characteristics of the stream channel. The concentration of herbicides would decrease rapidly downstream because of dilution and interactions with physical and biological properties of the stream system.

Accidental spills are not considered within the scope of the project. BMPs would reduce the potential for spills to occur, and if an accident were to occur, BMP 5-10 minimizes the magnitude and intensity of impacts. An herbicide transportation and handling plan is a project requirement. This plan would address spill prevention and containment.

Lakes, Wetlands and Floodplains

Herbicides affect lakes and wetlands differently than streams. Dilution by flow or tributary inflow is generally less effective in lakes. Dilution is partially a function of lake size, but dilution could be rapid in small lakes with large water contributing areas. Decreases in herbicide concentration in lakes, ponds, and other lentic water bodies are a function of chemical and biological degradation processes or preferential adsorption of the herbicide into the lake sediments rather than from dilution. The primary pathways for herbicide to enter lakes would be from runoff.

Some invasive plants may grow in wetlands or near reservoirs. To protect water quality, only spot or hand treatments is proposed. A large rain event after treatment could carry herbicide into water resulting in minor amounts of herbicide contacting surface water. This amount would be insignificant compared to concentrations modeled with GLEAMS and well under any threshold of concern.

Alternative 1 – No Action

Direct Effects and Indirect Effects

There are no direct effects from choosing the no action alternative. Alternative 1 would not allow eradication of tamarisk infestations resulting in an indirect effect. Potential contamination would not occur as a result of herbicides entering the stream system or ground water. This alternative would allow the continued overall elevated consumption of water as a result of Tamarisk stand density. Associated improvements to the aquatic and riparian habitats would not occur; the diversity of native riparian vegetation would continue to be diminished.

In some locations, tamarisk may be aiding in stabilizing banks. Stabilization may be affecting the channel’s natural lateral movement, and also decreasing the amount of sediment yield.

Cumulative Effects

There are no direct or indirect effects therefore there are no cumulative effects from choosing the no action alternative.

Alternative 2 – Proposed Action

Design Features and Mitigation Measures

Water quality would be protected following measures described in the R5 Water Quality Management Handbook (R5 FSH 2509.22 (10)). Best Management Practices. BMPs would be implemented during all activities associated with an action alternative. BMPs are measures developed cooperatively with the Forest Service and the California State Water Quality Control Board to control non-point source pollution on National Forest System lands. Many BMPs are

available for use and can be tailored to accommodate site-specific conditions. The following BMPs would be applied to protect water quality in the project area:

Pesticide use planning process (PRACTICE: 5-7)

Objective: To introduce water quality and hydrologic considerations into the pesticide use planning process.

Implementation of BMP 5-7 results in the incorporation of applicable BMPs 5-8 through 5-14 into the project design.

Pesticide application according to label directions and applicable legal requirements (PRACTICE: 5-8)

Objective: To avoid water contamination by complying with all label instructions and restrictions for use.

Directions found on the label of each pesticide are detailed and specific, and include legal requirements for use. Responsibility for ensuring that label directions and other applicable legal requirements are followed will be the responsibility of the Forest Service project supervisor who will have a Qualified Applicator Certificate.

Pesticide application monitoring and evaluation (PRACTICE: 5-9)

Objective: 1) To determine whether pesticides have been applied safely, were restricted to intended target areas, and have not resulted in unexpected non-target effects; 2) To document and provide early warning of hazardous conditions resulting from possible pesticide contamination of water or other non-target areas; 3) to determine the extent, severity and possible duration of any potential hazard that might exist.

A monitoring protocol for this project will be included in the project implementation plan.

Pesticide spill contingency planning (PRACTICE: 5-10)

Objective: To reduce contamination of water by accidental pesticide spills.

An on-site spill plan will be prepared and incorporated into the Project Safety Plan so that accidental spills of herbicide can be responded to quickly and efficiently (FSM 2153.3, BMP 5-11).

Cleaning and disposal of pesticide containers and equipment (PRACTICE: 5-11)

Objective: To prevent water contamination resulting from cleaning, or disposal of pesticide containers.

The cleaning and disposal of pesticide containers must be done in accordance with Federal, State, and local laws, regulations, and directives. Specific procedures for the cleaning and disposal of pesticide containers are documented in the Forest Service Pesticide Use Management and Coordination Handbook (FSH 2109.114), and State and laws.

The applicator will use approved rinsing procedures in accordance with State and local laws and regulations, and arrange for disposal of pesticide containers.

Streamside and wet area protection during pesticide spraying (PRACTICE: 5-12)

Objective: To minimize the risk of pesticide inadvertently entering waters, or unintentionally altering the riparian area, SMZ, or wetland.

Only hand application of herbicide will occur in order to minimize the risk of pesticide inadvertently entering water. Applicators will carry no more than one gallon of herbicide during project implementation in order to minimize the amount of herbicide that could potentially enter a waterway. Herbicide will only be applied to tamarisk plants found on dry ground.

Direct and Indirect Effects

The use of any chemical adjacent to water sources causes a direct and indirect risk of chemical contamination. Under this alternative, the usage of the herbicides Imazapyr and Triclopyr can cause direct effects in water quality.

Up to 4,796 acres of chemical treatment, including 351 miles of perennial and intermittent streams, would take place in RHCAs. All treatment would be conducted by spot or hand methods. None of the treatments are extensive enough under any alternative to have an effect on peak flows, low flows or water yield. Methods used for treatment would have negligible effect on water infiltration into soil and associated surface runoff. No 5th field watershed has more than 1 percent proposed for treatment and most have less than 0.5 percent. This amount is much too small an area to show effects to flows from treatment (Table 4).

Table 4. Percent of watershed area proposed for treatment.

HUC 5th Code	Watershed Acres	Infested Acreage	Percent Watershed Infested	HUC 5th Name
1806000513	190380	119	0.1	Arroyo Seco
1806000701	190146	1507	0.8	Headwaters Cuyama River
1806000704	56424	117	0.2	Alamo Creek
1806000706	110684	229	0.2	Lower Cuyama River
1806000801	104673	572	0.5	Upper Sisquoc River
1806000803	78986	60	0.1	Middle Sisquoc River
1806001001	79178	226	0.3	Mono Creek
1806001002	49933	289	0.6	Headwaters Santa Ynez River
1806001004	65313	377	0.6	Redrock Canyon-Santa Ynez River
1807010205	188987	569	0.3	Upper Piru Creek
1807010206	91204	170	0.2	Lower Piru Creek
1807010207	171971	559	0.3	Sespe Creek

Tamarisks provide little shade when compared to native riparian species such as willows and cottonwoods. Although treatment would occur in the summer through fall when streamflow has practically disappeared in major drainages, removal of tamarisk may still result in short term effects on stream temperatures in and around areas where springs and seeps exist throughout the year. An increase in stream temperature is not likely to have any long term measurable effect

particularly after native species start establishing. As treatment methods target individual plants, the risk from spot or hand application of herbicides to native riparian vegetation is small. Native plants would maintain partial shade throughout project implementation.

Where manual methods remove invasive plants near streams there could be minor loss of ground cover and soil disturbance leading to erosion, and a minor localized increase in fine sediments, particularly if vegetation is removed from stream banks. This increase would only last a season until vegetation became re-established and is not considered significant. Tamarisk removal would allow many treatment sites to reseed naturally with existing native vegetation. Hand-pulled plants and cut stumps would be removed and placed away from channels and riparian areas. Therefore this alternative is not likely to result in an increase in sediment transport into the waterway or an increase in turbidity.

Imazapyr, Triclopyr, and their metabolites could enter surface waters through overland flow, and subsurface movements. Potential effects will be minimized if BMPs are followed. Under this alternative, Tamarisk within 10 feet of a channel will be treated with Imazapyr. This alternative also proposed the application of Triclopyr in areas 10 feet away from running water or stream channels.

Treatment would not occur during rainfall, or preceding forecasted rainfall. This would limit the herbicide from entering surface waters through overland flow, or through leaching. GLEAMS modeling shows that concentrations of triclopyr entering surface waters from adjacent treatment is below the level of concern for human health and wildlife (Table 5). Triclopyr is rapidly broken down by sunlight in surface waters to triclopyr acid and has a half-life in these conditions of less than one day. Triclopyr acid has a maximum half-life of 14 hours in water (SERA, 2011a). Considering the ephemeral and intermittent nature of the streams in the area, the dry conditions, and low precipitation during the time of the year when the project would be implemented, no significant effects are expected in the area. Therefore, Triclopyr and its metabolites are not expected to accumulate or negatively affect water quality in the project area or downstream.

Similarly, the Imazapyr analysis indicates all hazard quotients (HQ) values were at or below FS risk assessments; therefore, no herbicide concentrations in water reached levels of concern for sensitive fish or for consumption of ambient water by a child (Table 5). No hazards associated with the direct toxic action of Imazapyr can be identified for aquatic animals. Imazapyr is relatively non-toxic to soil microorganisms, aquatic invertebrates, and fish. Imazapyr is not expected to bioaccumulate in the food chain (SERA, 2011b). Imazapyr is only moderately water soluble and forest field studies have not found it very mobile in soils. If imazapyr is carried into a stream by runoff it preferentially stays with the soil over partitioning into water. This is unlikely to happen during the late summer or fall when herbicides would be applied because there is less rain in the summer and more vegetation growth to hold soil particles in place.

Table 5. Potential Herbicide Concentrations in Water for Different Precipitation Ranges

Herbicide/ location	Chemical/ Formulation (lb/acre)	Peak Water Contamination Rate (mg/L per lb/acre)	Range of Hazard Quotients (Consumption of ambient water by a child)	Toxicity Index for Listed Fish (mg/L)	Range of Hazard Quotients (sensitive fish)
Triclopyr					
Arroyo Seco (North)	Triclopyr / 0.00012	0.000017 - 0.0002	1E-06 – 2E-04	0.091	3E-04 – 2E-2
Mono Creek (South)	Triclopyr / 0.00012	5.4E-06 - 0.00003	1E-06 – 2E-04	0.091	3E-04 – 2E-2
FS Risk Assessment	Triclopyr / 0.45	0.00000015 – 0.03	1E-02 – 2	0.091	2 - 200
Imazapyr					
Arroyo Seco (North)	Imazapyr / 0.00012	0.007 – 0.018	2E-07 – 1E-04	10.4	1E-06 – 2E-04
Mono Creek (South)	Imazapyr / 0.00012	0.001 - 0.007	2E-07 – 1E-04	10.4	1E-06 – 2E-04
FS Risk Assessment	Imazapyr / 1	0.000009 – 0.26	7E-04 – 0.4	10.4	4E-03 – 0.8

PACFISH Riparian Management Objectives (RMOs)

Invasive and noxious plants are a threat to overall watershed ecological condition. Long-term beneficial effects from the reduction of invasive plants in riparian areas, wetlands, and streams and subsequent increases in desirable vegetation will result in improved watershed conditions.

Water is protected from herbicide concentrations of concern to aquatic species by spot treatment and conservative application rates. One reason treatments are proposed is to recover native vegetation structure which provides more bank stability and greater shading for streams. There would be no change in the amount of large wood in streams or in pool frequency under any action alternatives. There are no ground disturbing mechanical treatments proposed.

Given the type of low impact activities proposed for this project and the use of BMPs, this alternative would have no negative effect to RMOs.

Cumulative Effects

The rapid degradation of triclopyr and imazapyr in surface water would prevent an accumulation of herbicide from achieving levels capable of harming aquatic life or presenting a risk to human health. The entire project area will be hand-treated during the summer and fall, which based on precipitation patterns it is the driest time of the year. Groundwater resources are also subject to similar cumulative effects, though leaching of significant amounts of these herbicides to groundwater is not expected.

The project would induce specific benefits to the stream systems and riparian zones in general that would contribute to favorable cumulative conditions. Alternative 2 would increase flow rates and volumes in the stream system. This effect on water would benefit the overall health of

the ecological communities associated with the streams and would improve water quality. Channel morphology would gradually find a balance between sediment deposition and transportation.

Only the land within the National Forest system would be treated in the action alternatives proposed by this EIS. Herbicides are commonly applied on lands other than National Forest system lands for a variety of agricultural, landscaping and invasive plant management purposes. Herbicide use occurs on tribal lands, state and county lands, private forestry lands, rangelands, utility corridors, road rights-of-way, and private property. No requirement or central reporting system exists to compile invasive plant management information on or off National Forests in California. Accurate accounting of the total acreage of invasive plant treatment for all land ownerships is unavailable.

Chemical treatments are scattered across the watersheds making it unlikely that herbicide concentrations would be additive with similar treatments at the watershed scale. The potential for cumulative effects is negligible due to the implementation of BMPs that limit direct and indirect effects, the scattered nature of the treatments, and the dilution over time and space by mixing and addition of inflow downstream.

Very little vegetation would be removed in any watershed therefore none of the treatments are extensive enough under any alternative to effect peak flows, low flows or water yield in any watershed. No mechanical ground disturbing activity is proposed for this project therefore methods used for treatment would have negligible effect on water infiltration and associated surface runoff. No 5th field watershed has more than 1 percent proposed for treatment and most have less than 0.5 percent (Table). This amount is much too small an area to show effects to flows from treatment.

Alternative 2 is unlikely to have significant effects on water resources and therefore is unlikely to approach a threshold of concern or contribute to significant cumulative effects. No adverse cumulative effects are expected from implementation of this alternative.

Alternative 3 – Modified Proposed Action

Direct Effects Indirect Effects

Under this alternative, potential contamination would not occur as a result of herbicides entering the stream system or ground water. Alternative 3 would only allow hand-pulling treatments resulting in no effects to the water resources. Eradication of tamarisk infestations via herbicide would not be permitted. The treatment acreage is not expected to change. Indirect effects include the potential that Tamarisk will re-sprout if simply cut down and/or burned.

Cumulative Effects

Similar to Alternative 2, there are minor and insignificant direct and indirect effects to water quality and quantity under this alternative; therefore there are no cumulative effects.

Heritage Resources

Affected Environment

California prehistoric chronology is divided into four major periods: Paleo-Indian, Early Period, Middle Period, and Late Period. Paleo-Indian groups during this time may have focused on hunting Pleistocene megafauna, including mammoth and bison. Plants and smaller animals were undoubtedly part of the Paleo-Indian diet as well, and when the availability of large game was reduced by climatic shifts near the end of the Pleistocene, the subsistence strategy changed to a greater reliance on these resources.

The historic occupation of the project vicinity can be divided into several settlement periods: the Mission Period (A.D. 1769 – 1830), the Rancho Period (ca. A.D. 1830 -1865), and the American Period (ca. A.D. 1865 – present).

The proposed action has the potential to affect archaeological and traditional cultural properties that require compliance with section 106 of the National Historic Preservation Act (NEPA). Potential effects of ground disturbing activities may not be limited to physical damage of tangible and visible artifacts. Soil moving activities may modify the horizontal distribution of artifacts; obscuring patterns existing in their original deposition, and eventually introduce new trends in their arrangement.

Potential impacts to cultural resources include:

- Artifact breakage;
- Introduction of non-cultural elements;
- Alteration of horizontal and vertical distribution of cultural materials through deflation, compaction, and erosion of soils; and
- Increased exposure of archaeological site surfaces and consequently, increases in the incidence of vandalism and unauthorized artifact collection.

Compliance with the LMP and Other Relevant Laws, Regulations, Policies and Plans

Protection and management of cultural resources on National Forest System land is mandated by the National Historic Preservation Act, 1966 as amended (NHPA), 36 CFR 800, Forest Service Manual 2360, American Indian Religious Freedom Act, Archaeological Resource Protection Act and the National Environmental Policy Act (NEPA). In addition, Region 5 of the US Forest Service, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation has developed alternative procedures, per 36 CFR 800,14, in the form of the *First Amended Regional Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with section 106 of the National Historic Preservation Act for undertakings on the National Forests of the Pacific Southwest Region* (Regional PA) and its tiered agreements on lookouts, administrative buildings, fuel reduction, recreation residences and range. The LMP also addresses the requirement to manage and protect cultural resources.

Land Management Plan Consistency

The proposed treatments are consistent with the LMP pertaining to the management of cultural resources (LMP, Part 3, p. 13 S60-S63).

Methodology

Given the project's proposed treatments and the determination of the low probability of said treatments effecting the integrity or significance of cultural resources on the Forest, no fieldwork was carried out during this analysis.

Records Search

A record search for known cultural resources and archaeological surveys were not conducted for this analysis. Cultural resources, including prehistoric and historic archaeological sites, sacred sites, and modern Native American gathering sites are all present within the project area. It is deemed unnecessary to identify site types and their locales within the project area to complete this analysis. Determination as to whether cultural resources within the Area of Potential Effects (APE) qualify for listing on the National Register of Historic Places (NRHP) has not yet been made. For the purposes of this analysis all cultural sites within the project's APE are assumed to be eligible and will be treated as listed on the NRHP and designated as historic properties regardless if they are Native American or historic in nature. All site information and locations are protected under the Freedom of Information Act and is available to appropriate Forest Service personnel by Heritage Resource staff to insure any mitigation are implemented for the design criteria of cultural resources.

Findings of Effects

The proposed action and described treatment applications do not meet the threshold to likely affect cultural resources within the projects APE. Previous archaeological inventories have been conducted within portions of the projects APE for various unrelated Forest undertakings and a myriad of cultural site types are present within the project area. However, it is determined that proposed eradication methods do not have the potential to significantly impact archaeological resources.

Stipulations

In order to comply with section 106 of the NHPA, the LMP, and the Regional PA between the USDA Forest Service, Pacific Southwest Region, California SHPO, and ACHP, no treatments shall displace more than one cubic meter of undisturbed soil per acre (PA Appendix D2.3(i)).

PROGRAMMATIC AGREEMENT AMONG THE U.S.D.A. FOREST SERVICE, PACIFIC SOUTHWEST REGION (REGION 5), CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, NEVADA STATE HISTORIC PRESERVATION OFFICER, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION REGARDING THE PROCESSES FOR COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT FOR MANAGEMENT OF HISTORIC PROPERTIES BY THE NATIONAL FORESTS OF THE PACIFIC SOUTHWEST REGION

APPENDIX D
EXEMPT AND SCREENED UNDERTAKINGS
2.0 Screened Undertakings (Class B Undertakings):
2.3 Screened Undertakings (Class B) may include:
(i) Activities that involve less than one cubic meter of cumulative ground disturbance per acre;

Environmental Consequences

All design criteria have and will follow stipulations defined in the Regional Programmatic Agreement (PA Appendix D2.3(i)). By following this stipulation the project will have a No Adverse Effects to cultural resources under the NHPA.

Direct, Indirect, and Cumulative Effects

Implementation of the proposed action or any of the alternatives will have a No Adverse Effect to cultural resources through use of management measures to known cultural resources under the NHPA. Through the use of proposed eradication treatments and following the stipulation of the Regional PA, the implementation of the Tamarisk Eradication project is found to have no direct, indirect, or cumulative effects to cultural resources under the NEPA.

Summary of Effects

It is the determination of this report that there will be no effects to cultural resources during the implementation of the proposed action or any of the alternatives. However, if human remains are encountered during implementation, State Health and Safety Code Section 7050.5 requires that no further work continue at the location of the find until the County Coroner has made all the necessary findings as to the origin and distribution of such remains pursuant to Public Code Resources Code Section 5097.98. Based on the analysis of this study a determination of "No Historic Properties Affected" (36 CFR §800.4) by the proposed and alternative actions is made.

Botany

This information is based on the Sensitive Plant Biological Evaluation written for the Los Padres National Forest Tamarisk Removal Project (Simpson 2014).

Affected Environment

There are no threatened, endangered, or proposed plant species in the project area. Within the project area there is no critical habitat or areas proposed as critical habitat for listed plant species.

The sensitive plant species considered in detail are: *Abies bracteata, Calochortus palmeri var. palmeri, Castilleja plagiotoma, Cladium californicum, Clarkia jolonensis, Delphinium umbraculorum, Eriogonum butterworthianum, Juncus luciensis, Layia heterotricha, Malacothrix saxatilis var. arachnoidea, Monardella linoides ssp. oblonga,* and *Sidalcea neomexicana.*

Abies bracteata (D. Don) Poit. (bristlecone fir)

Synonym: *Abies venusta* (Douglas ex Hook.) K. Koch; *Pinus bracteata* D. Don; *Pinus venusta* Douglas ex Hook (Tropicos 2011).

Plant description: *Abies bracteata* (Pinaceae) is a fir species and a member of the pine family (Pinaceae). Out of the fir species growing in North America (Griffin and Critchfield 1976), *Abies bracteata* has the smallest range and is the least abundant.

General distribution: *Abies bracteata* is endemic to the Santa Lucia Range of Monterey and northern San Luis Obispo Counties (Griffin 1993, CNPS 2011). The species is narrowly distributed in an area about 13 miles wide by 55 miles long on lands mostly managed by LPNF.

Distribution in the Planning Area: There are 10 occurrences of *A. bracteata* on the LPNF (Figure 15). The occurrences are at Cone Peak; between the headwaters of Vicente Creek and the upper part of the west fork of Limekilm Creek; along Spruce Creek Canyon, Cone Peak, Logwood Canyon, Miller Canyon, Arroyo Seco River, Big Creek, growing on the west slopes of the Santa Lucia Mountains; and the ridge north of Church Creek.

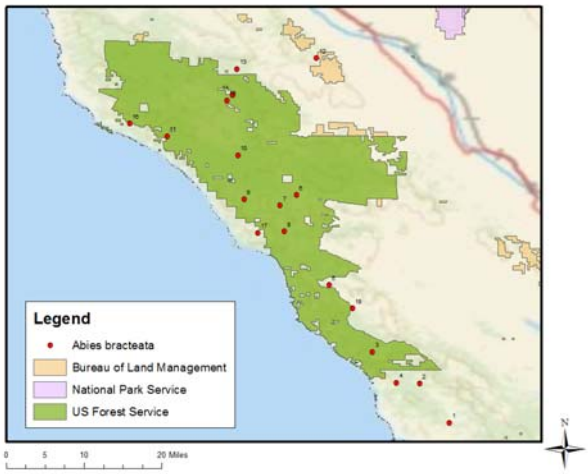


Figure 15. Distribution of *Abies bracteata* (bristlecone fir) in California.

Habitat description: *Abies bracteata* is known to occur in habitat associations of broadleaf upland forest, chaparral, and lower montane coniferous forest at elevations of 183-1600 meters (CNPS 2011). Stands are generally found along coastal drainages and in relatively inaccessible areas such as on steep north- or east-facing slopes, along ridges, cliff ledges, in canyon bottoms, and on raised stream benches and terraces. *Abies bracteata* is always found within 13 miles of the seacoast.

Occurrence status and population trends: There are 18 documented occurrences of *A. bracteata* (CNDDB 2011). The number of individuals observed in occurrences does not appear to be extremely low, although many sites have not been recently observed, so population trends are difficult to discern at this time due to limited information.

Threats or other information: *Abies bracteata* is threatened by military operations at Ft. Hunter Liggett (EO05). Non-native plants are the primary threat to *A. bracteata* (CNPS 2011). The rhizomatous shrub French broom (*Genista monspessulana*) is particularly invasive, directly competes with seedlings of Santa Lucia fir, and is difficult to eradicate once established (Stephenson and Calcarone 1999). Because *A. bracteata* primarily grows in areas designated as Wilderness or in areas that are largely inaccessible to humans, and because livestock/fuels management rarely occurs in occupied habitat, Forest Service management activities have little or no impact on *A. bracteata*. This species has long been recognized as a species at risk due to its narrow distribution and susceptibility to cone parasites. Many of the seeds produced by *A. bracteata* are destroyed through predation by a seed chalcid wasp (genus *Megastigmus*). It is not known if seed predation is limiting recruitment of new trees into current stands. Based on physical characteristics of the sites *A. bracteata* occupies (i.e., rocky areas with low fuel loads), it is generally regarded as fire-intolerant; the Wild Cattle fire damaged a stand of *A. bracteata* in 1996, killing several trees (Painter 2004) and several stands were damaged or destroyed in the Basin fire of 2008 (Lloyd Simpson, per. obs.). Some mature stands, however, have survived wildland fires (Stephenson and Calcarone 1999). Talley (1974) examined the fire history of the species and determined that there were no differences between past and present fire intensities within stands, despite changing fire regimes in California.

Calochortus palmeri Watson var. *palmeri* (Palmer's mariposa lily)

Synonym: *Calochortus palmeri* var. *paludicola* (Davidson) Jepson & Ames; *C. paludicola* Davidson (Tropicos 2011).

Plant description: *Calochortus palmeri* var. *palmeri* is a slender, branched perennial, 12-24 inches (30-60 cm) high. Calochortus palmeri var. palmeri is a monocot in the lily family (Liliaceae). There are two described varieties of C. palmeri: C palmeri var. munzii and C. palmeri var. palmeri (Utech 2002).

General Distribution: *Calochortus palmeri* var. *palmeri* is sparsely distributed across central and southern California from the Tehachapi Mountains and the La Panza Range south to the San Rafael, San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountains (Fiedler 2011, CNDDB 2011). The CNDDB (2011) reports 82 occurrences of *C. p.* var. *palmeri*. Although some of these are outside of National Forest System lands; at least 65 occurrences appear to occur within the Sequoia (SNF), San Bernardino (SBNF), Angeles (ANF), and Los Padres National Forests (CCH 2011, CNDDB 2011).

Distribution in the planning area: There are 83 documented occurrences on the ANF. On the LPNF, *C. p.* var. *palmeri* has been documented. In 2001, an occurrence of *Calochortus palmeri* var. *palmeri* was discovered on Alamo Mountain in the Piru Creek watershed (Burgess, pers. com. 2003).On the SBNF there are occurrences. The Santa Rosa Mountain occurrences are in question due to the fact that the 1901 and 1941 are the most recent observations from this location. These may be may be *C. p.* var. *munzii* however there are currently no vouchers for that location.

Habitat Description: *Calochortus palmeri* var. *palmeri* occurs in meadows, seeps, and vernally moist areas in chaparral, mixed conifer forest, and yellow pine forest at elevations of 3,300-7,200 feet (1,000–2,200 meters) (Fiedler 2011, Stephenson and Calcarone 1999). Hoover (1970) describes habitat for *C.s p.* var. *palmeri* as being "along streamlets where soil is wet during growing season but drying in summer."

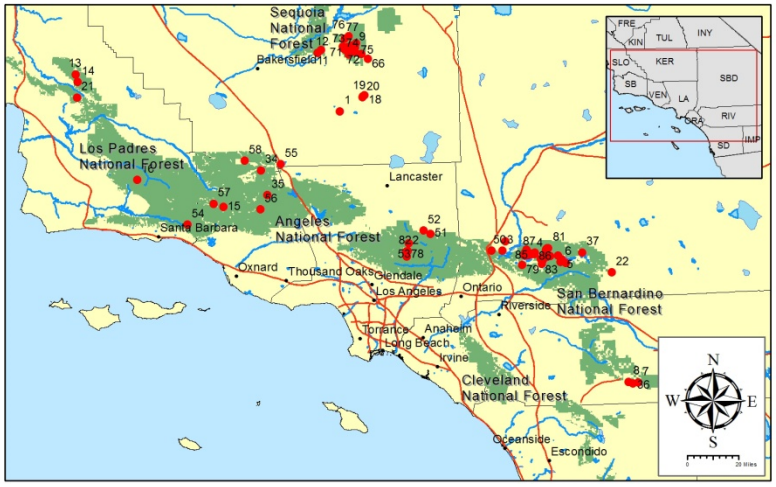


Figure 16. Distribution of *Calochortus palmeri* var. *palmeri* in California.

Occurrence status and population trends: On the LPNF, counts of flowering plants found near Chuchupate Ranger Station, were conducted in 1998 (30 plants), 2000 (140 plants), and in 2002 (92 plants). In 2003, an apparent banner year for the species, over 1,200 flowering plants were counted. The variation in the number of plants observed is probably due to annual variations in the number of plants that produce flowering stems rather than due to increases or decreases in

the total number of plants. The same person using the same methodology conducted all of these counts. Two newly discovered occurrences of *C. p.* var. *palmeri* in and near Godwin Canyon consisted of over 2,000 plants (Austin 2003).

On the SBNF, two new occurrences were discovered in 2004. One occurrence is located in the Maloney Canyon and Stove Flats area, half a mile south of Squint's Ranch. This area was burned in 2003 in the Old Fire. Approximately 7,000 individuals were found in this area. The second occurrence is located in Grout Creek, north of Gray's Peak, approximately 1 ½ miles north of Highway 38. Approximately 60 individuals were found at this location (USDA Forest Service 2005).

Calochortus palmeri var. *palmeri* appears to have an 'endurer' life history strategy for coping with wildfire. When wildfire occurs, the current year's crop of stems, flowers, fruits, and seeds are generally consumed by fire resulting in a loss of one year's reproductive output. However, the affected plants typically live, the plant's bulbs being sufficiently deep in the soil to survive most fire events. In response to post-fire environmental cues, most populations of *Calochortus* respond the year after a wildfire event with higher than usual percentages of plants producing flowering stems. This results in increased reproductive output and the dispersal of seeds into an environment that for a short period of time will produce less competition from neighboring plants. Reductions in surface leaf litter may also provide better habitat for seedlings. Presumable, this reduction in competition and improvement in habitat provides germinating seeds an environment that is more likely to result in the successful recruitment of new plants into the population.

On the SBNF, numerous locations of occupied habitat burned or were located within unburned islands within the 1999 Willow Fire. Fire intensity ranged from unburned to medium; however, most occurrences were located in areas that burned with low fire intensity. Many of the occurrences were found within dozer lines. Nonnative grass, *Bromus tectorum*, was present near most of the occurrences surveyed after the fire. Because population numbers were not known prior to the fire, post fire numbers could not be compared however CNNDB field forms indicate that individuals were most plentiful in the second year after the fire. It is not known if this is due to timing of surveys, rainfall amounts, extent of surveys, or other factors (Kopp, pers. comm. 2005).

Threats and other information: *Calochortus palmeri* var. *palmeri* can be affected by overgrazing, trampling, flooding, erosion, off-highway vehicles, and development projects (Lardner et al. 1998). The species is most vulnerable to impacts from grazing between April and August, when the plant is flowering and setting seed. This taxon is also affected by dispersed and developed recreation. At least seven occurrences of *C. p.* var. *palmeri* are located in protected areas: one on the SBNF near Big Bear Lake, where it occurs within a fenced meadow area with *Sidalcea pedata*, and the other six [American Canyon, Chuchupate, Chorro Grande, Godwin Canyon (2 occurrences), and Manzana Creek/White Ledge] are in areas free of human disturbance on the LPNF. *Calochortus palmeri* var. *palmeri* is reported to be "declining rapidly" due to grazing in wet meadow (California Native Plant Society 2001) but there is little in the way of documented evidence that this is occurring.

On the SBNF, plants are affected by annual nonnative grasses, incised streams affecting meadow habitat, dispersed and developed recreation including activities at Tent Peg Campground, Aspen Glen Picnic Area, along Forest Designated 1W17 OHV trail, and by road maintenance along

Forest System Roads 3N16 and 3N14. The degree of these threats is not known. At least 16 occurrences were burned over in the 1999 Willow Fire on the Mountaintop District of the SBNF. Burned area emergency rehabilitation (BAER) measures were avoided within occupied habitat to the greatest extent possible however fire suppression actions and BAER projects could affect occurrences during future fires. Occurrences located within Wildland Urban Interface defense zones could be affected by vegetation treatments to reduce fuels however because habitat is within riparian areas, there would be an elevated effort to protect habitat.

Castilleja plagiotoma A. Gray (Mojave paintbrush)

Synonym: (None) (CNPS 2011, Tropicos 2011).

Plant description: *Castilleja plagiotoma* (Orobancheae) is a hemi-parasitic perennial herb (CNPS 2011) that is 30-60 cm tall.). It flowers from April-June (Wetherwax 2011, CNPS 2011). It is the larval host plant for the rare Ehrlich's checkerspot butterfly (*Euphydryas editha ehrlichi*) (Emmel and Emmel 1973).

General Distribution: *Castilleja plagiotoma* occurs in the Kern, Los Angeles, San Bernardino, and San Luis Obispo counties in California (CNPS 2011).

Distribution: *Castilleja plagiotoma* occurs on BLM land, National Forest land, and on land with unknown ownership (Figure 17), although which national forests occurrences are at is hardly documented. *C. plagiotoma* occurs on the hills along Panoche-Idria road, at Alcalde near Curry Mountain, at Arroyo Hondo, in Antelope Valley, in Lancaster, and in Cuyama Valley. In the San Bernardino Mountains, it occurs in the Mohave Desert, in Coxey Meadow, and at the head of Lythe Creek Canyon. This species also occurs northeast of White Rock Bluff near Caliente Mountain, on the San Emigdio Mountains region, on the Bitter Creek National Wildlife Refuge, in the Southern Sierra Nevada Mountains at Tomo-Kahni (Creation Cave) State Historical Park, on the Tehachapi Mountains, and in the Liebre Mountains region. Among the San Gabriel Mountains, *C. plagiotoma* occurs at the north end of Bob's Gap, and along the south fork of Little Rock Creek.

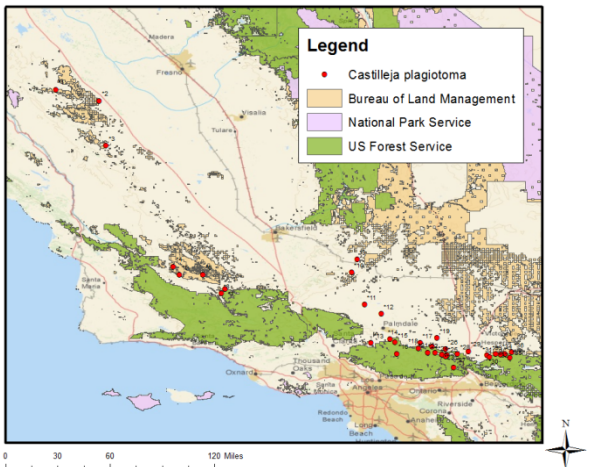


Figure 17. Distribution of *Castilleja plagiotoma* (Mojave paintbrush) in California

Habitat description: *Castilleja plagiotoma* inhabits Great Basin scrub communities in alluvial conditions, Joshua tree woodlands, pinyon and juniper woodlands, and lower montane coniferous forest at 300 - 2500 meter elevations. (CNPS 20011).

Occurrence status and population trends: *Castilleja plagiotoma* is uncommon and vulnerable in California, but not extremely endangered; it is also vulnerable worldwide (CNPS 2011). Although there are numerous occurrences of *Castilleja plagiotoma* documented among several mountain regions, population trends are difficult to discern at this time due to limited information.

Threats or other information: *Castilleja plagiotoma* is threatened by recreational activities and road maintenance, and possibly by renewable energy development (CNPS 2011). Because *Castilleja plagiotoma* is a hemi-parasitic plant, impacts to host plants will affect *C. plagiotoma* as well. Occurrences near ranches (CCH 2011) could be threatened by grazing, trampling, and ranch activities, while *C. plagiotoma* occurring at the San Gabriel Mountains Hunt Canyon shooting area on the Angeles National Forest is potentially threatened by shooting range activities.

Cladium californicum (S. Watson) O'Neill (California Sawgrass)

Synonym: *Cladium mariscus* subsp. *californicum* (S. Watson) Govaerts; *Mariscus californicus* (S. Watson) Fernald; *Cladium mariscus* var. *californicum* S. Watson (Tropicos 2012).

Plant description: *Cladium californicum* is a coarse rhizomatous perennial. The rhizomes are up to 20 cm long and 1 cm wide. The culms are 1-2 (-3) m tall and 5-10 mm wide, cylindric, and hollow. The leaf blades are flat to broadly V-shaped, 1-2 (-2.5) m long and 5-10 mm wide. The leaf margins and abaxial midvein are harshly scabrous with obvious teeth. The inflorescences are terminal or both lateral and terminal; pedunculate, with the 30-50 cm-long peduncle mostly covered by the subtending leaf sheath; and paniculately branched to the 3rd or sometimes the 4th order, the branches slightly flexuous. The spikelets are arranged in groups of (3-) 4-6, are ellipsoid to lanceolate and are 3 mm long. There are 5-6 floral scales, arranged in a spiral, and the proximal 1-3 scales are sterile while the distal 3-4 each subtend 1 flower. The distal-most flowers are bisexual, while the others are staminate. The 3-branched styles are 1.0-1.5 mm long, and the stigmas are 1.0-1.5 mm long. The achenes are ovoid, purplish brown, smooth or irregularly rugulose, glossy, 1.5-2.0 mm long and 1 mm wide; with a base that is vaguely 3-lobed, not flared or discoid, and truncate; and with an apex that is acute. The persistent style base forms a beak on the apex 0.2 mm long. The species flowers and fruits from about June through September (Tucker 2012; Tucker 2002).

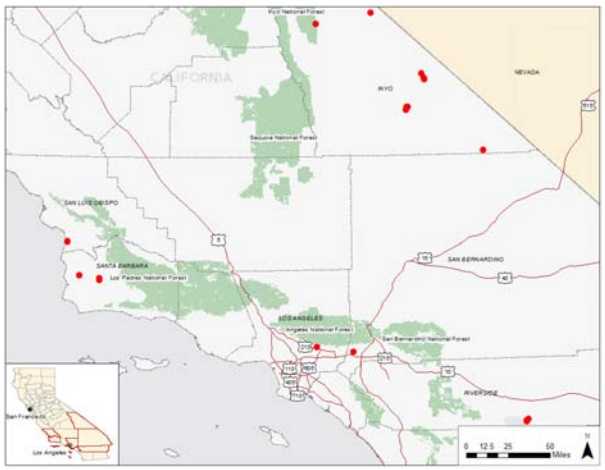


Figure 18. Distribution of *Cladium californicum* (California sawgrass) in California

General distribution: *Cladium californicum* is found across southern California, Arizona, Nevada, southern Utah, New Mexico, Texas, and northern Mexico. Within California, it is found from the southern Central Coast through the western Transverse Ranges to the deserts (Tucker 2012; Tucker 2002; CNDDB 2012; CCH 2012).

Distribution in planning area: There is 1 known site on Inyo National Forest, but there are other locations near Los Padres and Angeles National Forests and it may be useful to search potential habitat on forest lands nearby (CCH 2012; CNDDB 2012).

Habitat description: *Cladium californicum* has been found at elevations from 30 m below sea level to 2150 m above sea level (-100–7000 ft). It prefers alkaline marshes, swamps, springs (including hot springs), perennial streams, and ponds. These areas may be sunny or partly shaded by riparian trees. The soil is usually moist to wet, often alkaline, and may be clay or gravel. The

rock type is often mixed alluvium, but may include quartzite. The immediately adjacent vegetation is usually riparian, such as palms or willows, and may be dense. The riparian area is usually surrounded by common vegetation of the area, such as creosote bush scrub or pinyon-juniper woodland (Tucker 2012; Tucker 2002; CNDDB 2012; CCH 2012).

Occurrence status and population trends: This species can form abundant, large thickets in favorable habitat, possibly excluding some other riparian species. It can be scattered to locally common at moist sites, but is restricted to moist ground. Although 19 sites have been mapped, 2 of those are in areas that are fully developed and the sites are known or presumed to be extirpated (CNDDB 2012; RSA-POM herbarium specimens). No counts have been reported; since *C. californicum* is a rhizomatous perennial that forms large, dense, stands, determining the number of individual plants in the field would be impossible. An alternative might be to estimate the area of cover, percent cover, patch length and width, or number of clumps.

Threats or other information: There are only 19 known occurrences of *C. californicum* in California. Two of those have been extirpated by development. Other reported threats include grazing, competition from non-native plants, and alteration of the hydrology. Hydrologic alteration may be the biggest threat, since *C. californicum* is restricted to wet areas and therefore the drying of any of these sites could mean extirpation of a population. At one site that had been altered by water development and exotic plants, *C. californicum* was stated to be "likely more common here historically" (see EO's 10, 11; CNDDB 2012; CNPS 2012).

Clarkia jolonensis Parnell (Jolon clarkia)

Synonym: (None) (Tropicos 2011).

Plant description: *Clarkia jolonensis* (Onagraceae) is an annual herb. Flowering occurs from April-June (CNPS 2011). *Clarkia jolonensis* is often confused with *C. lewisii* (CNPS 2011), which also occur in the Outer South Coast Ranges, but it can be distinguished from *C. lewisii* and other Clarkia species having brown seeds; corolla bowl-shaped with pale lavender to pinkish lavender petals that lack claw and are generally red-flecked; and by flower buds that are reflexed on an inflorescence axis that is more or less straight (Lewis 2012).

Distribution in the planning area: There are four documented *C. jolonensis* occurrences on the LPNF (Figure 18), which are located in the Chews Ridge Region; near Nacimiento Fergusson Road Bridge, where it crosses over the Nacimiento River; along Arroyo Seco River; and in the Santa Lucia Mountains, above Sans Mill.

Habitat description: *Clarkia jolonensis* is found in chaparral, cismontane woodland, riparian woodland, and coastal scrub communities at 20 to 660 meter elevations (CNDDB 2011, CNPS 2011).

Occurrence status and population trends: There are 22 documented occurrences of *C. jolonensis* in California (Figure 18). One population has less than 250 plants as of 1995, but all of the other occurrence abundances are unknown, and therefore, population trends are currently difficult to discern. *Clarkia jolonensis* was added to the Forest Watch List in 2003, and it has only been since that time that the Forest has begun to track this species.

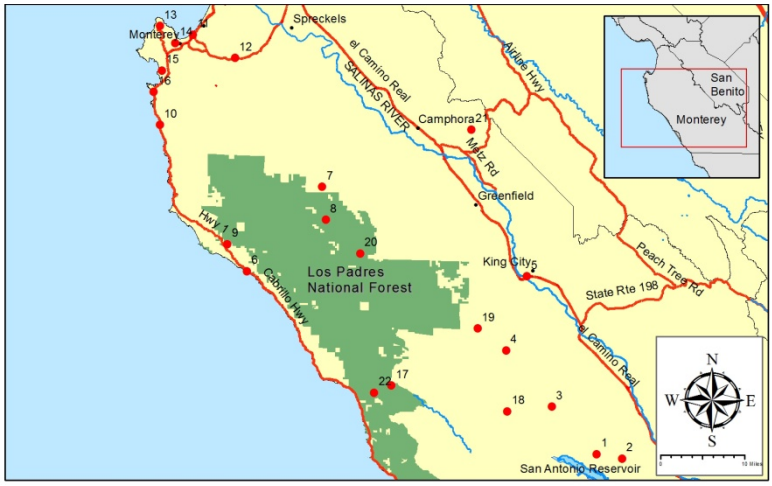


Figure 19. Distribution of *Clarkia jolonensis* in California

Threats or other information: Only one *C. jolonensis* occurrence has known threats, and it is on the LPNF within the Fort Hunter Liggett Military Reservation. These threats are road and trail construction and maintenance, foot traffic and trampling, an improper burning regime, and feral pigs. Any occurrences may be at risk due to grazing and the presence or encroachment of non-native vegetation (CNPS 2011). Several *C. jolonensis* occurrences are in or near disturbed habitats, such as along roads, trails, railways, or near camps.

Delphinium umbraculorum Lewis & Epling (umbrella larkspur)

Synonym: (None) (Tropicos 2011).

Plant description: *Delphinium umbraculorum* (Ranunculaceae) is a perennial herb. Delphinium umbraculorum is a dicot in the buttercup family (Ranunculaceae) and is known to hybridizes with D. parryi subsp. parryi and D. patens subsp. montanum (CNPS 2011, Koontz & Warnock 2011).

General distribution: *Delphinium umbraculorum* is endemic to the Outer South Coast Ranges *and the Western Transverse Ranges* (Koontz & Warnock 2011) from Monterey County, down through San Luis Obispo and Santa Barbara counties, to Ventura County, California (CNPS 2011).

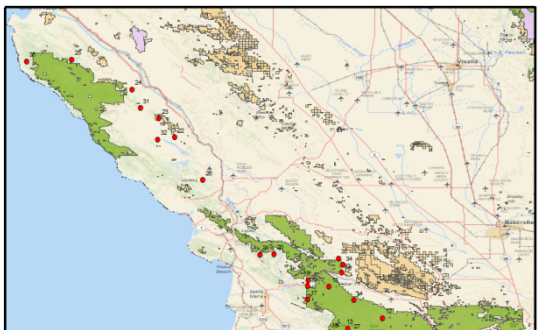


Figure 20. Distribution of *Delphinium umbraculorum* in California

Distribution in the planning area: There are a total of 18 documented occurrences of *Delphinium umbraculorum* on the LPNF (Figure 20).

Occurrence status and population trends: There is a total of 36 documented occurrences of *D. umbraculorum* (CCH 2011, CNDDB 2011). Little is known about the extent of the occurrences, and most sites have not been visited since the mid- to late- 1900's, although one occurrence was described as "scattered". Last known, the occurrence on Bureau of Land Management land consisted of four plants, and the occurrences on the Carrizo Plain Ecological Reserve had four and ten individuals. Due to the limited information, population trends are difficult to discern at this time.

Threats or other information: *Delphinium umbraculorum* occurrences may be at risk due to hybridization with *D. parryi* subsp. *parryi* and *D. patens* subsp. *montanum* (CNPS 2011, Koontz & Warnock 2011). Cattle grazing is a threat to populations on Bureau of Land Management land and Carizo Plain Ecological Reserve, and one population was possibly inundated.

Eriogonum butterworthianum J.T. Howell (Butterworth's buckwheat)

Synonym: (None) (Tropicos 2011).

Plant description: *Eriogonum butterworthianum* (Polygonaceae) is a perennial subshrub that is 1 to 3 dm tall and 1 to 4 dm in diameter. Flowering occurs from June-September (CNPS 2011).

General distribution: Eriogonum butterworthianum is known from the vicinity of Arroyo Seco in the Santa Lucia Mountains of Monterey County, California (CNDDB 2011, CNPS 2011).

Distribution in the planning area: All four documented occurrences of E. butterworthianum occur on the LPNF (Figure 21). The occurrences are in an area that is southwest of Juniper Peak, and continues southwest to the confluence of Arroyo Seco and Roosevelt Creeks; a site east of the confluence of these two creeks; the vicinity of the north fork of San Antonio River; and the south side of the road leading to the Indian Ranger Station.

Figure 21. Distribution of *Eriogonum butterworthianum* in California

Habitat description: *Eriogonum butterworthianum* grows in sandy soils and inhabits foothill and valley grasslands, and sandstone within chaparral communities at 585-740 meter elevations (CNPS 2011).

Occurrence status and population trends: There are four documented occurrences of *E. butterworthianum* in California. When last observed in 1994, one population consisted of 120 plants, and another of over 180 in 2006. Population sizes are unknown for the other two occurrences. One population has experienced a decrease in size over the years, due to limited information, other population trends are currently difficult to discern.

Threats or other information: One occurrence of *E. butterworthianum* occurrence is threatened by foot traffic, and other populations may be at risk from this type of disturbance as well.

Juncus luciensis Ertter (Santa Lucia dwarf rush)

Synonym: None (Tropicos 2011).

Abundance: There are currently 26 known occurrences of *Juncus luciensis* (CNDDB 2012). Of these, six are on the Plumas National Forest, two on the Tahoe National Forest, one on the Lassen National Forest, and four believed to be on the LPNF. Five occurrences are on lands owned by public or nonprofit entities other than the U.S. Forest Service, and the remaining five are of uncertain ownership or privately owned. More than half of these occurrences were last reported more than twenty years ago. For most of them, information about location, associated species, and population size is limited at best, though a few of them report that *J. luciensis* was abundant at the site.

Range/Distribution: *Juncus luciensis* is endemic to California, reported in the northeastern and southwestern parts of the state at elevations between 300 and 2040 meters, in Lassen, Modoc, Monterey, Napa, Nevada, Placer(?), Plumas, Riverside, San Benito, San Diego, San Luis Obispo, San Benito, and Santa Barbara counties.

Trend: Neither population sizes nor population trends are well documented.

Protection of Occurrences: None known

Threat(s): No threats to specific occurrences are known, and little is known about the plant's vulnerability to various kinds of threats. As a wetland annual, it may be particularly vulnerable to disruptions of hydrology and to disturbance during its period of producing fruit.

Fragility/habitat specificity: "*J. luciensis* occupies "wet, sandy soils of seeps, meadows, vernal pools, streams, and roadsides" at elevations between 300 and 2040 meters.

Layia heterotricha (DC.) H.& A. (pale-yellow layia)

Synonym: *Madaroglossa heterotricha* DC. (Tropicos 2011).

Plant description: *Layia heterotricha* is a plant in the sunflower family (Asteraceae) and is an annual herb that is 13-90 cm tall, glandular, with a banana- or apple-scented aroma.

General distribution: *Layia heterotricha* occurs in Fresno, Los Angeles, Monterey, Santa Barbara, and Ventura counties, California. It has previously been known in Kings, Kern, and San Luis Obispo counties, California, but occurrences in these counties is currently presumed extirpated. *Layia heterotricha* has been confirmed in San Benito County, California, but the plant may now be extirpated (CNPS 2011).

Distribution in the planning area: Within the National Forest System, *L. heterotricha* is found only within the boundaries of the LPNF. Here, *Layia heterotricha* is found at about twenty-one locations on the Mount Pinos Ranger District (MPRD) and the Ojai Ranger District (ORD) in the Sierra Madre Mountains, near Pine Mountain, in the Cuyama Badlands, and in the Lockwood Valley area (CNDDB 2011).

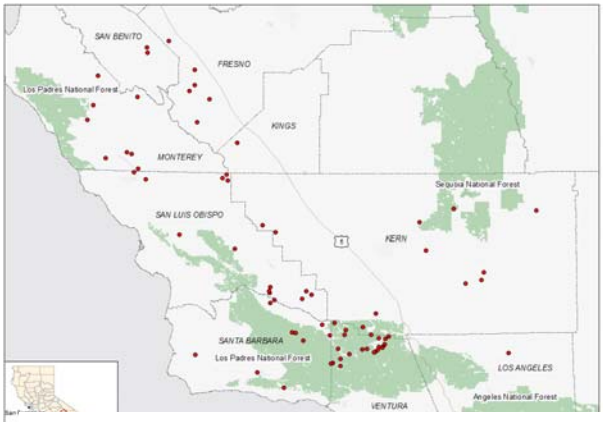


Figure 22. Distribution of *Layia heterotricha* in California.

Habitat description: *Layia heterotricha* occurs in alkaline or clay soils in cismontane woodland, pinyon-juniper woodland, coastal scrub, and valley and foothill grassland communities at 300-1705 meter elevations (CNPS 2011). They have also been found in the upper sonoran-pinyons (CCH 2011). On the LPNF, *L. heterotricha* is most often associated with calcareous potreros and Lockwood clays. Baldwin (1994) notes that it often occurs on sites with "below-average exotic vegetative cover."

Occurrence status and population trends: Documenting trends in population abundance is complicated by the large natural variance in population numbers that occurs in response to yearly changes in annual rainfall. Wet years tend to favor the expression of *L.heterotricha* populations and in dry years few if any seeds may germinate and produce flowers. Hoover (1970) reported that *L. heterotricha* is "frequent on hillsides or sometimes on plains…" Twisselmann also stated that *L. heterotricha* is "scarce …[but] often colorfully common in this unusual soil [highly local beds of ultra-fine friable (dry bog) clay." Steeck (1995) found that *L. heterotricha* in Quatal Canyon could vary from over 200 plants in a population in one year to just five plants the following year. In 2003 there were over a thousand plants at same location (Foster 2003a).

In the Carrizo Plains National Monument, a cluster of seven colonies consisted of over 6,000 plants. On NFS land at Santa Barbara Potrero, *L. heterotricha* has been repeatedly collected and/or recorded (1957, 1960, 1962, 1965, 1975, 1994, 1995, 2001, 2002) indicating that this occurrence is able to maintain itself for many decades despite the use of this land for cattle grazing. Surveys conducted in 2003 have resulted in the discovery of six occurrences of *Layia heterotricha* on the LPNF and some of these occurrences numbered in the tens of thousands (Foster 2003b, 2003c, 2003d, 2003e, 2003f, 2003g).

Threats or other information: *Layia heterotricha* is threatened by conversion of suitable habitat into agricultural areas, grazing, non-native vegetation, vehicles, and past construction of the San Antonio Reservoir (CNPS 2011). was reported to have moderate vulnerability on NFS lands (Stephenson and Calcarone 1999) due to livestock grazing, invasion of nonnative annual plants, and off-highway vehicle trespass. Trail and road maintenance may also affect several occurrences.

Malacothrix saxatilis (Nutt.) T. & G. var. *arachnoidea* (McGregor) E. Williams (Carmel Valley malacothrix)

Synonym: *Malacothrix arachnoidea* E.A. McGregor (Basionym) (Tropicos 2011).

Plant description: *Malacothrix saxatilis* var. *arachnoidea* in the sunflower family (Asteraceae) is a perennial rhizomatous plant. *Malacothrix saxatilis* var. *arachnoidea* is one of four varieties of *M. saxatilis*. Only one other variety, *M. saxatilis* var. *commutata*, occurs within the same range as *M. saxatilis* var. *arachnoidea*. The stems and leaves of *M. saxatilis* var. *arachnoidea* are covered with dense, woolly hairs, whereas those of *M. saxatilis* var. *commutata* are smooth to lightly hairy (Davis 2012).

General distribution: *Malacothrix saxatilis* var. *arachnoidea* occurs in Monterey and San Luis Obispo counties, California.

Distribution in the planning area: There are two reported occurrences on the LPNF. One occurrence is in Monterey County near the Carmel Valley Road along Finch Creek and is reported to be partly within the LPNF (California Natural Diversity Database 2002). The second occurrence is on Little Pine Mountain, 8 miles above the Upper Oso gate. The taxonomic status of this second occurrence had been questioned due to the disjunct location of the population, but a collection from this location was recently annotated by Stan Davis as being valid *Malacothrix saxatilis* var. *arachnoidea* (pers. comm. Wilken 2003).

Figure 23. Distribution of *Malacothrix saxatilis* var. *arachnoidea* in California

Habitat description: *Malacothrix saxatilis* var. *arachnoidea* occurs in coastal scrub, rocky soils within chaparral communities, on shale, and on roadcuts, at 25-1,036 meter elevations (CNPS 2011).

Occurrence status and population trends: There is a total of 18 *Malacothrix saxatilis* var. *arachnoidea* occurrences in California (Figure 23). Population sizes have ranged from less than ten plants to 82 plants, however, population size is unknown for most occurrences.

Threats or other information: Two *Malacothrix saxatilis* var. *arachnoidea* occurrences on privately owned land are at risk due to dams and flooding, with the sites also subject to grazing, however grazing does not appear to impact the populations of *Malacothrix saxatilis* var. *arachnoidea*. Road and trail construction and maintenance threatens one occurrence, while the occurrence on the Hastings Reserve is threatened by non-native vegetation, improper burning regimes, military operations, grazing, and feral pigs.

Monardella linoides Gray subsp. *oblonga* (Greene) Abrams (flax-like monardella) (Jokerst 1993) (flaxleaf monardella) (USDA 2011) (Tehachapi monardella) (CNPS 2011).

Synonym: *Monardella oblonga* Greene (basionym) (Tropicos 2011).

Plant description: *Monardella linoides* subsp. *oblonga* (Lamiaceae) is a rhizomatous perennial subshrub that has an erect and open habit. Flowering occurs from June–August (CNPS 2011). *Monardella linoides* subsp. *oblonga* is one of four subspecies of *Monardella linoides* in the mint family (Lamiaceae), and may be indistinct from *M. l.* subsp. *linoides* (CNPS 2011).

Distribution in the planning area: There are 32 documented occurrences of *Monardella linoides* subsp. *oblonga* on the LPNF, three on the Sequoia National Forest (SNF), and one on the Inyo National Forest (INF) (Figure 24). The occurrence localities on the LPNF are in the vicinities of Mount Abel, Mount Pinos III Burn Area, Frazier Mountain, Alamo Mountain, the head of the drainage that lies east of Grande Valley Road and northeast of Pine Spring Campground, Seymour Creek, the north fork of Lockwood Creek, Apache Canyon Hills, immediately west of Half Moon Campground, Reye's Peak, southwest of Pine Spring Campground, San Emigdio Range, the hills between Mystery Spring and Long Canyon, and the San Guillermo Mountain Area. The occurrences on the SNF are located at Road's End by Tobia's Creek, on Breckenridge Mountain, and west of Johnsondale at Slick Rock Road. The occurrence on the INF is at the head of Monach Meadows, by the south fork of Kern River.

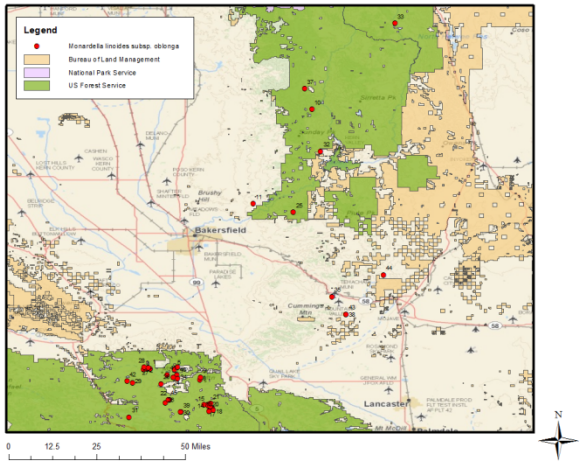


Figure 24. Distribution of *Monardella linoides* subsp. *oblonga* in California

Habitat description: *Monardella linoides* subsp. *oblonga* grows among rock outcrops and general openings in lower and upper coniferous forests and pinyon-juniper woodlands at 900-2470 meter elevations (CNDDB 2011, CNPS 2011).

Occurrence status and population trends: There is a total of 42 documented occurrences of *Monardella linoides* subsp. *oblonga* in California. Occurrence abundances range from at least 30 to over 2000 plants, although population size is unknown for many occurrences, and population trends are difficult to discern at this time due to lack of information.

Threats or other information: *M. l.* subsp. *oblonga* is known to respond positively to wildfires (CNPS 2011), but is threatened by road and trail construction and maintenance, vandalism, dumping, littering, foot traffic and trampling, non-off-road vehicle recreational activities, and erosion and runoff. The species may also be threatened by renewable energy development (CNPS 2011). Where plants are found in roadcuts, 'source' populations are present above the roadcut in most instances, and hence, when plants are lost to due to road maintenance or accelerated erosion, new plants often pioneer the new disturbance.

Sidalcea neomexicana A. Gray (Salt Spring Checkerbloom)

Synonyms: *Sidalcea neomexicana* subsp. *thurberi* (B.L. Rob.) C.L. Hitchc., *S. parviflora* var. *thurberi* B.L. Rob., *S. confinis* Greene, *S. crenulata* A. Nelson, *S. neomexicana* var. *diehlii* M. E. Jones (Fryxell 1988; Tropicos 2012).

Plant description: *Sidalcea neomexicana* is a perennial herb that grows from clustered, fleshy roots or a fleshy taproot, and lacks rhizomes. There are 1 to several stems, 2-5 (-9) dm tall, sometimes glaucous, generally bristly- to stellate-hairy (occasionally glabrous) proximally and stellate-hairy distally. The leaf blades are fleshy and 2-5 (-8) cm wide, with appressed hairs, and sometimes glaucous. The basal leaves are crenate to shallowly 5(7)-lobed, and the upper leaves are 5-lobed. The inflorescence is open, branched or unbranched, many-flowered, and glabrous to sparsely hairy. The flower pedicels are longer than the calyces. There are 2 bracts, fused at the base, and no bractlets. The calyx is 5-8 mm long, with acuminate lobes, prominent veins, and hairy with stellate and pustulose hairs. The petals are 6-18 mm long and pale pink-rose with paler (whitish) veins. The filaments are fused into a tube around the style. The fruit contains 5-10 segments, each about 2-3 mm long, with sides that are smooth to weakly net-veined, glabrous, and with a 0.5-0.8 mm-long beak. This species flowers from about March or April through June (Hill 2012; CNPS 2012; Hitchcock 1957).

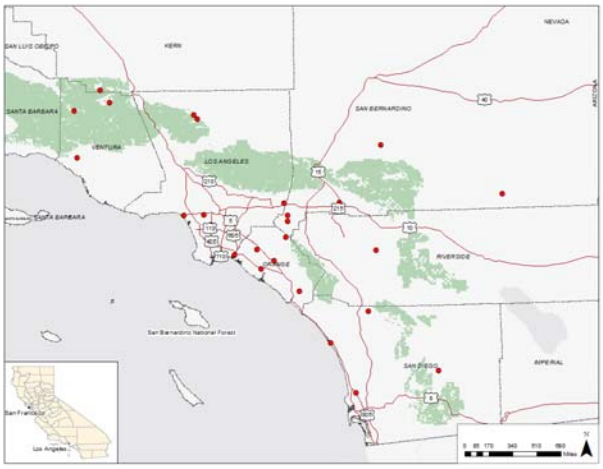


Figure 25. Distribution of *Sidalcea neomexicana* in California

Distribution in planning area: *Sidalcea neomexicana* is known from two occurrences on Angeles National Forest. However, this species has been collected in areas very near to Los Padres, San Bernardino, and Cleveland National Forests, and has potential to occur there. It might be useful to search potential habitat on these forests (CNDDB 2012; CCH 2012).

Habitat description: *Sidalcea neomexicana* is usually found between 30 and 1530 m (100-5020 ft), but one site was as high as 2380 m (7800 ft). The species prefers moist alkaline areas such as springs, marshes, bogs, swamps, or playas. It has been found on hillsides, on roadcuts and roadsides, in pastures and fields, and in meadows. Areas are generally flat but may be gently sloped. The soil is alkaline, usually fine-textured (clay, silt, or loam) but occasionally sandy, and often moist. In may be derived from granite or other rock types. The immediately adjacent vegetation often is riparian, swamp, or bog vegetation. The surrounding vegetation may be chaparral, coastal scrub, grassland, desert scrub, pinyon-juniper woodland, lower montane coniferous forest, or ponderosa pine forest (Hill 2012; CNPS 2012; RSA-POM herbarium specimens; CNDDB 2012).

Occurrence status and population trends: Plants have been observed to be scattered or frequent. At least one individual was observed to spread up to 1.5 m (5 ft). Population sizes vary considerably from 15 to 1175 individuals, and may be related to the amount of suitable microhabitat available in an area. There are 12 historic occurrences and only 3 that have been seen recently. The area of one historic occurrence (EO 15) has been developed and there is no information as to whether plants are still extant at this site. EO 11 is at a much higher elevation than other sites, and it would be good to verify the identity of the specimen upon which the occurrence is based (RSA-POM herbarium specimens; CNPS 2012; CNDDB 2012). In the case of *S. neomexicana*, it may be useful to survey at least the historic occurrences and collect

baseline data such as the number of plants, a measure of plant vigor such as height or number of flowers, and record any visible disturbances and possible threats.

Threats or other information: One occurrence (EO 15) may have been extirpated by development (CNDDB 2012). Agriculture may also pose a threat (Hitchcock 1957), either from habitat alteration such as disking or livestock trampling, or from hydrologic changes induced by irrigation or wells. Soil moisture near the surface may be one of the limiting factors. Groundwater depletion may be a threat, and may reduce the ability of this species to recover from habitat disturbance (e.g. fire; U.S. Fish and Wildlife Service 1997; Pritchett and Manning 2009). There is also some indication that a related species, *S. pedata*, might be out-competed by non-native weeds (U.S. Fish and Wildlife Service 1997).

Environmental Consequences

Direct, Indirect, and Cumulative Effects

There are no known occurrences of Threatened, Endangered, Proposed, plant species in the project areas. Nine Forest Service Sensitive plant species are located in or near proposed project areas. *Castilleja plagiotoma* occurs on alluvial soils but no populations are in or near the project areas. *Cladium californicum* is most commonly found in riparian habitats but all known occurrences are well outside the project areas off of the forest. There is a population of *Monardella linoides* ssp. *oblonga* (EO 30) located near the proposed project area on the upper Piru Creek near Halfmoon Campground. Two populations of *Layia heterotricha* (EO 44 and 45) are located near the project area in the upper Cuyama River project area. A population of *Calochortus palmeri* var. *palmeri* (EO 56) is located near the project area on Sespe Creek and another one above Juncal Dam (EO54) near the Santa Ynez River project area. None of these populations are in the project area and are not likely to be affected directly by project activities and there should be no indirect or cumulative effects on these populations.

Five known populations of *Delphinium umbraculorum* are located in or near the project area in the Santa Ynez River watershed (EO 4, 5, 7, 29, and a new 2011 occurrence along the road by North Portal west of Gibraltar Dam). Some of these populations could be affected directly by project workers stepping on plants or by mechanical removal of tamarisk co-located with individual *D. umbraculorum* plants. A population of *D. umbraculorum* is also found on the forest road 30S02.3 above Branch Creek in the lower Cuyama River project area. This population is above the road and will not be directly or indirectly affected by project activities.

Sidalcea neomexicana is found is moist alkaline habitats generally riparian in nature. One population is located in the upper Cuyama River along Lockwood Valley Road on private land. It is possible that it occurs on forest land in the project area. If so, it could be trampled by workers or disturbed by mechanical removal of tamarisk.

In the Arroyo Seco project area on the Monterey Ranger District, populations of *Abies bracteata* (EO 6 and 7), *Clarkia jolonensis* (EO 20), *Eriogonum butterworthianum* (EO 1), *Juncus luciensis* and *Malacothrix saxatilis* var. *arachnoidea* (EO 17) occur within or close to the proposed project location. *Abies bracteata* do not occur directly in the riparian habitat but are above the stream channel where project activities will occur. There will be no direct or indirect effects on this species by the project. *Clarkia jolonensis* is found along Rocky Creek trail which starts above the Arroyo Seco River and follows it for the first 2/3 mile before turning up Rocky Creek. This portion of the trail is able the Riparian zone and not directly in the project area. None of this population should be directly or indirectly affected by the project. However, if the

trail were to be used as an access point for project work, then individuals could be stepped on or or disturbed by project workers. Some parts of an *E. butterworthianum* population occur in the projects area. The bulk of the occurrence is well outside of the project area. Two small subpopulations straddle the stream channel. Some individuals may be trampled by workers during project activities if tamarisk is co-located with individuals of *E. butterworthianum*. *Juncus luciensis* occurs in the upper part of the watershed above the proposed project area. It is possible that it could occur in the project area and, if so, some individuals may be trampled by workers during project activities if tamarisk is co-located. *Malacothrix saxatilis* var. *arachnoidea* is found along Arroyo Seco Road between Arroyo Seco Campground and forest boundary. Individuals in this short section of the occurrence could be affected by the project if activities occur here. They could be trampled by workers or disturbed by mechanical removal of tamarisk.

Cumulative effects to sensitive plants by this project would be minimal. Some of the occurrences of these plants are located along trails or roads which have ongoing maintenance. Road or trail use from the proposed project would have short-term effects. The duration of the project would be short enough that increases of activities would be undetectable beyond the existing use and not likely to contribute to negative cumulative effects.

After an area is treated initially, retreatment will be minimal or at least have much less impact. Once tamarisk is eliminated, there will be no further impact to any sensitive species. However habitats would be restored to native conditions and there could be opportunities for sensitive plant species to colonize those areas

Determination

It was determined the that the proposed tamarisk removal riparian ecosystem restoration project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for *Abies bracteata*, *Calochortus palmeri* var. *palmeri*, *Castilleja plagiotoma, Cladium californicum, Clarkia jolonensis, Delphinium umbraculorum, Eriogonum butterworthianum, Juncus luciensis, Layia heterotricha, Malacothrix saxatilis* var. *arachnoidea*, *Monardella linoides* ssp. *oblonga* or *Sidalcea neomexicana*.

Aquatic Species (Amphibians and Fish)

Information in this section is based on the BA/BE for Threatened, Endangered, and Proposed Fish Species and Sensitive Fish Species for the Los Padres National Forest Tamarisk Removal Project (Smith 2013). It also includes information from the Terrestrial Wildlife BE/BA for the Los Padres National Forest Tamarisk Removal Project (Hill 2014).

Affected Environment

Tamarisk treatments are proposed along portions of the Arroyo Seco River, upper and lower Cuyama River, Branch Creek, Sisquoc River, Santa Ynez River, Mono Creek, Sespe Creek and tributaries and Piru Creek and tributaries.

Salinas River System

The Salinas River flows through the Salinas Valley between the Santa Lucia and Gabilan Mountain ranges. The Arroyo Seco River is a main tributary to the Salinas River, flowing east to northeast providing groundwater and surface water recharge for the Salinas Valley. It is undammed and along with its tributaries, supports one of the largest runs of SCCC steelhead trout in the Salinas River watershed. Mass wasting (landslide) processes dominate much of the

landscape with recent landslides modifying older slide-prone topography, especially in the steep, rugged, deep stream canyons. Characteristic aquatic habitat types for the lower section of the river are large, deep pools, up to 400 feet long and over 10 feet deep, separated by long reaches of dry channel (up to 900 feet long). There are occasional smaller, shallow pools ranging from 3 to 15 feet in length. Instream cover mainly consists of large boulders and bedrock ledges. Aquatic species are concentrated, being restricted to the larger pools. Fish found in the smaller pools would likely die due to the rapid rate the river dries up. Much of the riparian zone adjacent to the Arroyo Seco and its tributaries is composed of rocky substrate with sparse, open vegetation patterns. Riparian areas along the Arroyo Seco River are relatively intact and in very good condition, especially in the Ventana wilderness area.

The Arroyo Seco River provides habitat for SCCC steelhead trout in the project area and for the purposes of this analysis is presumed to provide habitat for pacific lamprey.

Santa Maria River System

The Santa Maria River is a relatively short coastal river providing the access corridor for and formed by the confluence of two large interior rivers that flow through the LPNF, the Sisquoc River and the Cuyama River. Headwaters of the Santa Maria are in the Sierra San Rafael, Sierra Madre and Caliente mountain ranges (NMFS 2012). Agricultural use is intensive within the lower Santa Maria River Basin (Chubb 1998).

The Cuyama River is dammed by Twitchell dam which blocks passage of anadromous fish. Twitchell Dam is managed to minimize surface flows to the ocean thus water flows from the Cuyama River are cut off before reaching the Santa Maria River, thus the Santa Maria River only flows to the ocean during high rainfall years. Surface flows in the Cuyama upstream of the reservoir are also limited most of the year due to ground water pumping and agricultural irrigation (NMFS 2012).

The Sisquoc River provides habitat for anadromous fish during years when water levels allow access, as there are no known barriers. The lower Sisquoc River is poor migration habitat for anadromous fish due to the highly unstable streambanks with multiple ephemeral low gradient channels, and substrate consisting of cobble and shifting sands. Extensive wildfires during the 1920s and 1950s have been implicated as major factors leading to the destruction of spawning habitat in the Sisquoc River and its tributaries (Titus et al 2000). Numerous small diversion structures provide blockage at low to moderate flows. Urban and suburban development is also expanding (Chubb 1998).

Within the Tamarisk Removal project area, the Cuyama River and Branch Creek provide habitat for red-legged frog and arroyo chub. The Sisquoc River provides habitat for SC steelhead trout, red-legged frog arroyo toad, arroyo chub and is presumed to provide habitat for pacific lamprey.

Santa Ynez River System

The Santa Ynez River drains the south-facing slopes of the Sierra San Rafael and north-facing slopes of the Santa Ynez Mountains. Several impoundments are located in the Santa Ynez system and include Bradbury Dam, Gibraltar Dam and Juncal Dam on the mainstem and the Mono Debris Dam on Mono Creek, a tributary. Bradbury Dam forms Lake Cachuma and blocks anadromous access to the LPNF (NMFS 2012).

The Santa Ynez River and Mono Creek provide habitat for red-legged frog, arroyo toad and arroyo chub within the project area.

Santa Clara River System

The Santa Clara River drains most of the western portions of the Transverse Range and the north slopes of the San Gabriel Mountains. The mainstem is a sandy, wide channel with little riparian vegetative cover and essentially no instream cover. (Stoecker et al. 2005). The Santa Clara River system has many structures influencing aquatic organism passage. The Vern Freeman Diversion located on the mainstem allows anadromous access but there may be flow levels where the diversion slows or prevents adult steelhead trout from migrating upstream. Combined with the other dams and diversions throughout the Santa Clara River system, water discharged into the mainstem is significantly reduced (NMFS 2008).

Sespe Creek is the largest accessible (not blocked) steelhead trout-bearing stream in the Santa Clara River system and much of it is located in the Sespe Wilderness (NMFS 2008). Much of Sespe Creek provides high quality stream habitat but has been impacted by wildfires (Stoecker et al. 2005).

Piru Creek is the largest tributary to the Santa Clara River and is blocked to anadromous fish passage by Santa Felicia Dam at Lake Piru. Dams on Piru Creek reduce flows into the mainstem Santa Clara River (NMFS 2008).

Within the project area, Sespe Creek provides habitat for SC steelhead trout and pacific lamprey; Sespe and Piru Creeks provide habitat for red-legged frog arroyo toad and arroyo chub. A critical habitat unit for both Conservancy fairy shrimp and vernal pool fairy shrimp is designated in the vicinity of upper Piru Creek, Sheep Creek and Lockwood Creek.

Affected Species Accounts

The focus of the aquatic species analysis is to address the effects to special status aquatic species in compliance with the Endangered Species Act, Forest Service Policy [FSM 2670]), the LMP and NFMA.

Aquatic species of concern known or suspected to exist in the project area or that may be affected by the implementation of the project are included in the effects analysis. For species not carried forward in the analysis, the rationale why is provided in the aquatic species specialist report, and the Biological Assessments and Biological Evaluations for fish and wildlife species for this project. The following aquatic dependent federally listed endangered and threatened species and Forest Service sensitive species occur within project treatment areas and have the potential to be affected by project actions.

SCCC Steelhead Trout (Threatened)and SC Steelhead Trout (Endangered)

Distribution and Abundance

South central California (SCCC) steelhead trout (*Onchorhynchus mykiss*) are described to occupy river basins from Pajaro River, located in Santa Cruz County, CA (inclusive) to (but not including) the Santa Maria River, San Luis Obispo County, CA. Most of these rivers drain the Santa Lucia Mountain Range, the southernmost unit of the California Coast Ranges (62 FR 43938, August 18, 1997). Relative to the LPNF, SCCC steelhead trout trout are found on NFS lands in upper-reach tributaries of the Carmel and Salinas Rivers, Big Sur and Little Sur Rivers and smaller stream systems of the frontal coast area from south of Big Sur to Pismo Creek. Although SCCC steelhead trout occur more south, they are not on NFS lands.

Data on abundance of SCCC steelhead trout is mostly in-accurate or non-existent with the exception of run sizes for the Carmel River (Boughton and others 2006). However, the

abundance of SCCC steelhead trout was characterized by NOAA Fisheries when the species was listed as federally threatened in the Code of Federal Regulations (NMFS 1997). The following description of SCCC steelhead trout abundance is taken from this document.

"Historical estimates of steelhead trout abundance are available for a few rivers in this region. In the mid-1960's, CDFG (1965) estimated a total of 27,750 steelhead trout spawning in this ESU. Recent estimates for those rivers where comparative abundance information is available show a substantial decline during the past 30 years. In contrast to the CDFG (1965) estimates, McEwan and Jackson (1996) reported runs ranging from 1,000 to 2,000 in the Pajaro River in the early 1960's, and Snider (1983) estimated escapement of about 3,200 steelhead trout for the Carmel River for the 1964-1975 period. No recent estimates for total run size exist for this ESU; however, recent run-size estimates are available for five rivers (Pajaro River, Salinas River, Carmel River, Little Sur River, and Big Sur River). The total of these estimates is less than 500 fish.

Updated data on abundance and trends for steelhead trout in this ESU indicate slight increases in recent years. New data from the Carmel River show increases in adult and juvenile steelhead trout abundance over the past 2 to 5 years..."

Maps of SC steelhead trout trout (*Onchorhynchus mykiss*) in the *Status Review of West Coast Steelhead trout from Washington, Idaho, Oregon, and California* (Busby etal. 1996) include the Santa Maria River south to the U.S. - Mexican border. The final rule on listing (62 Federal Register [FR] 43938, August 18, 1997) defines the ESU as extending south to "the southern extent of the species' range," which is defined as Malibu Creek (NMFS 1997). However, in May 2002, the range was revised to include systems south to the U.S. - Mexican border (67 FR 21586, May 1, 2002) (NMFS 2002). Most of the coastal watersheds within the SC Steelhead trout Recovery Planning Area were surveyed for *O. mykiss* in 2002 by the NMFS (Boughton and Fish 2003). Historically 46 watersheds were known to have supported SC steelhead trout populations. Post survey, 26 of the 46 watersheds were considered vacant of steelhead trout because of lack of water or presence of impassible barriers or no steelhead trout were found (NMFS 2012).

Within the LPNF, SC steelhead trout occur in the Santa Maria river and its tributaries (including Sisquoc River), the Santa Ynez River and its tributaries below impoundments, the Ventura River system, and the Santa Clara River and its tributaries (including Sespe Creek). They also occur throughout the smaller ocean-facing streams of the greater Santa Barbara coastline. Recent run sizes were estimated to be less than 500 adults total while the historical run size was estimated to be at least 32,000 to 46,000 (Good and others 2005). SC steelhead trout are at high risk of extinction based on results of NOAA Fisheries' west coast steelhead trout status review (Busby and others 1996) and in a subsequent status update (Good and others 2005).

NMFS developed Geographic Information Systems (GIS) data, available at http://swr.nmfs.noaa.gov/salmon/layers/finalgis.htm, for listed populations of steelhead trout. These data identify streams known to be occupied by steelhead trout, as well as information about spawning, rearing, and/or migration habitat.

Designated Critical Habitat:
Designated critical habitats are areas determined to be essential to the conservation of federally listed threatened or endangered wildlife species. Section 7 of the Endangered Species Act prohibits destruction or adverse modification of critical habitat. NOAA Fisheries designated CH for SCCC and SC steelhead trout on September 2, 2005 (70 FR 52488). CH for steelhead trout

trout encompasses specific areas within and outside of the geographic area occupied by the species at the time of listing, on which are found physical or biological features essential to the conservation of the species. The CH designation identifies primary constituent elements that include sites necessary to support one or more steelhead trout life stages. Specific sites include freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, nearshore marine habitat and estuarine areas. The physical or biological features that characterize these sites include water quality and quantity, natural cover, forage, adequate passage conditions and floodplain connectivity. For the Tamarisk Removal project, CH is designated in all streams where steelhead trout occur within the Arroyo Seco, Upper Sisquoc, Middle Sisquoc and Sespe Creek HUC5 sub-watersheds.

Habitat Requirements
Major streams in southern California originate in the coastal mountains, and many cross broad alluvial areas before reaching the sea. These low-elevation alluvial flats present inhospitably warm and fluctuating temperatures, and streamflows tend to be intermittent. The higher-elevation headwaters, therefore, are the primary spawning and rearing areas for steelhead trout. It is likely that the largest steelhead trout populations historically occurred in major streams where the upstream spawning and rearing habitats were closest to the ocean, such as in the Ventura, Santa Clara, and Santa Ynez Rivers. Streams that still support steelhead trout runs are primarily in small drainages whose headwaters are in mountains very close to the coast (e.g., the Santa Lucia, Santa Ynez). These streams tend to be those without impassible barriers (e.g., dams) between spawning and rearing habitat and the ocean (Moyle and others 1995).

Typically, steelhead trout spawning habitat is found in stream segments with 0–1 percent gradients; foraging and dispersal habitats occur at 0–4+ percent gradients. Steelhead trout are found at elevations ranging from sea level to 4,500 feet. Migrating fish require deep (1 foot) holding pools with cover (e.g., rock ledges, bubble curtains). They move upstream in perennial or seasonal stream reaches (Carroll 1985) and seek out spawning areas in riffles or pool tails where gravel is clean, plentiful and of appropriate size (0.25 – 0.75 inches) (Phillips and others 1975). Streamflow must be adequate to maintain oxygen levels of at least 5 parts per million (Bjornn and Reiser 1991) and temperatures of 37 º F – 68 º F (Bell 1986). Channel depths of no less than 0.8 foot are necessary, and channel dimensions with width-to-depth ratios of approximately 10–15:1 are thought to contribute to the best spawning conditions.

Threats:
The extensive decline of steelhead trout in south-central and southern California is due primarily to instream water management facilities that have resulted in inadequate flow, flow fluctuation, water diversion and extraction, blockage of passage, and desiccation of portions of rivers and streams (NMFS 1997). Suitable spawning and rearing habitat on National Forest System lands are frequently located in upper-elevation areas above currently impassable barriers (i.e., dams) especially in the Santa Ynez and Ventura Rivers where steelhead trout recovery is most conceivable (McEwan and Jackson 1996 and U.S. Army Corps of Engineers 2004). The California Department of Fish and Game Steelhead Restoration and Management Plan of California identifies Bradbury Dam, on the Santa Ynez River, as a limiting factor for steelhead trout and that "nearly all historic spawning and rearing habitat is located upstream." Efforts are ongoing to restore steelhead trout populations of the LPNF. Currently, actions on National Forest System lands may include; invasive nonnative species eradication, riparian vegetation restoration, abandoned mine land restoration, removing or mitigating recreation use impacts, and planning fuel treatment projects (prescribe burns) in watersheds occupied by steelhead trout.

Arroyo Toad (Endangered and Management Indicator Species)

Distribution:
The current distribution of arroyo toad (*Anaxyrus californicus*) in the United States is from the San Antonio River in Monterey County south to the Tijuana River and Cottonwood Creek Basin along the Mexican border. Although the arroyo toad occurs mostly along coastal drainages, it has also been recorded at several locations on the desert slopes of the Transverse Ranges (Jennings and Hayes 1994).

The arroyo toad is concentrated in a small number of locations on the LPNF. Substantial populations exist in Piru Creek, including the lower reaches of Agua Blanca Creek; Sespe Creek; and interconnected reaches of the upper Santa Ynez River, Mono Creek, and Indian Creek. A smaller population occurs along the Sisquoc River. All these populations are predominantly on National Forest System lands. The northernmost population of arroyo toads, on the San Antonio River in Monterey County, lies just off the national forest on the Fort Hunter Liggett Military Reservation (Stephenson and Calcarone 1999).

Habitat Requirements:
The arroyo toad is endemic to the coastal plains, mountains, and desert slopes of central and southern California and northwestern Baja California from near sea level to about 8,000 feet (2,400 meters). Within these areas, arroyo toads are found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces. Arroyo toads have evolved in a system that is inherently dynamic, with marked seasonal and annual fluctuations in rainfall and flooding. Breeding habitat requirements are highly specialized. Specifically, arroyo toads require shallow slow-moving stream and riparian habitats that are naturally disturbed on a regular basis, primarily by flooding (U.S. Fish and Wildlife Service 2000).

Threats:
Arroyo toad populations are localized and face a variety of threats. Many populations occur immediately below major dams. The manner in which water is released from upstream reservoirs can greatly influence arroyo toad reproductive success.

Drawdown of surface water from wells is also a concern (Stephenson and Calcarone 1999). National forest personnel participate in multi-jurisdictional planning processes to coordinate stream flows and ground water extraction.

Predation of arroyo toads and larvae by nonnative species such as bullfrogs and warm water fishes are a significant threat. These species occur in many of the streams occupied by arroyo toads. In areas near human development, Argentine ants have spread into riparian areas and are reducing the native ant fauna. Native ants are a major food source for arroyo toads; consequently, the species may be negatively affected by the continued spread of Argentine ants (Stephenson and Calcarone 1999).

Invasive nonnative plants are also a problem in some areas where they decrease the amount of available surface water. Tamarisk and arundo also stabilize stream terraces, deepening flood channels and resulting in unsuitable habitat for arroyo toads (Stephenson and Calcarone 1999).

Campgrounds and roads near arroyo toad breeding pools have resulted in toads and their egg masses being inadvertently crushed by vehicle and foot traffic and disturbed by waterplay. There are seven public campgrounds located near arroyo toad breeding habitat on the LPNF. Seasonal closures and/or restrictions on vehicle access have recently been instituted at some of these

campgrounds to reduce impacts (e.g., Beaver, Lion, and Mono Campgrounds). Several road crossings on the Los Padres have been relocated or rebuilt to reduce impacts to breeding pools (Stephenson and Calcarone 1999).

Other threats of direct harm to toads or toad habitat include unauthorized OHV use, fire suppression activities, livestock grazing, suction-dredge mining and streamside prospecting. Siltation and alteration of stream terraces caused by any of these activities or the aftermath of fire, can negatively impact arroyo toad habitat.

Designated Critical Habitat:
Designated Critical Habitat for the arroyo toad encompasses 98,366 acres in 21 separate units in Santa Barbara, Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties (76 FR 7246, February 9, 2011). About 8,500 acres of five critical habitat units are located on the LPNF and all are within the Tamarisk Removal project area. These include the Sisquoc River, Upper Santa Ynez River Basin (Santa Ynez River above Gibraltar Reservoir and Mono Creek), Piru and Sespe Creeks.

California Red-Legged Frog (Threatened)

Distribution:
The greatest numbers of California red-legged frog (*Rana draytonii*) occur in Monterey (32 occurrences), San Luis Obispo (36 occurrences), and Santa Barbara (36 occurrences) Counties (61 Federal Register 25813). Remaining populations occur in small streams along the coastline. Only three known populations exist south and east of Ventura County: at the Santa Rosa Plateau on the southeastern flank of the Santa Ana Mountains (near the Cleveland National Forest); in the Castaic Ranges in Los Angeles County; and on Amargosa and San Francisquito Creeks in Los Angeles County.

Most California red-legged frog locations on National Forest System lands are on the LPNF. They are known to occur in multiple locations in Branch, La Brea, Sespe, Piru, Ventana, and Morro Creeks, and the Santa Ynez, Sisquoc, and Carmel Rivers. The largest known populations occur on the upper Carmel River, Mono Creek upstream of Mono Campground, and near Juncal Campground on the Santa Ynez River (Stephenson and Calcarone 1999, U.S. Fish and Wildlife Service 2000b).

Habitat Requirements:
The California red-legged frog has been found at elevations that range from sea level to about 5,000 feet (1,500 meters). They use a variety of habitat types, including aquatic, riparian, and upland habitats. Breeding sites of California red-legged frog are always in aquatic habitats. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. When riparian vegetation is present, frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community may provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding.

Threats:
Predatory, invasive nonnative fish and amphibians are serious threats to California red-legged frog populations. Impacts from campgrounds and roads include potential crushing of frogs and egg masses underfoot or by vehicles and disturbance from people playing in the water. Although grazing in riparian areas is not authorized in any occupied habitats on National Forest System lands, livestock grazing that results in a loss of riparian habitat can also be detrimental to frogs.

Water diversions, groundwater extraction, and stock pond and small reservoir developments can also cause degradation or elimination of habitat (Stephenson and Calcarone 1999). Potential spread of chytrid fungus from other locations may also threaten this species.

Designated Critical Habitat:
Ten separate units of designated critical habitat for the California red-legged frog overlap the LPNF within Monterey, San Luis Obispo, Santa Barbara, and Ventura counties (75 Federal Register 12816). These units include about 285,000 acres of the LPNF of which, 34% occurs in wilderness. Within the Tamarisk Removal project area CH is designated in the Sisquoc River, Santa Ynez River and tributaries, and Piru Creek.

Arroyo Chub (Sensitive)

Distribution:
Arroyo chub (*Gila orcutti*) is currently most abundant in areas outside its native range (Swift and others 1993). The species is native to the Los Angeles, San Gabriel, Santa Ana, Santa Margarita, and San Luis Rey Rivers and to Malibu and San Juan Creeks (Moyle and others 1995). It was successfully introduced outside of its native watercourses as a baitfish in the 1930s and 1940s (Swift and others 1993). These include the Santa Clara, Santa Ynez, Santa Maria, Cuyama, and Mojave River systems (Moyle and others 1995, Swift and others 1993). They often hybridize with other cyprinid species and consequently cannot be considered to be genetically pure in streams where they have been introduced (Moyle and others 1995). Introduced populations may occur in the Tamarisk Removal Project area in the Cuyama, Sisquoc and Santa Ynez Rivers and in Sespe and Piru Creeks.

Habitat Requirements:
Arroyo chub is found in slow-moving or backwater sections of warm to cool (50–75.2 ° F) streams with mud or sand substrates. Depths are typically more than 16 inches. This species is adapted to wide fluctuations in water temperature. Spawning takes place in pools or quiet edge water when water temperatures are between 14 ° C and 22 ° C. Juveniles rear in quiet water in the water column among vegetation or flooded cover (Moyle and others 1995).

Pacific Lamprey (Sensitive)

Distribution:
Pacific lamprey (*Entosphenus tridentatus*) occur in Pacific coast streams along the coast of Japan, through Alaska, and south to Baja California. Runs of Pacific lamprey occur in several creeks along the coast in Monterey and San Luis Obispo Counties, parts of the Santa Maria and Santa Ynez Rivers, parts of the Ventura River, and the Sespe Creek portion of the Santa Clara River drainage (Swift and others 1993, U.S. Fish and Wildlife Service 2004). Although anadromous Pacific lamprey still occur in most of their native stream systems, large runs that once characterized these streams seem largely to have disappeared. The species has been extirpated from many streams in the urbanized southern end of its range, although the Santa Clara River, which has relatively undisturbed upper reaches, still supports consistent runs (Moyle 2002).

Within the Tamarisk Removal project action area, Pacific lamprey is assumed to be distributed in the same stream reaches as SCCC and SC steelhead trout. These include the Arroyo Seco River, Sisquoc River and Sespe Creek.

Habitat Requirements

Anadromous Pacific lamprey in the adult life stage spends up to 3 years in the ocean. Landlocked forms spend their adult life stage in lakes or reservoirs. Adults migrate up rivers and streams to spawn. Spawning habitat consists of gravel beds and may have relatively high sand and silt content. In the larval stage, the Pacific lamprey burrows into mud and sand located in slow, depositional areas (e.g. pools, eddies), spending 4-6 years filtering detritus of microscopic organisms (Close and others 2002).

Environmental Consequences

The analysis of environmental effects to aquatic species and habitats considers those factors that have the greatest potential to impact water quality and quantity. Relative to the analysis of effects to streams, Riparian Conservation Areas have been identified within the project area and are also taken into consideration in the assessment. Factors considered in this analysis include proximity of actions to habitat, the extent of the geographic area where disturbance may occur, timing of effect in relationship to species life history information, the nature of the effect on habitat, the duration of effect, disturbance intensity and severity, and consistency with the five-step screening process for riparian conservation areas (USDA-FS 2005) included in Appendix B. Sources of information are referenced in the analysis, and represent consideration of the best available science.

The analysis of direct effects includes areas proposed for treatment within the project area boundary, for the duration of the proposed work. The analysis area for indirect effects and cumulative effects includes the treatment area plus areas that might be influenced by the project in terms of downstream factors. Specifically this includes twelve 5th-field watersheds that overlap or partially overlap the project area boundaries.

Indirect effects were considered for the period beginning in early 2014 on to about five years after the project is completed, the point where project generated effects might be expected to dissipate or end due to the nature of planned treatments.

Alternative 1, No Action

Direct Effects

With no tamarisk removal activities, there would be no direct effects to Federally listed threatened and endangered aquatic species, sensitive aquatic species, aquatic Management Indicator Species or their habitats as potential herbicide contamination to aquatic habitats would not occur.

Indirect Effects

Under the no action alternative tamarisk would remain established in RCAs throughout the LPNF. Tamarisk would continue to spread along stream corridors as seeds would spread and establish new plants downstream of existing plants. Existing native riparian plant communities would continue to lose diversity and continue a trend towards a tamarisk dominated, non-native plant community. As tamarisk plants continue to spread and become denser, native vegetation, which provides more shade to stream channels than tamarisk would continue to decrease, providing less shade to perennial water sources and potentially increasing stream temperatures. Overall surface and localized ground water availability would continue to decline as tamarisk density continued to increase. In some locations tamarisk would continue providing stream channel stabilization and in these areas may continue restricting periodic natural channel movements and channel processes.

Alternative 2, Proposed Action

Herbicide Toxicity

In general, for aquatic organisms lethal effects (LC50) from chemicals at concentrations below 1 part per million (ppm) are considered indicative of highly toxic substances, lethal effects at concentrations of 1 to 10 ppm are considered toxic, and lethal effective concentrations at greater than 10 ppm are considered indicative of slightly toxic compounds (USFS 1984).

The Forest Service contracts with Syracuse Environmental Research Associates (SERA) to conduct human health and ecological risk assessments for herbicides and pesticides that may be proposed for use on National Forest system lands. Herbicide effects to aquatic resources were analyzed in risk assessments for each of imazapyr and triclopyr. The risk assessments consider worst-case scenarios including accidental exposures and application at maximum reported rates. Various modeling methods are used in the risk assessments to estimate herbicide concentrations and dilutions scenarios for both terrestrial and aquatic applications.

FS/SERA risk assessments use peer-reviewed articles from the open scientific literature and current EPA documents. To estimate potential ecological risk of herbicides, these risk assessments integrate the results of exposure and ecotoxicity studies using hazard quotients (HQs). HQs are calculated by dividing exposure estimates by ecotoxicity values, both acute and chronic, for various wildlife species and are then compared to levels of concern (LOCs). HQs with values greater than one mean there is some level of exposure concern and a potential for adverse effects to a species. HQ values of 1 or less mean the exposure and dose are less than the toxicity level and adverse effects are not expected. Detailed dose-severity assessments are also completed to qualitatively describe potential adverse effects to wildlife and plant species. Observed adverse effect levels (OAELs) are documented for longer term exposures to a particular herbicide based on many biological conditions including mortality, gross signs of toxicity and behavioral, physiological or biochemical changes. In this way determinations can be made about effects of a particular chemical on specific types of animal and plant species (SERA 2009).

Two types of herbicide are proposed for treatments for this project:

Imazapyr

Imazapyr is effective for controlling both terrestrial and aquatic vegetation. It is an anionic, non-volatile organic acid that is both persistent and mobile in soil. Commercial formulations contain either imazapyr acid or the imazapyr isopropylamine salt, both of which are dissolved in a water solution and the behavior of both forms are expected to be similar. Laboratory studies show imazapyr is essentially stable to hydrolysis (chemical reaction with water), aerobic and anaerobic soil degradation, as well as aerobic and anaerobic aquatic metabolism. Field dissipation studies show imazapyr is not very mobile in soils but can leach to groundwater and move via runoff to surface water. Upon direct application or indirect release into surface water, photolysis (photo degradation by sunlight) is the only identified mechanism for imazapyr degradation in the environment. The half-life of imazapyr is approximately 3 to 5 days in surface water (SERA 2011 – imazapyr; USEPA 2006).

For aquatic organisms, available acute and chronic toxicity data indicate that imazapyr acid and salt are practically non-toxic to fish, invertebrates, and non-vascular aquatic plants. None of the expected exposures (non-accidental) to these groups of animals raise concern and most accidental exposures raise only minimal concern. Fish species are used as surrogates to determine effects of imazapyr on aquatic phase amphibians. Assessments done on several fish

species for both terrestrial and aquatic applications determined HQs were below levels of concern by factors of 25 to 100. Acute risks to fish and aquatic invertebrates were not calculated by the EPA because LC50 values were greater than the highest concentration tested. Chronic LOC's were also not exceeded for these organisms. Considering the very low acute and chronic HQs in fish and the conservative assumptions used to derive the HQs, there is no evidence that acute or chronic exposure to imazapyr will cause any toxic effects in fish and thus imazapyr is not expected to cause toxic effects to aquatic phase amphibians.

Risk to terrestrial-phase amphibians is covered in risk assessments completed by the EPA using birds as surrogates. A concern with this results from a lack of data on the permeability of amphibian skin to imazapyr. Based on the risk characterization for birds and other groups of terrestrial animals for which data are available, there is no basis to assume terrestrial-phase amphibians would be at risk from exposure to imazapyr (SERA 2011 – imazapyr). The EPA has determined that there are no risks of concern to terrestrial birds, mammals and bees. Available acute and chronic toxicity data indicate that imazapyr acid and salt are practically non-toxic to birds, mammals, and honeybees. Acute risks to both mammals and birds were not calculated because LC50/LD50 (Median Lethal Concentration/Median Lethal Dose) values were greater than the highest concentration tested. Chronic LOC's were also not exceeded for these organisms (SERA 2011 – imazapyr; USEPA 2006).

Imazapyr is not expected to bioaccumulate in aquatic organisms because it exists as an anion at typical environmental pHs (SERA 2011 – imazapyr).

Triclopyr

Triclopyr is a selective herbicide used to control broad leaf weeds and brush. There are two types of triclopyr used commercially as herbicides; a triethylamine salt (TEA) and a butoxyethyl ester (BEE), both are non-volatile. Both triclopyr TEA and BEE either dissociate or hydrolyze quickly in water. Triclopyr TEA rapidly dissociates in water to the triclopyr acid/anion and triethanolamine. Triclopyr BEE rapidly hydrolyses in the environment to the triclopyr acid/anion and butoxyethanol. Both triethanolamine and butoxyethanol are rapidly dissipated by microbial degradation. Triclopyr acid is a weak acid which will dissociate completely to the triclopyr anion at pHs greater than 5 (USEPA 1998). Triclopyr also has an environmental metabolite TCP (3, 5, 6-trichloro-2-pyridinol). TCP is about as acutely toxic to aquatic species as triclopyr BEE (SERA 2011 - triclopyr). Adverse effects to aquatic species from TCP were likely at the highest application rates of triclopyr. These rates are not possible to reach with proposed cut stump and stem tissue treatments. Triclopyr acid is somewhat persistent in soil and is mobile, it photodegrades rapidly in water with a half-life of approximately 14 hours and does not bioaccumulate in aquatic organisms. (USEPA 1998)

For most groups of aquatic organisms including aquatic-phase amphibians, triclopyr BEE is more toxic than triclopyr TEA and triclopyr acid. For triclopyr TEA and triclopyr acid an acute NOAEC of 125 mg a.e./L is applied to amphibian species. For triclopyr BEE acute NOAECs for amphibian embryos range from 2.3 to 4.2 mg a.e./L and for amphibian larvae a very conservative 0.1mg a.e./L is used for NOAEC. Risk characterizations for aquatic phase amphibians are essentially identical to those for fish species (SERA 2011 - triclopyr). Triclopyr acid and triclopyr TEA are practically non-toxic to freshwater fish and aquatic invertebrates on an acute basis. Triclopyr BEE is moderately to highly toxic to freshwater fish and slightly to moderately toxic to aquatic invertebrates on an acute basis. On a chronic basis triclopyr TEA may affect fish at levels greater than 104 ppm and aquatic invertebrate reproductive impairment may occur at levels greater than 80.7 ppm. Risk assessment modeling shows that concentrations of triclopyr

entering surface waters from adjacent broadcast spraying do not approach these concentrations and are below levels of concern for aquatic species. (SERA 2011 - triclopyr; USEPA 1998)

Triclopyr was specifically tested for ability to cause malformations in the frog embryos (Perkins et al. 2000). Consistent with results for other aquatic species, triclopyr TEA, was 15 times less toxic than triclopyr BEE. No statistically significant increases in abnormalities were seen in any groups exposed to triclopyr formulations at non-lethal levels. Additionally, the highest recommended rates of triclopyr were applied directly to water at 15cm in depth (volume not specified) for 96 hours during embryo development and no toxic response was observed.

Berrill et al. (1994) conducted toxicity studies on eggs and tadpoles of various frog species exposed to triclopyr BEE. Exposure of eggs to concentrations up to 4.6 ppm triclopyr for 48 hours caused no effect on hatching success, timing, malformations, or subsequent avoidance behavior of tadpoles hatched from exposed eggs. Tadpoles were more sensitive; with death occurring at exposures of 2.3 and 4.6 ppm triclopyr. Many of the frog tadpoles became unresponsive to prodding when exposed to 1.1 ppm. Surviving tadpoles recovered after exposure was terminated. Concentrations of triclopyr in water resulting from typical aerial application rates are below 1 mg/L (1 ppm), thus acute and chronic risks to aquatic animals are low (SERA 2011 - triclopyr). At the highest application rates of aerial or broadcast treatments, acute exposure from runoff could adversely affect responsiveness of some tadpoles, increasing the risk of predation. These application rates are not achievable with cut stump and stem tissue treatments.

No toxicity data are available for triclopyr or TCP in terrestrial phase amphibians in open literature or in studies submitted to the EPA. However, risk characterizations for terrestrial phase amphibians were derived using toxicity studies on birds as surrogates for California red-legged frogs (USEPA 2009) HQs for acute exposure range from 0.01 to 5.0 and for chronic exposure range from 1.0 to 134.0 (SERA 2011 - triclopyr).

Additives

Hi-Light™ Blue Liquid manufactured by Becker-Underwood is proposed for use as a colorant to mix with herbicides so people applying pesticide treatments can see where they have treated. The Material Safety Data Sheet indicates there are no reportable quantities of hazardous ingredients present, and no toxic chemical(s) subject to reporting requirements. Hi-Light® Blue dye is listed as mildly irritating to skin and eyes and is considered to be virtually non-toxic to humans. Its effect on non-target terrestrial and aquatic species is unknown, however its use has not resulted in any known issues (Bakke 2007). This colorant is short-lived, and breaks down in a matter of days. This dye is not expected to have any deleterious toxic effects to the environment.

Project Specific Toxicity Modeling

The SERA reports typically use the GLEAMS model (Groundwater Loading Effects of Agricultural Management Systems) as a tool to assess herbicide risks. The GLEAMS model is a computer model used to estimate an herbicide concentration after herbicide application on an agricultural field. Herbicide concentrations provided by GLEAMS are used in dilution models for streams or ponds to get water contamination rates for specific scenarios. This model is well validated for agricultural use and is the best available at this time but has certain limitations when applied to herbicide treatments as proposed in this project. The model assumes broadcast treatment along a small perennial stream. The treatment is 50 feet wide and 1.6 miles long. This would overestimate herbicide in streams on the project area as no broadcast treatment is proposed. In order to model more meaningful, project appropriate herbicide risks, spreadsheets

developed for the SERA Risk Assessments were modified for the type of herbicide, herbicide application rates, soil texture and rainfall conditions found at treatment sites on the LPNF (see hydrologist report and project file for a complete overview of modified parameters). The results reflect more accurate potential herbicide concentrations in streams within the project area after treatment, however, model limitations do not allow a high level of precision for proposed treatment methods as the model still assumes aerial application of herbicides. Results from the modified model were compared with results from the SERA risk assessments and are shown in Table 6.

Modified results show much lower potential water contamination rates post treatment for both imazapyr and triclopyr, both well below toxicity indices. Modified hazard quotients are well below a value of 1 for sensitive fish, thus herbicide concentrations in water reached do not come close to levels of concern.

Table 6. Project Specific Modeled Herbicide Concentrations in Water

Herbicide/ Location[1]	Chemical/ Application Rate[2] (lb/acre)	Modeled Estimate of Peak Water Contamination Rate Post Treatment (mg/L per lb/acre)	Toxicity Index for Listed Fish[3] (mg/L)	Post Treatment Range of Hazard Quotients[4] (sensitive fish)
Imazapyr				
Arroyo Seco (North)	Imazapyr / 0.00012	0.007 – 0.018	10.4	0.000001 – 0.0002
Mono Creek (South)	Imazapyr / 0.00012	0.001 – 0.007	10.4	0.000001 – 0.0002
FS Risk Assessment	Imazapyr / 1	0.000009 – 0.26	10.4	0.004 – 0.8
Triclopyr				
Arroyo Seco (North)	Triclopyr / 0.00012	0.000017 – 0.0002	0.091	0.0003 – 0.02
Mono Creek (South)	Triclopyr / 0.00012	0.0000054 – 0.00003	0.091	0.0003 – 0.02
FS Risk Assessment	Triclopyr / 0.45	0.00000015 – 0.03	0.091	2 - 200

[1]Two average rainfall scenarios were run, one for the northern portion of the forest and one for the southern portion of the forest.
[2]Application rates were adjusted to more accurately reflect the amount of herbicides proposed for use for this project.
[3]Toxicity index shows herbicide concentration levels where adverse effects to fish species occur.
[4]Hazard Quotients with values greater than 1 mean there is some level of exposure concern.

Direct Effects

Direct application of herbicide to water is not proposed nor intended for this project. Aquatic emergent plants would not be treated under any alternative. Herbicide delivery will be restricted to hand applications to cut stumps or stem tissue. No aerial spraying is being proposed. Herbicide application would occur in the driest times of the year, and will only be applied to large tamarisk plants on cut ends or by injection.

Tamarisk treatments will take place in the dry season, during low stream flow or no stream flow periods of the year. Treatment personnel will not enter active, wet stream channels while treating tamarisk. There is no risk of accidental crushing of fish species or aquatic phase amphibians by treatment personnel. Resource protection measures to prevent trampling on individuals will be implemented to minimize direct harm by crushing. Access routes and treatment sites will be thoroughly searched for arroyo toads and California red-legged frogs by a qualified biologist.

Risk assessment models use broadcast spraying of herbicide immediately adjacent to stream channels to determine concentrations of herbicide entering waterways. These assessments determined that spraying imazapyr or triclopyr adjacent to a stream channel would have no toxic effects to fish aquatic invertebrates and amphibians. The risk assessments also calculate HQs for each of imazapyr, triclopyr TEA and triclopyr BEE. Imazapyr has very low (0.03) acute and chronic HQs for fish with no concerns for toxic effects. Direct application of triclopyr TEA to water does not lead to HQs that exceed levels of concern for aquatic animals. Likewise for triclopyr BEE, worst case scenario HQs are 0.3, far below a level of concern of 1.0. Modified GLEAMS model results specific to this project show much lower potential water contamination rates post treatment for both imazapyr and triclopyr than levels shown in the SERA reports. Results are well below published toxicity indices. Modified hazard quotients are well below a value of 1 for sensitive fish, thus herbicide concentrations in water reached do not come close to levels of concern.

Hand application of herbicide directly to stump or stem tissue eliminates the chances of herbicide reaching streams from spray drift. Additionally, contaminated runoff or leaching from ground water is greatly reduced by direct hand application of herbicides because the only pathway of chemical movement is trans-location from the plant to the soil or to an adjacent plant. The concentration of herbicide that may be delivered by runoff or ground water leaching is much less than those modeled for direct spraying scenarios in which concentrations resulted in no toxic effects to aquatic animals.

Concentrations of herbicides potentially reaching water as a result of an accidental spill depend on the amount of herbicide and the stream ratio of surface area to volume. The persistence of the herbicide in water depends on the length of stream where the accidental spill took place, velocity of stream flow, and hydrologic characteristics of the stream channel. The concentration of herbicides would decrease rapidly downstream because of dilution and interactions with physical and biological properties of the stream system. BMPs reduce the potential for spills to occur and include a herbicide transportation and handling plan, which will address spill prevention and containment. Potential effects in case of a spill will be minimized by a pesticide spill contingency plan. Accidental spills are not considered within the scope of the project.

It is unlikely with proposed treatments that herbicide will reach stream habitats occupied by fish or aquatic phase amphibians. If for some reason it does, it is extremely unlikely it would be at concentrations to have any effect to aquatic animal species. Therefore, it is discountable that direct application of herbicide to stump and stem tissue will cause high enough concentrations of herbicide to enter stream habitats to have any negative effect on fish species or aquatic phase amphibians.

Cut stump and stem tissue treatment methods eliminate the risk of terrestrial phase amphibians having direct dermal contact with herbicides from the herbicide delivery method or from contact with contaminated foliage. Treatment delivery methods also eliminate the risk of terrestrial phase amphibians eating contaminated prey. Few studies have been conducted to assess effects of herbicides on terrestrial phase amphibians, however, it is assumed the effects would be similar to those on other terrestrial species. Because proposed herbicide treatments do not broadcast herbicide by air and because treatments are limited spatially (spot treatments proposed) and because only large tamarisk plants would be treated with herbicides (by injection or on cut ends), it is not expected that terrestrial phase amphibians would come in direct contact with herbicides.

Indirect Effects
Food and Shelter

Amphibian larvae feed in the substrate consuming detritus, algae, bacteria, diatoms and other loose organic material. Fish consume various aquatic invertebrates and juvenile amphibians consume small insects at the edges of breeding pools. Adult amphibians will disperse from breeding pools and consume terrestrial insects (USFWS 1999). Considering proposed treatment methods (cut stump and frill treatments), both imazapyr and all forms of triclopyr are expected to have no toxic effects to aquatic non-vascular plants, aquatic vascular plants, aquatic invertebrates and terrestrial invertebrates. Triclopyr, in the form of BEE can exceed LOCs for aquatic plants, aquatic invertebrates and terrestrial invertebrates when applied directly to water or aerially applied in high concentrations due to spray drift. However, with proposed treatment methods it is unexpected that triclopyr will reach any water sources in the treatment area or that triclopyr would have any negative effects to terrestrial invertebrates. Thus, food sources for all life stages of fish and amphibians would not be affected by the proposed project. Aquatic plants providing cover to fish and aquatic phase arroyo toad and providing substrate for anchoring eggs for red-legged frog would not be affected by the proposed project.

Riparian zones provide shelter, forage and predator avoidance for terrestrial phase amphibians. Treatment methods target tamarisk plants specifically and would have no effect to other non-target terrestrial vegetation. Tamarisk is a non-native species and does not typically provide shelter, forage, or predator avoidance. Removal of tamarisk would allow native plant communities to re-establish would decrease accelerated transpiration rates to increase available surface water and improve overall terrestrial phase amphibian habitat conditions in RCAs.

Shade and Water Temperature

Hand removal of small tamarisk plants less than 1 foot high dispersed in spot treatments throughout a watershed would not measurably change the amount of effective shade on streams. Larger tamarisk plants provide little shade when compared to native riparian species such as willows and cottonwoods. However, if individual tamarisk plants or groups of plants are large enough and close enough to permanent water to provide shade, their removal may cause a short term, localized decrease in effective shade. Intermittent stream channels would be unaffected because they lack water during the period of warm temperatures. Since treatment areas are dispersed spatially, and since less than one percent of any 5th-field watershed is proposed for treatments, the likelihood of increases in stream temperatures is very small and not measureable. Existing native vegetation would continue to provide shade throughout project implementation especially in areas where there is 80% or greater existing canopy closure or in areas with an overstory of larger (greater than 6 inch diameter) native vegetation. In the long term removal of tamarisk will allow an increase in native vegetation which would potentially increase shade. Long term, the project may lead to lower stream temperatures and improved aquatic and riparian temperature conditions.

Suspended Sediment and Substrate

Hand pulling of tamarisk plants in RCAs adjacent to perennial water could result in short-term fine sediment delivery to a stream and may cause localized turbidity and some fines settling out on the stream bed due to ground disturbance. Since plants pulled by hand are less than one foot tall, removal of soil cover is very minimal and soil disturbance limited to the root zones of the removed plants. Fine sediment created by hand pulling tamarisk plants would be washed from the soil surface during the first few precipitation events large enough to cause streamside runoff. This increase would be short-term, about one season, and localized to the site scale and undetectable from background levels of turbidity and instream fines. There would be no measurable effects to aquatic habitat quality. Growth of native herbaceous vegetation during the

first growing season after treatments would reduce the risk of fine surface erosion delivered to stream channels in subsequent years.

Increases in turbidity and instream fines are expected to be minor and dispersed. Short-term reductions of water clarity with low intensity are unlikely to alter aquatic species activity patterns such as food acquisition or predator avoidance. Negative physiological effects to aquatic species are not anticipated. Additionally, tamarisk removal would allow many treatment sites to reseed naturally with existing native vegetation and lead to increased soil cover in RCAs and improved riparian function in terms of sediment regime.

Herbicide treatments have no ground disturbing effects nor have potential to cause compaction. Existing soil cover would remain relatively undisturbed. Herbicide treatment will not generate accelerated erosion rates and will result in no turbidity increases or fine sediment-related effects to aquatic species or their habitats.

Water Volume and Water Quality

While the literature does not present conclusive evidence regarding higher transpiration rates or higher water consumption from tamarisk, existing tamarisk outcrops are unfavorable to native riparian plants due to the aggressive nature of tamarisk spread and are unfavorable to other riparian dependent species due to reductions in plant diversity (Deloach et al 2000). Many characteristics of tamarisk allow it to out-compete native vegetation in various settings. These characteristics include high seed production and viability, rapid germination and growth, and drought and salt tolerance (Smith et al 1998; Sala et al, 1996; Shafroth et al. 2002).

Because tamarisk removal is spotty and distributed spatially and temporally, there will not be enough of a decrease in vegetative cover to cause measureable changes to peak/base flows. Tamarisk treatments do not involve the use of mechanical ground disturbing equipment, thus do not result in increased soil compaction. There will be a negligible effect on water infiltration and increases in surface run-off are not expected. For tamarisk plants larger than 1 foot tall, root systems will remain intact so that soil stability in treated areas will be largely maintained. Existing native vegetation will also remain intact within RCAs to provide soil stability.

Tamarisk infestations can decrease the availability of surface water, especially in more arid climates. Its increased transpiration rates may lead to earlier drying of intermittent water bodies, eliminating shallow freshwater features earlier in the dry season than normal. Tamarisk removal would return intermittent water sources to more natural wet and dry period timing. There may be short-term increases in soil moisture in treated areas due to tamarisk removal, but this is not expected to result in measurable flow changes in stream channels.

At a watershed scale, very little vegetation would be removed in any watershed (less than 1% of any 5th-field watershed is proposed for treatment), therefore none of the treatments are extensive enough to affect peak flows, low flows or water yield in any watershed. Project actions are not likely to change the runoff responses in project area watersheds and are not expected to increase peak/base flows by a detectable level.

As discussed under direct effects of herbicide treatments, the risk of hand application of herbicide directly to stump or stem tissue eliminates the chances of herbicide reaching streams from spray drift and greatly reduces the chances of contaminated runoff and ground leaching. Treatments will occur during the dry season and will not occur during rainfall, or preceding forecasted rainfall. This limits herbicides from entering surface waters through overland flow or through leaching. It is unlikely with proposed treatments that herbicide will reach stream

channels. If for some reason it does, it is extremely unlikely it would be at concentrations to have any effect to aquatic species. Modeled estimates of water contamination rates are well below toxicity indices and hazard quotients are well below the level of 1.

BMPs reduce the potential for spills to occur. BMP objectives require an herbicide transportation and handling plan to address spill prevention and containment. Potential effects in case of a spill will be minimized by a pesticide spill contingency plan.

Riparian Conservation Areas
Fully developed and functioning riparian zones are generally present along major project area streams including the Santa Ynez River as well as the Sespe, Piru, and Sisquoc corridors (USDA-FS, 2005). However, the establishment of tamarisk in RCAs threatens the physical integrity of riparian ecosystems.

Invasive and noxious plants such as tamarisk are a threat to overall watershed ecological condition. Removing tamarisk would improve riparian stability where invasive plants have colonized along stream channels and out-competed native species. Long-term beneficial effects from the reduction of invasive plants in riparian areas, wetlands, and streams and subsequent increases in desirable vegetation will result in improved watershed conditions. Overall, tamarisk removal will maintain or improve existing riparian vegetation conditions, improve the structure and species diversity of plant communities in RCAs and improve overall channel processes at both the site and watershed scales.

Other Physical Channel and/or Aquatic Habitat Conditions
Proposed tamarisk treatments do not include instream activities nor have the potential to effect streambank conditions. Pulling up small tamarisk plants will not add measureable amounts of sediment to stream channels and current width to depth ratios will not be altered thus no short term channel alterations are anticipated. Removal of tamarisk would allow stream channel processes including sediment regimes, and channel form processes to return to more natural patterns over time and will have slight positive long term effects to stream channel function. In the long term removing tamarisk will improve RCA vegetation conditions which will contribute to decreased potential for channel degradation improving habitat conditions for aquatic species.

There are no expected measurable changes to physical barriers, instream large woody debris, pool frequency, off-channel habitat, refugia, floodplain connectivity, drainage network, road density and location or disturbance history from the activities proposed in this alternative. The long-term trend would be a slight improvement in overall riparian and aquatic conditions in the action area because of the reduction in non-native and invasive tamarisk plants.

Alternative 3, Modified Proposed Action

Under Alternative 3 no herbicide treatments are proposed.

Direct Effects

As in Alternative 2, resource protection measures to prevent trampling on individuals will be implemented to minimize direct harm by crushing. Access routes and treatment sites will be thoroughly searched for arroyo toads and California red-legged frogs by a qualified biologist. There would be no risk of direct effects from herbicide toxicity.

Indirect Effects

Similar to Alternative 2, if individual tamarisk plants or groups of plants are large enough and close enough to permanent water to provide shade, their removal may cause a short term,

localized decrease in effective shade. Decreases in stream shade at the site scale are not expected to measurably increase stream temperatures because activities are dispersed spatially and temporally at the site scale and because of the small magnitude of this activity at the watershed scale. Native vegetation will continue to provide existing levels of shade.

Hand pulling of tamarisk plants in RCAs adjacent to perennial water could result in short-term fine sediment delivery to a stream and may cause localized turbidity and some fines settling out on the stream bed due to ground disturbance. Removal of soil cover would be very minimal and soil disturbance limited to the root zones of the removed plants. Fine sediment created by hand pulling tamarisk plants would be washed from the soil surface during the first few precipitation events large enough to cause streamside runoff. This increase would be short-term, about one season, and localized to the site scale and undetectable from background levels of turbidity and instream fines. There would be no measurable effects to aquatic habitat quality. Growth of native herbaceous vegetation during the first growing season after treatments would reduce the risk of fine surface erosion delivered to stream channels in subsequent years.

Increases in turbidity and instream fines are expected to be minor and dispersed. There is low probability that increases in turbidity and fine sediment amounts generated from project actions would adversely affect patterns of migration, reproduction, or rearing of aquatic species. In context of existing aquatic habitat conditions, sediment and turbidity-related effects of the project will be of low magnitude and of a quantity that could not be meaningfully measured or evaluated.

There would be no expected measurable changes to chemical contamination/nutrients physical barriers, instream large woody debris, pool frequency, off-channel habitat, refugia, streambank condition floodplain connectivity, drainage network, road density and location or disturbance history from the activities proposed in this alternative. The long-term trend would be a slight improvement in overall riparian and aquatic conditions in the action area because of the reduction in non-native and invasive tamarisk plants.

Cumulative Effects for Both Action Alternatives

Cumulative Watershed Effects (CWE) were examined for the project and considered the disturbance history as well as ongoing and reasonably foreseeable future actions of both private and public lands in the action area.

Riparian and aquatic habitat conditions throughout the LPNF have changed over time and will continue to be influenced by natural events such as rainfall and wildfire. Rainfall in Southern California has been and continues to be highly variable. Fires were common throughout history, and heavy rainfall following fires has delivered variable amounts of sediment to stream systems. High erosion rates following large and severe wildfires have altered stream channels and have also altered riparian vegetation types or riparian vegetation communities within NFS lands.

Reasonably foreseeable future and ongoing federal actions considered for the cumulative effects analysis for the project include the following: recent and on-going vegetation treatment activities including prescribed burning, and other fuels reduction activities on NFS lands. There is extensive recreation use within the analysis area including hiking, fishing, camping, and hunting. Non-recreation uses include grazing, private property inholdings, transmission lines and communication sites. Dam and reservoir construction on major river systems has reduced the amount of available fish habitat by blocking passage to areas historically occupied by anadromous fish. These facilities will remain into the foreseeable future and tamarisk removal actions will have no bearing on them.

Numerous state and private human activities also play a large role in affecting riparian and aquatic habitats and include fuels reduction projects on private lands, recreational use, roads, trails, grazing, agriculture, waterway channelization, instream aggregate extraction, and urban development. All these activities have significant impacts to aquatic habitats in the major rivers systems including the Salinas, Santa Maria, Santa Ynez and Santa Clara Rivers. Proposed actions combined with other federal actions and activities on private lands within the action area are not expected to add additional negative effects to aquatic species.

Herbicides are commonly applied on lands other than National Forest system lands for a variety of agricultural, landscaping and invasive plant management purposes. Herbicide use occurs on tribal lands, state and county lands, private forestry lands, rangelands, utility corridors, road rights-of-way, and private property. No requirement or central reporting system exists to compile invasive plant management information on or off National Forests in California. Accurate accounting of the total acreage of invasive plant treatment for all land ownerships is unavailable. Chemical treatments on NFS lands are scattered across the watersheds making it unlikely that herbicide concentrations would be additive with similar treatments at the watershed scale. The potential for cumulative effects is negligible due to the implementation of BMPs that limit direct and indirect effects, the spotty and distributed nature of the treatments, and the dilution over time and space by mixing and addition of inflow downstream.

Negative short-term impacts of the Project on watershed conditions are minor. Post-project cumulative watershed risk remains low as treatment areas are small and are dispersed spatially (less than 1% of any 5th-field watershed is proposed for treatment). Long-term, the Project will result in improved watershed conditions and will allow more natural stream channel and riparian area processes to occur. Design features and BMPs that reduce potential risk and disturbance will be used during project implementation. The treatments will take place over several years, further reducing the risk and disturbance in any given year. Additionally, the slightly elevated surface erosion levels resulting from pulling of tamarisk plants are expected to return to near pre-project levels within one season post treatment. The small short-term reduction in stream shade is not of a magnitude to have measurable effects to stream temperature. As native plants re-colonize treatment areas near streams, effective stream shade is expected to increase in the long term. Treatments take place on NFS lands which are less disturbed than developed areas within the sub-watersheds.

Treatments also result in improvement of stream channel function and improvements to riparian area structure and function. Project actions are not likely to contribute to changes in runoff response in action area watersheds and are not expected to contribute to increases in peak/base flows by a detectable level. Project treatments would not contribute cumulatively to other effects because negative effects would be minor, dispersed, and of relatively short duration and, therefore, discountable at the site scale and field watershed scales. Tamarisk removal would provide specific benefits to stream systems and riparian zones in general that would contribute to favorable cumulative conditions, improving water availability, channel morphology processes and riparian zone structure and function. Project activities move treated RCAs towards being more resilient to disturbance which may lead to reduced impacts from future large disturbance events such as flood and fire.

Determinations (Summary)

Activities proposed for the Tamarisk Removal Project would have an overall neutral effect at both the site scale and 5th-field watershed scale on aquatic habitat indicators including chemical contamination, physical barriers, LWD, pool frequency, off channel habitat, refugia, width to

depth ratios, streambank condition, floodplain connectivity, peak/base flows, drainage network, road density and location and disturbance history.

The analysis determined that there would be a short-term, slightly negative effect to the temperature, turbidity and substrate indicators. This is due to removal of tamarisk vegetation that may be providing shade and the possibility of minimal amounts of fine sediment delivery to streams near aquatic habitats resulting from hand pulling of small tamarisk plants. Changes in stream temperature are not expected to be measurable and amounts of fine sediment are not expected to be distinguishable from background levels, thus negative effects are expected to be of low intensity and low duration. The effects to aquatic species habitat are expected to be negligible. Over the long term there would be a positive trend toward improved RCA conditions due to long term increases in native vegetation and a trend towards more natural stream morphology processes.

Threatened and Endangered Species

Project actions may affect but are not likely to adversely affect SCCC steelhead, SC steelhead, arroyo toad, or California red-legged frog or their designated critical habitats.

Sensitive Species

Project actions may impact individuals but would not cause a trend towards federal listing or a loss of viability of Pacific lamprey or arroyo chub.

Wildlife

This section is based on information from the Terrestrial Wildlife BE/BA for the Los Padres National Forest Tamarisk Removal Project (Hill 2014).

USFWS Threatened, Endangered, Candidate, Proposed, and USFS Sensitive wildlife species known or suspected to occur based on available habitat are included in the analysis. For species not carried forward in the analysis, the rationale why is provided in the wildlife report for this project. Those wildlife species known or suspected to exist in the project area or that may be affected by the implementation of the project are carried forward in the analysis.

Within the LPNF boundary, Critical Habitat also exists for several terrestrial wildlife species. These include the California condor (Final 1976), least Bell's vireo (Final 1994), southwestern willow flycatcher (Proposed 2013). Within the project area reaches, Critical Habitat exists for the following:

- California condor (Sisquoc River, Sespe Creek, and lower Piru Creek);
- Least Bell's vireo (Mono Creek/Santa Ynez River);
- Southwestern Willow Flycatcher (Santa Ynez River and lower Piru Creek).

Affected Environment

Species Assessments – ESA-listed Species

Least Bell's Vireo

The Least Bell's vireo is a riparian-dependent, migratory songbird (CWHR 2008; USFWS 1998). As a result of habitat loss, the species' range has contracted and become fragmented, and

brown-headed cowbird parasitism further exacerbates the decline (ibid). The population estimate is on an upward trend in southern California (Kus et al. 2010).

It is usually found near water and nests and feeds in thickets associated with willow, cottonwood, baccharis (CWHR 2008); habitat structure is more important than actual species for habitat selection, and includes both a canopy and dense shrub layer (USFWS 1998).

It arrives at breeding habitat near the end of March from wintering ground in Mexico, and it stays through late August (ibid). Egg laying peaks in May and early June; young fledge nearly two weeks after hatching (ibid).

Activities that threaten the species and outlined in the draft recovery plan (USFWS 1998) include: removal or destruction of riparian vegetation; thinning of riparian growth, especially near ground level; removal or destruction of adjacent upland habitats used for foraging; and, increases in human-associated or human-induced disturbances. Nesting adults are apparently somewhat tolerant of disturbances and minor habitat alteration (Kus et al. 2010). Recovery actions (USFWS 1998) mention non-native plant species, including tamarisk, as a threat.

There is one occurrence of the least Bell's vireo on the Forest, at Agua Caliente Canyon near the confluence with the Santa Ynez River. Forest habitat databases indicate there is suitable and occupied habitat on the LPNF. Suitable habitat is available across the Forest in appropriate sites. Occupied habitat is concentrated along the Santa Ynez River, Mono Creek, and Agua Caliente Canyon. Forest critical biological habitat exists on Mono Creek, the Santa Ynez River just below the confluence with Mono Creek, and in nearby Indian Creek.

Critical Habitat

Critical Habitat for the least Bell's vireo was designated in 1994 (USFWS 1994). Least Bell's vireo critical habitat exists in the project area and may be treated. It is located on the Santa Ynez River above and below Mono Creek, and in Mono Creek at that location.

Least Bell's vireo critical habitat primary constituent elements are (USFWS 1994):

- Space for individual and population growth, and for normal behavior;
- Food, water, or other nutritional or physiological requirements;
- Cover or shelter;
- Sites for breeding, reproduction, rearing of offspring; and generally; and
- Habitats that are protected from disturbance or are representative of the historic geographical and ecological distribution of a species.

These features can be found in riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats (ibid). Activities that may constitute destruction or adverse modification of vireo critical habitat include (ibid):

- Removal or destruction of riparian vegetation;
- Thinning of riparian growth, particularly near ground level;
- Removal or destruction of adjacent chaparral or other upland habitats used for foraging, and;
- Increases in human-associated or human-induced disturbance.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered March 29, 1995 (USFWS 2002). It breeds in dense trees and shrubs in riparian communities, called forested or scrub-shrub wetlands (ibid). Causes of habitat loss include changes in water and soil chemistry and disruption of natural hydrologic cycles and the establishment of non-native plants (USFWS 2002) (such as tamarisk).

The southwestern willow flycatcher's range is similar to its historical range, but the amount of habitat within that geographic area is much reduced (USFWS 2002). In California, it had been common in lower elevation riparian areas in the southern third of the state (ibid).

This flycatcher is known to nest in tamarisk and in stands with tamarisk otherwise present in the understory or overstory (USFWS 2002). Nesting success in tamarisk is similar to success in native vegetation (ibid). Where tamarisk is used, it is suitable when it is tall and dense, the site is mixed with native vegetation, and surface soils are wet or water is present (ibid).

Tamarisk removal can adversely affect southwestern willow flycatchers where tamarisk is mixed with native vegetation (USFWS 2002) in particular if, after removing tamarisk, there is no suitable nesting habitat for birds returning the subsequent year.

The southwestern willow flycatcher arrives at breeding sites from early May through mid-June and young fledge from mid-June through mid-August (USFWS 2002).

There are numerous occurrences of the southwestern willow flycatcher in the project area. State records indicate observations along Mono Creek down to the confluence with the Santa Ynez River. Forest records place the willow flycatcher along the Santa Ynez River, Upper Sespe Creek, and Upper and Lower Piru Creek, but do not indicate if the records are the endangered southwestern subspecies. Suitable willow flycatcher habitat exists in all project areas except the Arroyo Seco River on the Monterrey Ranger District.

Critical Habitat

Final critical habitat for the southwestern willow flycatcher occurs in the Santa Ynez River below Gibraltar Reservoir and in lower Piru Creek immediately above Piru Lake.

Blunt-nosed leopard lizard

Blunt-nosed leopard lizards are found in the San Joaquin Valley and adjacent suitable habitat (CWHR 2008). They were listed as endangered in 1967 (USFWS 2010).

Suitable habitat for this lizard is sandy washes (CWHR 2008) and the associated sparse vegetation (USFWS 2010). Dense vegetation, like that found when exotic grasses dominate the landscape, hinder lizard movement and increase likelihood of predation (ibid). It is not known whether dense, young tamarisk patches similarly inhibit movement, but we would not expect leopard lizards to occur in riparian areas. The inherent density of riparian vegetation would decrease habitat suitability for the blunt-nosed leopard lizard.

Modeled habitat includes sandy soils, low elevation and relatively flat ground, and with sagebrush or oak brushland/annual grassland. Forest Service modeled habitat is outside the project area except for one 15-acre patch, located at the downstream end of the Cuyama Valley. Therefore, suitable habitat is unlikely to be encountered in the project area.

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley (USFWS 2010). As a result of habitat loss due to agriculture, its distribution is thought to be less than 15 percent of its

historical level (ibid). In the project area vicinity, the state has records in the San Joaquin Valley, but not on the National Forest (CNDDB 2012). The Forest Service does have records, but none since 1983. These observations were near the upper Cuyama River, including the Lockwood Valley area.

Kern Primrose Sphinx Moth

The Kern primrose sphinx moth was listed as threatened in 1980 (USFWS 2007). Since listing, new populations have been located, although the threats to those populations and persistence remain.

This sphinx moth basks on the ground in sandy washes until it warms enough to fly, a behavior that makes individuals at risk for injury or being killed during cooler (less than 58 degrees Fahrenheit) weather where people may be driving or hiking through occupied habitat (Jump et al. 2006). Once active, females will lay eggs on the sandy ground or short plants (ibid). Larvae will make their way to a specific host plant (Camissonia campestris) where they will develop through several stages (ibid). These plants, or food plants, are particular to certain substrates found in a few places in the southern California region (Jump et al. 2006; USFWS 2007). The plant, commonly called a field primrose or suncup, has specific habitat features, as well.

The Kern primrose sphinx moth is known from a few locations in southern California: the Walker Basin, the Carrizo Plain, and the Cuyama Valley. Sites where it is found in the Cuyama Valley near the LPNF border include washes flowing west from the LPNF to the Valley near Ventucopa, and washes flowing north to the Valley near New Cuyama (USFWS 2007). Habitat features where the moth is found in the Cuyama Valley include sandy washes with open areas for basking; young alluvial soils that support the larval foodplant; loose soil such that larvae can burrow and build pupal chambers; sufficiently dense growth of the foodplant so that larvae can make travel from patch to patch (ibid). Gently sloping washes are preferred habitat (Jump et al. 2006; USFWS 2007). Sandy alluvial soils that are outside annually flooded channels are reported as optimal habitat (Jump et al. 2006). This means the preferred locations for host plant growth and larval burrowing sites must be recently formed; older alluvial soils are too compacted for the larvae to burrow, even if Camissonia campestrisis present (ibid). Also, south of Highway 33 and the intersection of the Ventura County line, Camissonia campestris is less common, and is replaced by another primrose species; it is unknown whether this other species is a suitable larval host (ibid).

There are several state records of this moth in the Cuyama Valley off the LPNF. On the LPNF there are two recorded observations in the database. The first is near where Deer Park Canyon meets the Cuyama Valley, near Ventucopa. The second, is south of there, near Highway 33 and Apache Canyon. The observation near Apache Canyon is near a proposed treatment area.

Species Assessments –Forest Service Sensitive Species

Willow flycatcher

Willow flycatchers are found across much of North America, from the Northeast US west to southern British Columbia, Washington, Oregon, and northern California, and south along the Rocky Mountains and Sierra Nevada Mountains (Sedgwick 2000).

In California, the willow flycatcher is found in the north, along the Sierra Nevada Mountains, and in isolated stream reaches in the southwest.

In the project area, there is suitable willow flycatcher habitat in all project reaches except for those on the Monterrey District. There are three willow flycatcher records in the project area, last detected in 1990 or 1991 (CNDDB 2012). The Forest Service has almost 40 records along the Santa Ynez River, Sespe Creek, and upper and lower Piru Creek. All Forest Service records are from 2001 or earlier.

Suitable habitat is found in dense willow thickets (CWHR 2008) or comparably structured vegetation, which may include tamarisk. Preferred sites are usually found near water, such as wet meadows, ponds, or stream backwaters (CWHR 2008). In the western US, it is riparian dependent (Sedgwick 2000). It is reasonable to assume willow flycatchers use tamarisk, have similar nesting success, and the impact from tamarisk management is like that of the southwestern willow flycatcher. Due to the low density of tamarisk, in particular the size used for nesting, it is highly unlikely that tamarisk contributes measurably to nesting willow flycatcher nesting habitat.

The territory and breeding season home range is about 1.7 acres (range 0.8 to 2.9 acres) (CWHR 2008). Adults arrive on breeding areas in May through June, and leaves for Central and South America in August or September (CWHR 2008; Sedgwick 2000). Egg laying peaks in June and young fledge at about two weeks (CWHR 2008; Sedgwick 2000).

California Legless Lizard

The California legless lizard is distributed from the lower Sacramento River valley south along western foothills of the Sierra Nevada Range and San Joaquin Valley to the western Mojave Desert, Tehachapi Mountains, and the southern California mountains (CWHR 2008; USDA FS 2005). It ranges from sea level to 3,500 feet, but is known up to 5,700 feet (USDA FS 2005).

The legless lizard burrows in loose, sandy soil with sparse vegetation, chaparral, pine-oak woodlands, coastal scrub, or riparian zones (USDA FS 2005). Rocks, logs, and leaf litter provide essential soil moisture (ibid). Sparse, open, and moderate stage class vegetation and all stages of coastal scrub provide medium habitat suitability (CWHR 2008).

Legless lizards can be active throughout the year in particular those at lower elevations near the coast (USDA FS 2005; CWHR 2008). They forage for insect larvae, small insects, and spiders (CWHR 2008).

Breeding occurs from early spring through July; up to four live young are born in September to October (USDA FS 2005).

State records of the legless lizard are known from in and near the four southern California National Forests (CNDDB 2011) up to 4,900 feet (USDA FS 2005). On the LPNF, they are known from the Mount Pinos, Santa Barbara, and Ojai Ranger Districts. Within the areas targeted for treatment for this project, the legless lizard is recorded near Mono and Lockwood Creeks.

Two-striped Garter Snake

The two-striped garter snake is distributed along the Pacific coast from the Monterey area south to Baja California (NatureServe 2013).

This snake is associated with densely vegetated streams (NatureServe 2013 CWHR 2008) from sea level to 8,000 feet in elevation (CWHR 2008). It hunts during the day along streams for fish,

fish eggs, amphibians and their larvae, and opportunistically takes small mammals and invertebrates (ibid). It can be found near perennial or intermittent streams (USDA FS 2005).

Mating occurs in March and April and an average of about 15 young is born in late July through August (USDA FS 2005). During the winter they hibernate, but may come out temporarily on warm days (ibid).

It is now present on about 60 percent of its historic distribution (USDA FS 2005). Sources for the decline in distribution include urban and agricultural development, reservoir construction, and stream channel lining (USDA FS 2005; CWHR 2008). Despite the decline in distribution, populations on the southern California National Forests remain viable (USDSA FS 2005).

State records of the two-striped garter snake are located south of the Monterey Bay area through San Diego County, including the Santa Lucia, Santa Barbara, and Ojai Ranger Districts. In the project vicinity, there are state observational records at Alamo and Branch Creeks; the lower Cuyama River, the Santa Ynez River and Sespe Creek. Forest records exist on each Ranger District. Records near the project are at Branch Creek, lower Sisquoc River, the Santa Ynez River and Mono Creek, the Upper Cuyama River at Nuevo Creek, Upper Sespe Creek and Piru Creek.

Ring-necked Snake

The ring-necked snake includes two subspecies, both of which occur on the LPNF. The subspecies have similar life histories. The ring-necked snake can be found in woodlands, chaparral, forests, and grasslands, in addition to agricultural and other human developments (USDA FS 2012). In dry areas like its southern California range, a permanent source of water is required and they are frequently associated with intermittent streams (ibid). Cover is important and includes bark, logs, and rocks (ibid) and generally move through open areas by utilizing litter and vegetation (ibid; CWHR 2008).

Salamanders are a large part of the ring-necked snake diet, and as such the distribution microhabitat use of the snake is similar to that of salamanders in southern California (CWHR 2008).

They are typically inactive during high or low temperatures and very dry weather (USDA FS 2012).

Southern Pacific Pond Turtle

The southern Pacific pond turtle inhabit rivers, lakes, wetlands, and other bodies of water from sea level to about 6,500 feet (USDA FS 2005). In the water it forages, regulates its temperature, and avoids some predators, and it requires logs, rocks, shoreline, and vegetation to bask for thermoregulation (ibid). Primary aquatic habitat is moving water with persistent and deep pools (Stephenson and Calcarone 1999).

Pond turtles nest in unshaded upland sites up to 660 feet from water on slopes less than or equal to 25 degrees (USDA FS 2005). Where they do overwinter on land, upland sites are used, up to 1,640 feet from water (ibid); in southern California they may be active year round (Stephenson and Calcarone 1999).

The primary threat to southern pond turtles is habitat loss, which has occurred particularly in lower elevation zones (Stephenson and Calcarone 1999). This habitat loss is most associated with water developments and stream channelization which has reduced the availability of deep,

persistent pools (ibid), and is also related to agricultural development, urbanization, and flood control and water diversion (USDA FS 2005).

Predatory fish, bullfrogs, which target juvenile turtles and specimen collecting, near easily-accessible locations, also threaten populations of pond turtles (USDA FS 2005). Nesting habitat can be destroyed by livestock grazing and nests trampled by recreating people (Stephenson and Calcarone 1999).

Pacific pond turtles are distributed west of the Cascade and Sierra Nevada Mountains from British Columbia to Baja California (USDA FS 2005). The southern Pacific pond turtle ranges south of the San Francisco Bay area to northern Baja Mexico (ibid). In southern California they are more numerous northwest of the Santa Clara River, which drains Sespe and Piru Creeks, which, incidentally have some of larger populations (ibid). Forty to fifty streams on the LPNF have populations of pond turtles (ibid) although there are no official Forest records of southern Pacific pond turtles. State records do exist throughout the Forest and near the project reaches (CNDDB 2012), and it is likely they occur in suitable habitat.

Populations have declined severely since the 1960s (USDA FS 2005). Population sustainability is threatened because about one-fifth of the know population localities are reproductively viable (ibid). Populations on the LPNF are generally more abundant and can likely be conserved through general riparian area management (ibid).

Extensive patches of tamarisk may alter water levels and adversely impact pool formation and depth, thus adversely impacting southern Pacific pond turtles (NatureServe 2013). An extensive infestation of tamarisk may also shade in basking and nesting areas. The current extent of tamarisk does not create such a severe situation.

Yellow-blotched ensatina

The yellow-blotched ensatina (Ensatina eschscholtzii) has a widespread North American distribution from Baja California to Canada. The subspecies E.e. croceater is found on the LPNF and vicinity near Mt. Pinos, Frazier Mountain, and Alamo Mountain (USDA FS 2005).

Despite that the ensatina is rarely encountered in its range and its abundance in not well known it is believed the species is well-distributed (ibid).

Little is known of the subspecies' habitat and life history, but information about other subspecies is applicable. General habitat associations include deep, shaded north-south-oriented canyons; steep slopes with herb, rock, and down woody debris cover. Organic matter such as leaf litter and woody debris are important for temperature and humidity regulation (ibid). Vegetative associations include conifers and oaks of moderate to large size and canopy moderate canopy cover (CWHR 2008). In dry regions of its distribution, like southern California, it is found on cool and moist locales such as north-facing slopes (USDA FS 2005). They apparently avoid standing and free-flowing water and prefer moist, but unsaturated, soils (USDA FS 2013). Ensatinas are most active at night and retreat to cover during the day (USDA FS 2005).

Environmental Consequences

For most of the wildlife species the potential effects to them and their habitat will be related to habitat modification from pulling/cutting down tamarisk and from crews hiking in to and around project sites while conducting the removal. For certain amphibians, the risk from chemical exposure are analyzed, as well.

Long term effects from tamarisk taking over not only a site but also much of a stream course are difficult to quantify as they relate to wildlife, but can be discussed in a qualitative manner. These are discussed in the no action alternative effects and impacts sections.

The result of not removing tamarisk is that individual tamarisk plants will grow larger, and collectively, tamarisk would spread along the watercourse and become denser over time. The result of that growth is likely to decrease the in stream flow as water is lost to evapotranspiration; lower the water table because tamarisk can draw water from deep underground; increase salinization in the area under the tamarisk canopy, which in turn impairs growing conditions for native vegetation, and in turn, habitat for native fauna.

Effects Analysis – ESA-listed Species

Least Bell's Vireo and Southwestern Willow Flycatcher

No Action Alternative

Direct and Indirect Effects
Because no activity is proposed for this alternative, there would be no direct effects. Individual tamarisk will continue to grow and collectively tamarisk would spread along the watercourse. Should tamarisk become the dominant tree and shrub in the riparian environment, habitat quality for both species would be reduced because preferred nesting and foraging habitat plant associations would change. Willow flycatchers are known to nest in tamarisk; however a broad-scale change in habitat as a result of a plant species change and the associated long term hydrological changes would make other aspects of habitat unsuitable. Preferred flycatcher habitat also includes standing water near nest sites, and an extreme tamarisk infestation could potentially lead to a dry site with no surface water.

Cumulative Effects
Loss of riparian habitat has caused a reduction in the range of these two riparian-dependent species. Tamarisk infestations along watercourses can further reduce the available habitat and reduce habitat quality for these birds. Should tamarisk infestations come to dominate these riparian areas, the loss of habitat for these species would be added cumulatively to the previous losses over the last century and a half to agriculture, development, and water resource management. Further reductions in habitat would impair recovery efforts for these species.

Action Alternatives

Direct and Indirect Effects
There would be no direct effects to either bird species because treatments are proposed to occur outside the breeding season. It is possible that a tree previously used as a nest site would be cut down or hypo-axed, but such circumstances are expected to be rare, and currently there are ample nesting sites available.

Both action alternatives would reduce the number of tamarisk plants in the riparian corridors. Native vegetation would have potentially more resources (space, water, light, for example). This in turn would maintain or improve the habitat quality already existing for the Bell's least vireo and southwestern willow flycatcher. Currently, because the amount of tamarisk is low, an improvement in habitat quality would be inconsequential.

Cumulative Effects
A reasonable cumulative effects area is the LPNF boundary. These birds are riparian-dependent, and their distribution is in turn dependent on habitat available across the Forest's stream reaches. Ten years, the implementation and monitoring period, is a reasonable time period to consider because the effects from the actions occur immediately.

Across the Forest, either action alternative would reduce the presence of tamarisk in suitable habitat, effectively improving habitat for each species. Cumulatively, this would maintain or improve habitat suitability on the Forest, and would not contribute to further habitat loss. When viewed in light of other tamarisk removal projects, the proposed action is likely to cumulatively benefit these species by curtailing the loss of preferred habitat.

Least Bell's Vireo Critical Habitat
The critical habitat listing specifically mentions thinning or selectively removing vegetation that could cause vireos to abandon an area because suitable nesting sites are absent or reduce reproductive success because habitat quality is reduced. Also, recreation increases could cause a decrease in reproductive success directly or indirectly through increased cowbird parasitism (ibid).

The tamarisk removal project will remove riparian vegetation through applying herbicide to larger individual tamarisk and by pulling small tamarisk. However, given the existing low density of tamarisk, thinning or selectively removing an occasional large tamarisk or pulling small tamarisk specimens will not greatly reduce the overstory shrub cover or understory cover associated with dense, small diameter riparian vegetation, and will therefore not reduce the available nesting and foraging habitat in the riparian areas. Because crews would be implementing the removal after the breeding season, there would be no increase in recreation during a critical time period where the vireos are susceptible to disturbance. Treatment activity is not expected to lead to an increase in recreation in designated critical habitat. The overall result of the tamarisk removal would be beneficial in that native vegetation, to which the vireo is suited, in designated critical habitat would continue to function with its natural components.

Blunt-nosed Leopard Lizard and Kern Primrose Sphinx Moth

No Action Alternative

Direct and Indirect Effects
The no action alternative would not directly affect the blunt-nosed leopard lizard and Kern primrose sphinx moth because no activities would take place. Their habitat is sandy washes, not riparian areas affected by tamarisk.

Cumulative Effects
There are no cumulative effects because there are no direct and indirect effects.

Action Alternatives

Direct and Indirect Effects
Potential direct and indirect effects from either action alternative are associated with access to and from treatment areas for tamarisk removal. Crews must hike into the riparian sites to treat or pull tamarisk, and en route may travel through suitable or occupied leopard lizard or sphinx moth habitat. The most severe impact of this action would be the trampling death of an individual lizards or moths; less severe would be damage to habitat and disturbance to an individual.

However, both species are not expected to occur in the treatment areas based on very limited observations and little suitable habitat. Direct or indirect effects to these species are extremely unlikely and therefore discountable.

Cumulative Effects
There would be no cumulative effects to the blunt-nosed leopard lizard or the Kern primrose sphinx moth because the direct and indirect effects are discountable.

Effects Analysis – Forest Service Sensitive Species

Willow Flycatcher

No Action Alternative

Direct and Indirect Impacts
No activity is proposed for this alternative, and as such there would be no direct impacts. Individual tamarisk will continue to grow and collectively tamarisk would spread along the watercourse. Should tamarisk become the dominant tree and shrub in the riparian environment, habitat quality would be reduced because preferred nesting and foraging habitat plant associations would change. Willow flycatchers are known to nest in tamarisk; however a broad-scale change in habitat as a result of a plant species change and the associated long term hydrological changes would make other aspects of habitat unsuitable. Preferred flycatcher habitat also in includes standing water near nest sites, and an extreme tamarisk infestation could potentially lead to a dry site with no surface water.

Cumulative Impacts
A reduction in habitat quality or loss of habitat altogether due to a tamarisk infestation could reduce the range of this bird, in particular in the southwestern margin of its range. Should tamarisk infestations dominate these riparian areas, the loss of habitat and reduced habitat quality for the willow flycatcher would be added cumulatively to the previous losses over the last century and a half to agriculture, development, and water resource management. The willow flycatcher is widespread in North America, however. Habitat quantity and quality may be reduced over the long term at the local scale under the no action alternative, but the no action alternative itself would is unlikely to contribute to a downward trend or loss of species viability.

Action Alternatives

Direct and Indirect Impacts
There would be no direct impacts to the willow flycatcher because treatments are proposed to occur outside the breeding season. It is possible that a tree previously used as a nest site would be cut down or hypo-axed, but such circumstances are expected to be rare, and there are ample nesting sites available.

Both action alternatives would reduce the number of tamarisk plants in the riparian corridors. Native vegetation would have potentially more resources (space, water, light, for example). This in turn would maintain or improve the habitat quality already existing for the willow flycatcher. Currently, because the amount of tamarisk is low, an improvement in habitat quality would be discountable.

Cumulative Impacts
A reasonable cumulative impacts area is the LPNF boundary. This bird is riparian-dependent, and its distribution is in turn dependent on habitat available across the Forest's stream reaches. Ten years, the implementation and monitoring period, is a reasonable time period to consider because the impacts from the actions occur immediately.

Across the Forest, either action alternative would reduce the presence of tamarisk in suitable habitat, effectively improving it for the flycatcher. Cumulatively, these would maintain or improve existing habitat suitability on the Forest, and not contribute to further habitat loss. When viewed in light of other tamarisk removal projects, the proposed action is likely to cumulatively benefit these species by curtailing the loss of preferred habitat.

California Legless Lizard, Two-striped Garter Snake, Ring-necked Snake, and Southern Pacific Pond Turtle

No action Alternative

Direct and Indirect Impacts
The no action alternative would not directly or indirectly impact the California legless lizard, two-striped garter snake, ring-necked snake, and southern Pacific pond turtle.

It is plausible that a severe tamarisk infestation could reduce surface water flow in the project reaches, which would impact habitat suitability for the two-striped garter snake, ring-necked snake, and southern Pacific pond turtle because there would be less surface water and shallower pools. Fewer open basking sites for turtles may be available if the tamarisk density is very high.

There would be no indirect impacts to the California legless lizard because their habitat is not found in areas affected by tamarisk.

Cumulative Impacts
The cumulative impacts area used for this project is the LPNF boundary and the time period is ten years during the implementation and monitoring period.

There would be no cumulative impacts to the California legless lizard, two-striped garter snake, ring-necked snake, and southern pacific pond turtle because the no action alternative has no certain and measureable direct and indirect impacts.

While there would be no measureable impacts from the no action alternative, over time, a severe tamarisk infestation in the affected drainages could adversely impact habitat for the California legless lizard, and to a greater degree, the two-striped garter snake, ring-necked snake, and the southern Pacific pond turtle, thus detrimentally impacting habitat across the species' distribution on the Forest and within their ranges. The impacts would be the result of potential changes in hydrology as a result of riparian areas dominated by tamarisk, thus reducing preferred vegetation associations and available surface water.

Action Alternatives

Direct and Indirect Impacts
Potential direct and indirect effects from either action alternative are primarily associated with access to and from treatment areas for tamarisk removal. Crews must hike into the riparian sites to treat or pull tamarisk, and en route may travel through suitable or occupied habitat. The most severe impact of this action would be the trampling death of an individual lizards or snakes; less

severe would be disturbance to an individual. It is unlikely that habitat for any of these species would be damaged. It is unlikely that so many individuals would be injured or killed as to cause a threat to the local populations. If anything, individuals may be disturbed, causing them to flee the vicinity of the access route. That in itself is unlikely to cause an adverse impact to the ability of the individual to survive or affect reproductive success.

Because the southern Pacific pond turtle is relatively large, it is easily observed and avoided while walking and thus very unlikely to be injured by people entering and leaving work sites. When on land, the turtle uses open basking sites, which are not likely to have tamarisk present. If the turtle were present in the area while work was being conducted, it may be inadvertently disturbed by people. However, given the low density of the tamarisk to be removed, any such disturbance would be short-lived.

Over the long term, removing tamarisk would be beneficial for the two-striped garter snake, ring-necked snake, and southern Pacific pond turtle because more surface water would be available and native vegetation would remain.

Cumulative Impacts
Currently tamarisk does not broadly infest habitat for these species; removing existing tamarisk would not greatly change habitat for these species. Thus, this project would not add measureable cumulative impacts to these species or their habitats. Potential disturbance would be limited in time and space and as such would not add cumulatively to other activities occurring on the Forest.

Yellow-blotched ensatina

No action Alternative

Direct and Indirect Impacts
The no action alternative would not directly or indirectly impact the yellow-blotched ensatina. A severe tamarisk infestation would not impact ensatina habitat because it is found in oak and conifer upland habitats rather that riparian areas.

Cumulative Impacts
Because there would be no direct or indirect impacts from the no action alternative, there would not be any indirect impacts.

Action Alternatives

Direct and Indirect Impacts
Habitat for the ensatina would not be impacted by the tamarisk removal project because its habitat would not be directly impacted by treatment. Ensatinas are typically active at night, and during the day would likely be burrowed under leaf litter, logs, or rocks. Indirect impacts to habitat are very unlikely because personnel will be using established trails to access treatment locales. It is possible that individual ensatinas may be inadvertently injured or killed by personnel travelling to and from the treatment sites if they cross through suitable habitat. However, potential direct impacts are extremely unlikely because foot traffic would occur during the ensatina’s non-active period, foot traffic would only incidentally cross ensatina habitat, and there is a low probability of interaction due to the low density of ensatina populations, in general.

Cumulative Impacts

The cumulative impacts area for the ensatina is the suitable habitat found across the LPNF. There would be no change to suitable habitat as a result of this project. Potential disturbance or injury from personnel travelling into and out of treatment areas is an extremely unlikely threat, and therefore would not contribute cumulatively to impacts from other activities on the Forest. The potential impacts from this project are short in duration and limited to very small geographic areas relative to the ensatina's range.

Determinations

It is determined that either action alternate of the Tamarisk Removal Project may affect but is not likely to adversely affect the following species or their designated critical habitat:

Least Bell's vireo, Southwestern willow flycatcher

This determination is based on the following rationale:

Individual birds will not be affected because proposed treatments would occur after the birds have migrated away for the season.

The amount of tamarisk present does not make up large portions of suitable habitat, and as such, removing individual large trees or shrubs, or pulling small specimens will not alter nesting or foraging habitat suitability for either bird.

In the long term, removal of tamarisk will maintain habitat with the plant species with which the birds are adapted.

Over the long term, preventing tamarisk from becoming established, widespread, and mature would maintain surface water availability that is an important feature of southwestern willow flycatcher habitat.

For Bell's least vireo and southwestern willow flycatcher, the long term effects of not removing tamarisk are adverse because native, preferred vegetation would be reduced, which may lead to reduced suitability and a reduction in available habitat in their range. This would reduce recovery efforts for each species.

It is determined that either action alternate of the Tamarisk Removal Project may affect but is not likely to adversely affect the following species or their designated critical habitat:

Blunt-nosed leopard lizard and Kern primrose sphinx moth

This determination is based on the following rationale:

The probability of direct and indirect effects from project implementation is very small and is related to non-motorized access to the treatment sites. There are likely few, if any individual lizards or moths present in the project area because habitat in the project area is small in area, if present at all.

The treatments proposed under either of the action alternatives would not affect blunt-nosed leopard lizard or Kern primrose sphinx moth habitat.

It is determined that the Tamarisk Removal Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the following species in the planning area:

Willow flycatcher

This determination is based on the following rationale:

Individual birds will not be affected because proposed treatments would occur after the birds have migrated away for the season.

The amount of tamarisk present does not make up large portions of suitable habitat, and as such, removing individual large trees or shrubs, or pulling small specimens, will not alter nesting or foraging habitat suitability for either bird.

In the long term, removal of tamarisk will maintain habitat with the plant species with which the birds are adapted.

Over the long term, preventing tamarisk from becoming established, widespread, and mature would maintain surface water availability that is an important feature of willow flycatcher habitat.

For the willow flycatcher, the long term impacts of not removing tamarisk are adverse because native, preferred vegetation would be reduced, which may lead to reduced suitability and a reduction in available habitat at the southwestern edge of their range.

It is determined that the Tamarisk Removal Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the following species in the planning area:

California legless lizard, two-striped garter snake, ring-necked snake, southern Pacific pond turtle, and yellow-blotched ensatina.

This determination is based on the following rationale:

Habitat for each of these species would not be adversely impacted by removal of sparsely populated tamarisk.

Riparian area habitat for the California legless lizard, two-striped garter snake, ring-necked snake, and southern Pacific pond turtle may be within the primary treatment zones. These species are moderately-sized and/or mobile, and could avoid being injured by either moving away from potential disturbance or, in the case of the turtle, is easily avoided because it is easily observed. Given the low density of individuals and the short duration of time in which people will spend in any one treatment area, the risk of injury is low and unlikely to affect wildlife populations.

Individual yellow-blotched ensatina may be disturbed if foot traffic to and from treatment sites passes through suitable habitat. This potential disturbance would be short in duration and limited in space.

Wildlife Management Indicator Species (MIS)

The forest MIS were reviewed in the Tamarisk Removal Project Management Indication Species Report (Hill 2014) and placed into 3 categories in Table 7. MIS that do not have habitat within or adjacent to the project area, or whose habitat will not be affected directly or indirectly by the project will not be further addressed in this report.

Table 7. Management Indicator Species (MIS) Selection for Project Analysis

Forest MIS Species	No habitat in or adjacent to the project area, thus not affected directly or indirectly by the project	Habitat in or adjacent to the project area, but not affected directly or indirectly by the project	Habitat would be affected directly or indirectly by the project
Mule Deer		X	
Mountain Lion		X	
Arroyo Toad			X
Song Sparrow			X
Blue Oak	X		
Engelmann Oak	X		
Valley Oak	X		
Coulter Pine	X		
Bigcone Douglas-fir	X		
California spotted owl		X	
California black oak	X		
White fir	X		

Of the above MIS species only habitat for the arroyo toad and song sparrow have the potential to be affected by the proposal. That effect will be analyzed further.. For the others, the analysis is complete as per the above table in that their habitats will not be affected directly or indirectly by the proposal for the reasons stated in the table.

Song Sparrow

Environmental Baseline

The song sparrow was selected as a Management Indicator Species (MIS) for riparian areas because its abundance is expected to be responsive to management actions and to indicate trends in the status of the riparian biological community, particularly birds (USDA FS 2011a).

Trends in abundance and/or habitat conditions are the measurements for evaluation (USDA FS 2011a). The monitoring method is riparian bird counts and/or habitat conditions (LMP FEIS, Vol. 1. p. 177, Table 433). Abundance trends for song sparrow and habitat condition assessments are expected to help indicate whether National Forest management practices are maintaining healthy riparian ecosystems in the face of the increasing recreation demand (ibid).

The song sparrow is a permanent resident of coastal scrub and riparian brush over most of the forest. The song sparrow is identified by California Partners in Flight as a riparian focal species, and is considered one of the best indicators of riparian health in the western U.S., since over ninety percent of song sparrow nests are found in riparian vegetation (Big Sur Ornithological Lab 2000). In California, song sparrows primarily breed in riparian habitat or coastal and inland wetlands, or coastal scrub along the fog belt where the lack of standing or running water is compensated by moisture from fog (USDA FS 2011a). Dense vegetation is essential for nest sites, foraging and safe retreat from predators (Roberson and Tenney 1993). Distribution of the song sparrow is associated with the presence of water during the breeding season, and the bird is

less abundant where there is less undergrowth present (USDA FS 2011a). The song sparrow forages in leaf litter (ibid). Nests are built in shrubs, subshrubs, forbs/herbs, and grasses (ibid).

Also, riparian habitat is one of the State's most endangered habitat types, with less than five percent remaining as compared to the time of statehood (http://www.werc.usgs.gov/sandiego/flycat.html). In Southern California, only three to five percent of the pre-settlement riparian forest remains, the rest having been converted primarily to farming or urban uses (http://www.fscr.org/html/1996-02.html).

In the overall southern California geographic area, riparian habitats have declined in quality and quantity at low elevations, where they historically were most extensive. Estimates indicate that channelization and diversion of streams in the past century have reduced the extent of riparian habitats in southern California by more than ninety percent. More recently, strong regulatory policies on "no net loss" of wetlands and floodplains have helped to check this decline. The extent of riparian habitats on National Forest System lands is relatively stable (LMP EIS Vol. 1, p. 207).

The health, vigor and structural condition of the riparian vegetation are generally good across the four southern California National Forests, except where affected by large-acreage wildland fires. Foothill riparian areas are cool, pleasant places near large and growing urban populations, so increases in recreation pressure are inevitable. Riparian habitat degradation currently tends to be localized in a few popular, easily accessible areas. Livestock grazing in riparian areas within the National Forests has been substantially reduced during the past fifteen years, resulting in some improvements in vegetation condition (LMP EIS Vol. 1, p. 207).

No other vegetation type in the southern California National Forests has been so drastically altered by human activities as riparian zones. Ecological processes have been altered by the development of water storage and diversion structures, invasion of undesirable nonnative species, urbanization, and, to a lesser extent, livestock grazing, recreation, and mining. Low-elevation streams face greater threats than high-elevation streams because riparian areas and their water flows are more likely to be diverted or altered, more likely to be urbanized, and more likely to be invaded by nonnative plant and animal species (LMP EIS Vol. 1, p. 98).

In-stream water storage and diversions have dramatically reduced the extent of riparian habitats in this region. In fact, approximately 95 to 97 percent of low-elevation floodplain riparian habitat in southern California has been eliminated, and most major streams now contain dams or diversions. In addition, many smaller streams and springs have been dammed or diverted for water supplies and local flood control. Subsurface waters have been heavily tapped for domestic water, lowering water tables and base flows of many springs and streams (LMP EIS Vol. 1, p. 99).

Dams remove riparian habitat directly by inundation, but cause greater habitat degradation by altering downstream hydrologic regimes and sediment budgets. Typically, dams reduce the magnitude and frequency of flood events, thereby increasing base flows, greatly reducing downstream transport of sediment, and altering water temperatures (LMP EIS Vol. 1, p. 99).

The reduction in the magnitude and frequency of flood flows removes key disturbance processes in floodplain and riparian habitats. Many riparian trees (such as white alders, willows, and cottonwood) are short-lived and regenerate on floodplains and stream banks following flooding and sediment deposition. Thus, even though major floods remove vegetation by scouring and

altering channel morphology, they also deposit sediments necessary for plant regeneration and fish spawning (LMP EIS Vol. 1, p. 99).

The interruption of the sediment supply by dams results in the water having greater erosive force, which in turn causes downstream channel incision. Channel incision lowers the water table and increases the vertical distance from the stream to the floodplain. Stream reaches below dams often lack sand and fine gravel and are marked by a series of deep scour pools floored with boulders and mud (Stephenson and Calcarone 1999). Temporary instream levees and sand bars suitable for plant establishment and growth do not form. As a result, many stream and river reaches lack gravels suitable for anadromous fish spawning. As stream incision progresses, stream banks supporting riparian vegetation are undercut and may disappear altogether (LMP EIS Vol. 1, p. 99).

Next to stream-flow alterations, the biggest factor threatening the health of riparian ecosystems is the spread of invasive nonnative plant and animal species. Reservoirs and other artificial aquatic habitats have facilitated the introduction of a wide variety of nonnative aquatic species into stream systems. Collectively, introduced species have caused serious declines in the capability of riverine habitats to support native species (LMP EIS Vol. 1, p. 99).

Concentrated recreation use in some portions of riparian habitats (particularly on the Angeles National Forest) has caused reduced vegetation and increased bank trampling, littering, and pollution. Because foothill riparian areas are cool, pleasant places to escape the summer heat, recreation pressure is inevitable, especially near urban areas (LMP EIS Vol. 1, p. 100).

Land and road development within watersheds also alter natural hydrologic regimes and can cause channel incision. Development decreases the infiltration capacity of watersheds and increases channelized runoff. Roads channel water into ditches, often increasing or altering the amount of water reaching streams. Such alterations increase peak storm runoff and the transport of pollutants and sediments from cleared lands. Additional impacts to riparian systems on Southern Province National Forests includes: livestock grazing and suction dredging and sand/gravel mining (LMP EIS Vol. 1, p. 100).

Los Padres National Forest

The LPNF is the exception to the generally high level of modification of riparian systems in southern California.

Conservation of riparian habitat is a high priority for all National Forests within the Southern Province. The new LMP set a goal to “improve riparian conditions”. The trend for this habitat type is expected to be stable or improving in the South Province.

Sauer et al. (2005) summarize Breeding Bird Survey (BBS) data, which show a declining trend for the song sparrow in California. An average decrease of 0.3 percent per year was noted for the period of 1966-2004, with a decline becoming more evident in the 1980-2004 sampling period (decrease of one percent). These results were not statistically significant. However, they are consistent with what appears to be a nationwide decline in the abundance of this species. There are also downward trends for the California foothills and Los Angeles ranges for these periods. South Coast/Central Coast Bioregions showed an increase of numbers in coastal plain prior to 1944 due to development of water systems (Nolan 1968).

Song sparrow abundance is negatively correlated with grazing and recreation use of riparian understory habitat (Marshall 1948) and positively correlated with the abundance of herbaceous

vegetation (Ballard and Geupel 1998). Abundance trends for song sparrow and habitat condition assessments will help indicate whether National Forest management is maintaining healthy riparian ecosystems in the face of the increasing recreation demand.

Audubon Christmas counts have also recorded the abundance of song sparrows since 1900. The Audubon data contradict the BBS results for song sparrows, but the trends are probably not significant. Using data from the Audubon website (http://audubon2.org/birds/cbc/hr/table.html), count results were compared from 1939 to present as a function of number of song sparrows observed per count hour. The previous years were not included due to lack of count hour data. Using Audubon counts as a measure, there appears to be a slight upward trend in song sparrows in California since 1939.

This may be an artifact of substantially increased observer efforts with more reliable data in the later years of the counts. However, even after eliminating from the analysis the early years and focusing on period when observations were generally over 10,000, there still appears to be a slight increasing trend for song sparrows present in California in December.

Song sparrows are well represented on all four southern California National Forests; they were recorded at 197 out of 206 stations during the 1988-1997 and 2003 riparian bird count (RBC) surveys. In any one year, song sparrows were detected at 46 percent of the survey stations. This species is one of a few that were numerous enough to estimate trends with good confidence. This monitoring effort used randomly generated stations of the “best” riparian areas under 4000’ in elevation; however, site selection was based on ease of access. Significant negative trends in song sparrow abundance were determined from this monitoring (Table 8 below) (USDA Forest Service 1998). All LPNF records for song sparrows are in riparian areas.

Table 8. Riparian Bird Point Count Summary for NFS Lands - Song Sparrows

Percent of Stations with Song Sparrows, by Observer*			**Percent of Stations with Song Sparrows**
Observer 1	Observer 2	Observer 3	
48.77	44.32	45.73	46.27

*Three observers/station, includes 1988-1997 & 2003 data

This trend was consistent with BBS (http://www.mbr-pwrc.usgs.gov/bbs/) trends as well as trends for other species in the riparian bird count studies for Southern California forests. Overall, the local Southern Province study found that conifer and ground-nesting species declined more than species nesting in other substrata, and that resident species declined more than migrants.

The LMP desired condition to maintain or improve habitat conditions to sustain healthy song sparrow populations can be supported by activities that maintain and improve riparian habitats. The Los Padres Riparian Conservation Strategy, riparian goals and standards in the LMP, Pacfish standards, and BMPs specify measures to protect the riparian habitat during all projects on Federal lands.

Current vegetation is suitable for nesting and foraging habitat. Tamarisk is present, but it does not dominate the riparian area. It may provide suitable nesting and foraging habitat along with native vegetation.

Environmental Consequences

No Action Alternative
The no action alternative would not directly impact the song sparrow's habitat in the short term. However, over the long term, there would be an adverse impact to the sparrow's habitat. It is difficult to quantify the potential impacts, but a qualitative discussion may prove informative.

Tamarisk is a nonnative invasive tree-shrub that can grow in dense patches, out-compete native vegetation such as willows (*Salix* sp.) and cottonwoods (*Populus* sp.), change soil chemistry by depositing salts from deep ground water on the soil surface, and remove large amounts of water from streams and riparian areas via evapotranspiration through its foliage. Its growth patterns, ability to change soil chemistry to its advantage over native riparian vegetation, and decrease available subsurface water availability in combination would cause a shift away from the native plant species distribution. Mature tamarisk may stands would cause a decrease in understory vegetative and structural diversity because it would shade out any other species' new growth and salinization of the soil and lowering of the water table would perpetuate tamarisk site dominance. A decrease in structural diversity and decrease in surface water table availability would decrease the available habitat for the song sparrow.

Cumulatively, the no action alternative would contribute to an overall decrease in habitat suitability and availability for the song sparrow across its southwestern US range over time. This effect would occur over the long term, the time it takes for established tamarisk stands to mature and for new stands to develop and mature along the riparian corridors. In the short term, tamarisk presence is unlikely to be detrimental because it does not dominate sites and it adds to vegetative diversity.

Action Alternatives
The action alternatives would not measurably affect the habitat for the song sparrow. The amount of habitat available on the Forest and in the province will remain the same. Because the amount of tamarisk is at present very low and is not dense, removing existing stems will not decrease the area of habitat. Over the long term, removing tamarisk helps to maintain native vegetation diversity, and thus helps to maintain riparian habitat for the song sparrow.

There would be no cumulative impacts from the action alternatives because there would measurable direct and indirect impacts.

Arroyo Toad

Environmental Baseline

The arroyo toad was selected as a management indicator species for low-elevation riparian and aquatic ecosystems because long term abundance, habitat occupancy, and habitat condition are expected to reflect then management effectiveness as it relates to habitat disturbance and degradation (USFS 2011b). Monitoring will also reflect how well recovery goals are being met (ibid).

Threats to arroyo toads include riparian habitat loss/degradation, water diversions and extractions, impacts from roads and trails, developed and dispersed recreation, non-native plants and animals, unauthorized OHV, grazing, mining and prospecting, and recreational collecting of toads, tadpoles and eggs.

Monitoring efforts on the four southern California National Forests have not typically been designed to obtain the level of information needed to determine trend. Based on this, it is not possible to make a definitive statement regarding trends in abundance and habitat conditions for the S. Province. However, monitoring efforts have been able to confirm that all sites previously documented as occupied continue to remain occupied.

Trends in abundance, distribution, and/or habitat conditions are to be used as measurements for evaluation. The prescribed monitoring method is population abundance and/or habitat condition in selected locations (LMP FEIS, Vol. 1. p. 177, Table 433).

Habitat improvement projects for arroyo toad and the aquatic and riparian habitats they occupy have included riparian habitat restoration, control of non-native species, prescribed burning to protect riparian areas and reduce the effects of wildfire, relocation of roads and recreation facilities, and Burned Area Emergency Rehabilitation and restoration after wildfires.

The arroyo toad is endemic to the coastal plains, mountains, and desert slopes of central and southern California and northwestern Baja California from near sea level to about 8,000 feet (2,400 meters). Within these areas, arroyo toads are found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces. Arroyo toads have evolved in a system that is inherently dynamic, with marked seasonal and annual fluctuations in rainfall and flooding. Breeding habitat requirements are highly specialized. Specifically, arroyo toads require shallow, low gradient slow-moving stream and riparian habitats that are naturally disturbed on a regular basis, primarily by flooding (U.S. Fish and Wildlife Service 2000).

The arroyo toad is a breeding habitat specialist (Sweet 1992; Sweet and Sullivan 2005 in USFS 2011b). They require shallow pools located in open sand and gravel channels, along low gradient (typically less than 6 percent) reaches of medium-to-large-sized streams (Sweet 1992). These streams can have either intermittent or perennial streamflow, and typically experience periodic flooding that scours vegetation and replenishes fine sediments.

The USFWS 2011 revised Critical Habitat for the arroyo toad describes elements identified as being necessary for sustaining the essential life-history functions of the species. These Primary Constituent Elements (PCE) are as follows (Federal Register 2011):

> (1) Rivers or streams with hydrologic regimes that supply water to provide space, food, and cover needed to sustain eggs, tadpoles, metamorphosing juveniles, and adult breeding toads. Breeding pools must persist a minimum of 2 months for the completion of larval development. However, due to the dynamic nature of southern California riparian systems and flood regimes, the location of suitable breeding pools may vary from year to year. Specifically, the conditions necessary to allow for successful reproduction of arroyo toads are:
>
> •Breeding pools that are less than 6 in (15 cm) deep;
>
> •Areas of flowing water with current velocities less than 1.3 ft per second (40 cm per second); and
>
> •Surface water that lasts for a minimum of 2 months during the breeding season (a sufficient wet period in the spring months to allow arroyo toad larvae to hatch, mature, and metamorphose).

(2) Riparian and adjacent upland habitats, particularly low-gradient (typically less than 6 percent) stream segments and alluvial streamside terraces with sandy or fine gravel substrates that support the formation of shallow pools and sparsely vegetated sand and gravel bars for breeding and rearing of tadpoles and juveniles; and adjacent valley bottomlands that include areas of loose soil where toads can burrow underground, to provide foraging and living areas for juvenile and adult arroyo toads.

(3) A natural flooding regime, or one sufficiently corresponding to natural, that: (A) Is characterized by intermittent or near-perennial flow that contributes to the persistence of shallow pools into at least mid-summer; (B) Maintains areas of open, sparsely vegetated, sandy stream channels and terraces by periodically scouring riparian vegetation; and (C) Also modifies stream channels and terraces and redistributes sand and sediment, such that breeding pools and terrace habitats with scattered vegetation are maintained.

(4) Stream channels and adjacent upland habitats that allow for movement to breeding pools, foraging areas, overwintering sites, upstream and downstream dispersal, and connectivity to areas that contain suitable habitat. In summary, the need for space for individual and population growth and normal behavior is met by PCEs 1 and 4; the need for food, water, and physiological requirements is met by PCE 1; cover and shelter requirements are met by PCE 2; areas for breeding, reproduction, and rearing of offspring are met by PCEs 1, 2, and 3; and habitats representative of the historical, geographical, and ecological distributions of a species are met by PCE 4.

The California Wildlife Habitat Relationships (CWHR) model describes the relative value of various habitat types for arroyo toads (CDFG 2008). However, the CWHR habitat relationship has not been updated recently, and thus, data from Forest Service files are being used for this report. Habitat for the arroyo toad was modeled in the southern Province using GIS and the following attributes:

- Elevation (0-4300 feet North of Santa Clara River and 0-5000 feet South of Santa Clara River)
- Stream Gradient: 0-2%
- Lateral buffers: Buffer out to a gain of 80 feet contour above streambed elevation.
- Stream Order: Second order or greater.

The habitat model was expected to overestimate the amount of suitable habitat, so surveys were necessary to assess actual suitability in the modeled habitat areas. Once suitability determinations of modeled habitat (as funding for surveys is available) are made, suitable habitat is mapped. Ground-truthing the modeled habitat has been an ongoing effort and, since riparian and wash habitats are dynamic, it is likely that the suitable habitat mapping will need future review and adjustments.

Arroyo toad tadpoles consume loose organic material found in interstitial spaces in the substrate (USFS 2005). Juveniles and adults forage in upland sandy washes and around oak trees, particularly for ants (ibid). When they become adults, they tend to be more nocturnal, more active on rainy nights, and burrow into the soil during the day (ibid).

Alteration of stream flow regimes as a result of dams and regulated flows has adversely affected arroyo toads. Scouring by powerful flows eliminates potential habitat and does not provide for shallow, low flow conditions necessary for breeding. Careful water releases may mitigate some of the adverse effects of water storage and the general lack of seasonal flooding.

Next to hydrological alteration, invasive species are the largest threat to arroyo toads (USFS 2011). Reservoirs and artificial aquatic habitat facilitate non-native species impacts to arroyo toads and other riparian-dependent species (ibid). Specifically, bullfrogs and non-native fishes are known predators of adults and larvae, respectively (ibid). Argentine ants may be replacing native ants, and while toads are known to consume Argentine ants, it is unknown yet whether this species presence will adversely affect arroyo toads (ibid). Tamarisk and arrundo decrease available surface water and cause deepening stream channels, leading to increased unsuitable habitat (ibid). Non-native grasses may decrease burrowing habitat in sandy terraces (ibid).

Los Padres National Forest

The LPNF assessed and modeled arroyo toad habitat on the Forest in 2003 in coordination with the US Fish and Wildlife Service (USFS 2011b). Revised Final Critical Habitat totals about 7300 acres on the Forest in five units (ibid).

The following is directly from the draft management indicator species update (USFS 2011b).

> On the LPNF, campground use and road travel has decreased in occupied arroyo toad habitat (in contrast to management activities that occurred prior to 2000). Campgrounds in occupied habitat have either been decommissioned (Lion, Beaver, plus two other campgrounds) or have seasonal closures (Hardluck Campground) with a corresponding decrease in road use.
>
> On the LPNF, the preferred stream gradient and substrate for arroyo toad breeding habitat occurs in areas near developed campgrounds. The flat sandy terraces and areas of slower water flows are as attractive to recreation planners and the recreating public as they are to breeding toads. As a result, LPNF campgrounds located near streams are likely to overlap occupied arroyo toad habitat.
>
> One analysis of land-use impacts showed that bank trample was larger in occupied threatened and endangered amphibian habitat, although trampling occurred in localized sites and was low overall. It is possible that trampling resulting from dispersed recreation activities may occur sufficiently late in the year to avoid substantial overlap with the breeding season of arroyo toads.
>
> In recent years, the LPNF experienced several large scale fires that burned through occupied habitat in the Sespe, Piru, Sisquoc and Santa Ynez Watersheds. Post-fire conditions included large amounts of sediment deposition. For the duration of these changed conditions, the amount and quality of arroyo toad habitat increased. The population of arroyo toads in the Upper Santa Ynez River is threatened by non-native species, recreation, and affects from the operation of an upstream dam and several water diversions that have led to sediment trapping, an altered hydrological regime, and changes in water temperature.
>
> Piru Creek in Subunit 5b is downstream of a large dam and the habitat there experienced degradation over the years from perennial water releases, rapid changes in flow volume, excessive flows during the breeding season, and an increased presence of nonnative predators. In 2005, the California Department of Water Resources (CDWR) began discharging water from Pyramid Dam into Piru Creek according to a water release schedule that generally simulated the natural hydrology of Piru Creek. In the following breeding season a dramatic improvement in arroyo toad breeding success, from 12 egg clutches observed in 2004 to approximately 165 egg clutches in 2005. The simulated

> natural flow regime improved breeding success of arroyo toads and continues to reduce non-native predators and improve arroyo toad habitat. If the current simulated natural flow regime is maintained, it appears that Pyramid Dam may no longer be a threat to the arroyo toad population and existing habitat in Piru Creek (U.S. Fish and Wildlife Service 2011).

In the southern California province, it was initially believed that the National Forests (Los Padres, Angeles, San Bernardino, and Cleveland NFs) supported about 36 percent of the arroyo toad population (USFS 2011b). The USFWS recently proposed downlisting to threatened the status of the arroyo toad (USFWS 2014). On the LPNF, populations are presumed extant in parts of the Sisquoc River; and extant in parts of the upper Santa Ynez River, Mono, Indian, Sespe, upper Piru, lower Piru, Agua Blanca, Agua Caliente, and Castaic Creeks, and unknown in and Lion Creeks (ibid).

Recent management coordination of water releases from Piru Creek storage dams has attempted to mimic natural flow regimes. Water flow regimes can affect vegetation. Population surveys have been done (2010-2012) (ibid). Reduced breeding populations and success in Piru Creek has been attributed to low precipitation, not water releases from the storage reservoir (ibid).

In the most recent USFWS document (2014), the Service reviewed the threat to the arroyo toad from invasive plants. The Service listed locations that include some of the reaches selected for this project (Sisquoc River, Santa Ynez River, and Sespe Creek) (ibid). The Service reports the threat level to arroyo toads from invasive plants as “medium level of impact” (ibid).

Environmental Consequences

No Action Alternative
The no action alternative would not have any direct, indirect, or cumulative effects to the arroyo toad habitat in the short term. Long term effects of the no action alternative are more speculative and not quantifiable, but may merit a qualitative discussion.

Should tamarisk come to dominate the riparian reaches, there would be a reduction in the available area of reproductive and larval habitat for the arroyo toad. Because a severe tamarisk infestation would decrease the available slow moving surface water and streams would become more deeply incised, there would be a reduction in breeding habitat and slow moving water for toad larva.

Action Alternatives
The action alternatives target tamarisk seedlings and larger trees/shrubs. Upland adult arroyo toad habitat would not be affected. Riparian or aquatic juvenile habitat would not be adversely affected. The primary effect of removing tamarisk is the long term prevention of tamarisk establishment. Current tamarisk seedling cover is small, and does not provide quality shaded habitat compared to native existing vegetation. Likewise, larger tamarisk specimens are not found in high densities, and do not provide large areas of shaded or cover habitat for toads. Thus, removal of low densities of mostly seedling-sized and larger tamarisk now will not measurably impact arroyo toad habitat. There may be an increase in sediment delivery to streams in the treatment area for up to a year which could affect juvenile toads. However, it is expected that the amount of sediment delivered would be minor, dispersed, and undetectable.

Removal of tamarisk is expected to improve habitat conditions for the arroyo toad in the long term by allowing stream channel processes including flood regimes, sediment regimes, and

channel form processes to return to more natural patterns, improving critical habitat conditions for arroyo toads.

Because existing tamarisk is not measurably contributing to suitable arroyo toad habitat, removal of tamarisk is not expected to have measureable impacts to habitat. As such, it would have no cumulative effect on arroyo toad habitat.

Migratory Land Birds

Analysis in progress.

Special Designation Areas

This section evaluates the impacts of tamarisk removal methods on congressionally designated areas, including wilderness, and wild and scenic rivers (WSR). The effects on the outstandingly remarkable values, water quality and free flowing characteristics of designated and eligible wild WSRs, and the effects on wilderness character are evaluated. Treatment methods are described in detail in Chapter 2.

Affected Environment

Wilderness

There are four congressionally designated wilderness areas on the LPNF with infestations of tamarisk in portions of their riparian habitats. These include the Dick Smith, San Rafael, Sespe, and Ventana Wilderness areas. In addition, the Mono Roadless Area, a recommended addition to the Dick Smith Wilderness area, is also infested with tamarisk. Infestations outside wilderness boundaries have the potential to spread into wilderness and damage and degrade wilderness values.

Invasive plants have adverse effects on wilderness character. They disrupt natural processes. Invasive plants frequently alter natural plant communities, interact in unknown ways with native wildlife species, and alter ecological processes such as plant community dynamics and disturbance processes such as fire. This potential change in ecological condition can threaten the natural integrity of the wilderness and the values for which it was designated. The presence of invasive weeds is typically a result of human use. Weed infestations are typically associated with human activities such as grazing, pack stock use, and trails; activities that create disturbed conditions that allow weeds to establish.

Dick Smith Wilderness

The Dick Smith Wilderness was established in 1984 by the California Wilderness Act and is located in Santa Barbara and Ventura Counties, approximately 12 miles north of Santa Barbara. The writer, artist, and photographer for whom this wilderness was named was referred to by some as the "conscience of Santa Barbara" (Tilton).

The area is extremely rugged with numerous canyons and ridges. Elevations range from less than 2,000 feet in canyon bottoms to 6,541 feet at Madulce Peak. Prominent canyons include Indian, Mono, Alamar, Don Victor and Santa Barbara. The area has eight trails totaling 49 miles and eight trail camps. Vehicular access to trailheads in the Los Prietos area is limited by seasonal closures and long drive times over low-standard roads. Better access exists in the eastern portion from trailheads along California State Highway 33.

While chaparral is the predominant vegetation, Madulce Peak has some of the most beautiful stands of mixed conifers found in the national forest. The eastern portion of the area (known as the Rancho Nuevo Region) is more open with massive sandstone rock formations, chaparral, bigcone Douglas-fir and Great Basin sagebrush.

Tamarisk in the Dick Smith Wilderness is located along a portion of Rancho Nuevo Creek and its tributary in Deal Canyon. Approximately 60 acres of tamarisk occurs along these stream segments (Fig. 3).

The Mono Roadless Area - Recommended Wilderness
The Mono Roadless Area is recommended for wilderness by the LPNF LMP, and is managed in the same manner as designated wilderness to retain its wilderness attributes. It is located in Santa Barbara County approximately 10 miles north of Santa Barbara. Elevations range from Hildreth Peak at 5,065 feet to 1,600 feet, where Mono Creek leaves the area. The area is surrounded by existing administrative jeep-ways. Access is limited to non-motorized travel originating primarily from Mono Campground. The Mono/Alamar Trail and a portion of the Poplar Trail comprise 10 miles of non-motorized trails within the area.

The Mono Creek drainage offers miles of outstanding natural features. The towering steep canyon walls of the Narrows, deep pools along Mono Creek, limestone and sandstone outcroppings, and the large expansive rolling grass potreros of Loma Pelona are classic backdrops for wilderness discovery.

The recommended wilderness has about 99 acres of tamarisk infestation along approximately 13 miles of stream in the Mono Creek watershed (Fig. 5).

San Rafael Wilderness
The San Rafael Wilderness became the first primitive area in the nation designated as wilderness under the Wilderness Act of 1964 (additional acreage was added in 1992 by the Los Padres Condor Range and River Protection Act). The San Rafael Wilderness is located in the San Rafael and Sierra Madre Mountain Ranges in northern Santa Barbara County. The wilderness includes the Sisquoc Condor Sanctuary and the Sisquoc WSR. Elevations range from 1,160 feet (where the Sisquoc River leaves the wilderness) to 6,593 feet at the summit of San Rafael Mountain. There are over 125 miles of trails within the wilderness with numerous points of access; the most popular access is from Nira Campground.

This wilderness is mainly covered by chaparral, which consists of chamise, buckthorn, ceanothus manzanita, scrub oak and yucca. Also found here are potreros (grassy meadows). Most trails through the area follow the creeks and rivers. The two main corridors into the wilderness are the Sisquoc River and Manzana Creek. These riparian zones provide food, water, and shelter for most species of wildlife. Rainbow trout, western pond turtles, and aquatic garter snakes are found in the water. Bordering the water, western toad or pacific and California tree frogs may be found. From April through June many songbirds can be heard, such as the yellow warbler, house wren, orange-crowned warbler, and plain titmouse that nest in riparian zones. Further from the creek, up in the brush, one can hear the calls of the scrub jay, California quail, and mountain quail.

Other points of interest include the Manzana Schoolhouse and the standing ruins of homesteads along the Sisquoc River. These sites are all that remain of a vigorous farming community that settled the flats along the river around the turn-of-the-century. The South Fork Cabin is a historic Forest Service shack that has sheltered generations of Back Country Rangers.

Tamarisk in the San Rafael Wilderness is found primarily along the Sisquoc River and its tributaries. There are about 422 acres of tamarisk located along almost the entire length of the river (Fig. 4).

Sespe Wilderness

The Sespe Wilderness was established in 1992 by the Los Padres Condor Range and River Protection Act and is located primarily within Ventura County. The wilderness includes the 53,000-acre Sespe Condor Sanctuary and the Gene Marshall-Piedra Blanca National Recreation Trail. Also found here is Sespe Creek, one of the last remaining undammed rivers in southern California. Part of Sespe Creek is a designated WSR (31.5 miles) with an additional 21.4 miles of Upper Sespe Creek eligible for designation. The creek is contained by sandstone cliffs, rising up to 500 feet above the water. Fabulous rock formations, along with petroglyphs and other evidence of ancient Indians, can be observed along the creek corridor (Tilton).

Elevations in the wilderness range from 7,510 feet at the Reyes Peak summit to approximately 1,000 feet where Sespe Creek leaves the wilderness. The Sespe Wilderness is mainly a chaparral-covered environment, with rock cliffs throughout. Steep, narrow gorges, picturesque pools, cascading riffles, and outstanding views of geologic formations create a unique visual experience. There are numerous trailheads, trails, and camps.

Tamarisk is found in several locations in the Sespe Wilderness including the upper and lower portions of Piru Creek, Buck Creek, and Sespe Creek. A total of about 475 acres occur within the wilderness in these riparian areas (Fig. 6).

Ventana Wilderness

In 1931, the chief of the Forest Service set aside 45,520 acres known as the Ventana Primitive Area. This was enlarged to 55,884 acres in 1937. The area was renamed the Ventana Wilderness when it became part of the National Wilderness System in 1969, and has been enlarged four times (in 1978, 1984, 1992, and 2002); bringing its total up to the present 232,411 acres. The 1992 enlargement added 38,000 acres in the Horse Creek and Rocky Creek areas on the eastern edge of the wilderness. The Big Sur Wilderness and Conservation Act of 2002 added 37,110 acres. The wilderness lies entirely within Monterey County. Elevations range from 600 feet, where the Big Sur River leaves the Wilderness, to about 5,750 feet at the summit of Junipero Serra Peak. There are numerous access points to over 260 miles of trails.

Steep-sided, sharp-crested ridges separating V-shaped valleys characterize the topography of the Ventana Wilderness. Most streams fall rapidly through narrow, vertical-walled canyons flowing on bedrock or a veneer of boulders. Waterfalls, deep pools and thermal springs are found along major streams.

Marked vegetation changes occur within the wilderness. These changes are attributed to dramatic climate and topographic variations, coupled with an extensive fire history. Much of the Ventana Wilderness is covered by chaparral. This brushy vegetative cover is typical of that found throughout southern California's fire susceptible mountains. The contrast of annual grass meadows and open pine stands may be found throughout the wilderness. Deep narrow canyons cut by the fast moving Big Sur and Little Sur Rivers support virgin stands of coastal redwood. Small, scattered stands of the endemic bristle cone fir may be found on rocky slopes.

About 113 acres of riparian habitat have been proposed for tamarisk removal in the Ventana Wilderness along the Arroyo Seco River (Fig. 1).

Wild and Scenic Rivers

Presently, there are two designated WSRs that are within the project area. Sespe Creek has 27.5 miles of wild designation and 4 miles of scenic designation all of which is in the project area (Fig. 6). This 31.5-mile segment of Sespe Creek, from its confluence with Rock Creek and Howard Creek downstream to where it leaves section 26, T5N, R20W, received designation as a Wild/Scenic River in 1992. Sespe Creek was selected for its interesting geologic formations, unusual gorges, and rich riparian vegetation providing excellent scenic diversity and recreation opportunities. This stream is considered an outstanding rainbow trout fishery and provides critical habitat for the endangered California condor.

The Sisquoc River has 34.6 miles of wild designation most of which is in the project area (Fig. 4). This river lies mostly within the San Rafael Wilderness, and offers excellent opportunities for solitude, wilderness-oriented activities, and appreciation of the outstanding scenery

In addition to the presently designated rivers, additional reaches have been recommended for designation by the 2006 LMP. These include 11.5 miles of Sespe Creek that originates at the confluence of Chorro Grande Canyon and extends to the confluence of Rock Creek. This segment has been found to be suitable for designation as either a recreation or scenic river. Below Chorro Grande Canyon, Sespe Creek offers excellent dispersed recreation opportunities, such as swimming and wading, picnicking, backpacking, hiking, horseback riding, bicycling, rock climbing, hunting, fishing, photography, driving for pleasure and viewing scenery on the adjacent scenic byway. Biologically, the resident population of arroyo toads in upper Sespe Creek is one of the largest within one hundred miles. This segment also includes intact habitat for southern steelhead trout and southwestern willow flycatcher habitat. This is outstandingly remarkable, because samples of intact habitat are very rare on the LPNF and in the national forests of southern California. Part of this proposed reach is within the project area (Fig. 6).

A 38.6 mile stretch of the upper portions of Piru Creek (those below a point in the Sespe Wilderness in the southwest corner of Township 6 N., Range 22 W., Section 3 to the maximum pool of Pyramid Lake) have been found suitable for classification as either a wild or scenic river. Upper Piru Creek provides an outstandingly remarkable opportunity to recreate in and along a year-round stream. The faults and rock formations found along the creek include important features crucial to the understanding of the very complex structural and geomorphic evolution of the west coast of North America. Along the upper portion of Piru Creek, exposures of the oldest basement rocks in the coastal mountains of the western United States are considered to be outstandingly remarkable. This portion of the Piru Creek supports a population of arroyo toads, and the scientific and interpretive values offered by several of the prehistoric/ethnographic sites constitute outstandingly remarkable values. Most of this proposed reach is within the project area Fig. 6).

Lastly, 18 miles of the Arroyo Seco River have has been found suitable for designation as a WSR. Steep canyon walls, gorges, rock outcrops, and jumbles of boulders that create pools and dramatic sounds characterize the dynamic setting of the Arroyo Seco River corridor. Many sections of the river (especially in the gorge and the many deep pools upstream) offer opportunities for solitude and challenge. These unique recreation opportunities are considered outstandingly remarkable. Geologically, the river also possesses significant and remarkable features, as it exposes the relationship of rocks and geologic structural features in the Salinian Block that are important as research areas to aid in understanding important tectonic and seismic processes along the California continental margin. Finally, the Arroyo Seco is the middle link of

an anadromous fishery and provides habitat for the federally threatened steelhead fish. This entire stretch of the River is contained within the project area (Fig. 1).

Environmental Consequences

Wilderness

To best preserve the wilderness resource, alternatives were evaluated for their potential effects on the four qualities of wilderness character: Untrammeled, natural, undeveloped, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. The untrammeled quality is the extent to which wilderness ecosystems remain free from modern human manipulation. Natural integrity is the extent to which long-term ecological processes are intact and operating. The undeveloped quality is a measure of how natural the environment appears and how free it is from any structures or developments. The outstanding opportunities for solitude or a primitive and unconfined type of recreation are subjective values defined as isolation from the sights, sounds and presence of others, and the developments and activities of people. Primitive recreation opportunities are those that allow the recreationists to use backcountry skills, knowledge and abilities that do not rely on developed facilities, mechanical transport or motorized equipment.

Wild and Scenic Rivers

Alternatives were evaluated for their potential effects to the free flow of water, water quality, and outstanding remarkable values associated with the recommendation or designation of the river as wild and scenic.

No Action Alternative

Under this alternative, tamarisk would continue to persist and expand in Wilderness and WSRs. By not aggressively treating tamarisk, wilderness character would remain “untrammeled” and free from human manipulation. However, the spread of tamarisk plants frequently changes the character of the ecosystem such that it damages the apparent naturalness and natural integrity of the wilderness.

Similarly, tamarisk can detract from the outstandingly remarkable values for which the WSRs were designated. Specifically, these include scenery, wildlife, botanical, and ecological values. Tamarisk would continue to affect scenery and botanical values by displacing native vegetation with a very different appearing non-native. It would degrade wildlife habitat and ecologically affect riparian systems by increasing evapotranspiration and depositing salts on the soil surface.

Action Alternatives

Approximately 1,169 acres (~28% of the total project area) of known tamarisk infestations are proposed for treatment by non-mechanical hand methods, chemical, or both treatment methods within the congressionally designated and recommended wilderness areas described in this analysis. Most of this treatment area also occurs in WSR corridors.

Under Alternative 3, tamarisk would be treated by non-mechanical hand methods such as hand pulling or use of hand tools for cutting, digging and grubbing. Alternative 2 provides for both non-mechanical hand treatments and herbicide treatments by either a cut stump method or frill method to directly apply herbicide to the target stem as described Chapter 2.

Methods to transport people and supplies to carry out invasive plant treatments include non-mechanized methods considered acceptable within wilderness, including backpack and pack

stock use. These types of traditional transport methods used within wilderness do not require additional analysis of the Wilderness Act's prohibitions on using mechanical transport. Use of helicopters or other mechanized methods to transport supplies and people to carry out invasive plant treatments is not proposed under any alternative.

Effects on Wilderness Character

Untrammeled

Treatment of tamarisk infestations within wilderness is human manipulation, and is a trammeling action which results from both action alternatives. The degree of difference between the two action alternatives is negligible since the application of herbicide would occur at the same time as non-mechanical hand treatments. Under Alternative 2, herbicide would be applied to cut stumps. Similarly, under Alternative 3, the same large tamarisk would be girdled. There will be short-term evidence of tamarisk treatments including dead or wilting plants and areas of disturbed soils where plants have been pulled up or grubbed out. Where plants are dead or dying, some people may recognize that herbicides were used. However, given the typically sparse distribution of tamarisk in the project area, the visual appearance of a few dying stems may not be visually significant. The effects of treatment activities may not appear natural to the forest visitor for a period of time following treatment. Hikers and pack stock users are typically traveling at a slow pace and these changes may be noticeable.

The amount of area proposed to be treated in wilderness is very small; approximately 1,169 acres of 713,236 acres (~0.002%) in wilderness on the forest. Effects would be localized to the treatment areas and effects to the wilderness ecosystem are limited to these treatment areas. Regional standards and project design features are in place to protect ecological resources including non-target botanical species, water, soils, fisheries and wildlife. Refer to the botany, hydrology, soils, fisheries and wildlife sections within the EIS and the supporting reports for details concerning the effects of invasive plants and the effects of invasive plant treatments on these resources.

Natural

Aggressive treatment of tamarisk in the wilderness would improve natural integrity. Treatments would decrease establishment and expansion of tamarisk in wilderness areas, and allow native vegetation and ecological processes to continue. Apparent naturalness of treated areas will improve as the evidence of tamarisk decreases and they are replaced with native vegetation. Alternative 2 has the highest probability of improving the natural character of wilderness. In the past, non-mechanical hand treatments methods alone have not been successful, because if the roots are not killed in larger specimens, tamarisk readily re-sprouts and seed production continues.

Undeveloped

No new developments, facilities, or structures are proposed by any alternatives. There would be no impact to the undeveloped quality of wilderness.

Outstanding Opportunities for Solitude or a Primitive and Unconfined Type of Recreation

Forest visitors may encounter workers applying herbicides using saws and hatchets including hypo-hatchets in the wilderness. Visitors may also encounter workers digging, grubbing or pulling smaller plants. These encounters may affect some people's sense of remoteness and their opportunity for solitude. This effect would be short term, typically one to several days, and backcountry crews treating weeds would be small (typically 1-4 people). Duration of effects

would depend on the size of site being treated. Effects on visitor's wilderness experience can be minimized through public notification and treating areas during low visitor use periods.

Effects on Wild and Scenic Rivers

The presence of invasive plants and treatments of them may impact the outstandingly remarkable values for which the rivers were designated or deemed eligible. Outstandingly remarkable values may include scenery, recreation, geology, fisheries, wildlife, botany/ecology, historic or cultural resources.

Recreation, scenery, and habitat for threatened and endangered wildlife are identified as outstandingly remarkable values for existing and proposed portions of Sespe Creek. Details on the effects of invasive plants and invasive plant treatments on resource values other than recreation are covered in their respective resource sections. Visitors recreating in the proposed Sespe Creek segment could see the results of hand tool or herbicide treatments, or witness the treatment activities. However, effects to this creek and the outstanding remarkable value of recreation would be minimal and similar to those described for wilderness. By removing tamarisk the scenic and wildlife habitat values would be improved. A short term negative effect on scenic value may occur with the presence of large dying tamarisk plants.

The Sisquoc River was designated for its solitude and wilderness-oriented activity opportunities, and outstanding scenery. Both action alternatives will affect solitude and wilderness-oriented activity values through the presence of workers treating tamarisk and the support activities associated with those treatments. Workers will be present in campgrounds and at infestation sites, and stock animals may be moving equipment and supplies along trails. The presence of dead and dying large tamarisk plants could affect scenery in the short term. All of these activities will decrease as tamarisk is successfully removed from the WSR corridor and treatment activities are greatly reduced over time.

The upper portions of Piru Creek have been recommended for designation as a wild or scenic river. Its outstandingly remarkable values are related to geology, wildlife habitat and cultural sites. Neither action alternative will have an effect on the geology because rock formations will not be disturbed and no characteristics of water flow will be affected. Wildlife habitat will be improved by the removal of tamarisk, specifically that of the arroyo toad. As cited in the archeological and cultural section, there will be no effects to any of the prehistoric/ethnographic sites in the recommended corridor.

The Arroyo Seco River has been recommended for designation as a WSR for its geologic, recreation, and fisheries habitat outstandingly remarkable values. There will be no effect to geologic values from either action alternative. Recreation values could be affected by disturbing solitude. The presence of treatment teams will disturb solitude by working in the area and using camping sites at night. Habitat for federally threatened steelhead fish will be improved by reducing the amount of water lost through evapotranspiration and preventing the increased deposition of salts on the surface.

As stated in the hydrology report, the use of any chemical adjacent to water sources causes a direct and indirect risk of chemical contamination in any of the existing or recommended WSRs. Under alternative 2, the usage of the herbicides Imazapyr and Triclopyr can cause direct effects in water quality.

None of the treatments are extensive enough under any alternative to have an effect on peak flows, low flows or water yield. Methods used for treatment would have negligible effect on

water infiltration into soil and associated surface runoff. No 5th field watershed has more than 1 percent proposed for treatment and most have less than 0.5 percent. This amount is much too small an area to show effects to flows from treatment (Table 4).

Because this project does not involve ground disturbance in WSR bed or banks (below the ordinary high water mark), it is not subject to Section 7(a) of the Wild and Scenic Rivers Act.

Cumulative Effects

Because the designated and recommended WSRs are mostly collocated with wilderness, the cumulative effects related to this project are basically the same. There are few other activities planned for the wilderness areas and WSR corridors that would occur at the same time as the proposed project. Trail maintenance is planned for the San Rafael Wilderness and the Sespe Wilderness, which also contain the Sisquoc River, Piru Creek, and Sespe Creek. The additional field crews would increase trail use and camping impacts if both trail work and tamarisk treatments occurred at the same time. This would further reduce the solitude and untrammeled values of wilderness, and impact the recreational experience and solitude opportunities of WSRs in the short-term. However, in the long-term, both projects would provide a cumulative benefit. A proposed project to study big horn sheep in the Sespe wilderness may also contribute impacts to solitude values of both the Sespe Wilderness and Sespe and Piru Creeks, if it occurred at the same time as the project. Helicopters may be used as part of the survey and capture methodology, but would only occur over a several day period. At this time it is not anticipated the study will overlap with this project.

The effects to recreation associated with tamarisk treatments are short term. It is unlikely that all wilderness areas or WSRs would be treated at the same time. Recreationists that are displaced due to their concern about herbicide exposure can recreate in alternate facilities or other areas. Similar recreation opportunities would be available in areas that have not been treated with herbicides.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

This project has been developed to improve the overall productivity of the natural riparian setting by removing the non-native tamarisk component from riparian corridors. Short term effects of removal of tamarisk are not expected to have consequential effects. A disturbance of soil could occur on the locations where tamarisk is pulled.

Unavoidable Adverse Effects

No unavoidable adverse effects have been determined for this project. As described in the biological effects determination sections, individuals may be affected, but this project is not expected to contribute to trends for listing or adverse effects to species.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

The action alternatives have not been found to have irretrievable and irreversible commitments of resources. The no action alternative could result in long term increases in tamarisk infestation that limit water availability and biodiversity across the LPNF.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders.”

Environmental Justice Act

Review of environmental compliance, project mitigations to address possible impacts, and a broad outreach of the public, Indian tribes, and agencies has been accomplished for this project.

American Indian Religious Freedom Act

Tribes have been consulted during scoping of this project. See tribes comment below (only one tribal respondent).

Incomplete or Unavailable Information

All necessary information for specialist report development and response to comments has been available.

Chapter 4. Consultation and Coordination

A project species list was obtained by the LPNF. It was created by the USFWS Ventura office, and it is valid for 90 days beginning in June 2014. The wildlife report has the list containing the wildlife species and critical habitat and it is in the project record.

The project is consistent with goals of the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and portions of California (PacFish; USDA and USDI 1995) and the 2005 PacFish InFish Restoration Strategy by maintaining characteristics of riparian areas and fish habitat on National Forest Lands with the action area. Formal consultation for PacFish was completed and is documented in the NMFS Biological Opinion issued January 23, 1995

The evaluation and screening of Forest Service actions is accomplished through the ESA consultation process developed to implement the May 31, 1995, Interagency Streamlining Agreement and the Matrix of Pathway and Indicators from NOAA Fisheries (NMFS 1996a). Interagency Level 1 teams evaluate the effects of proposed actions against the environmental baseline at project and watershed scales. The May 31, 1995, streamlining guidance was re-issued in 1997 and 1999 (USDA-FS and others 1999), all versions describe the expected use of the "effects matrix" when making ESA effects determinations and evaluating action consistency with relevant LMP requirements. To fulfill obligations under 7(a)(2) of the ESA for individual or groups of projects and to be exempt from section 9 take prohibitions, the administrative units may use the interagency consultation Streamlining guidance or subsequent updated procedures, to avoid jeopardizing the continued existence of listed salmonids.

The LPNF utilizes the Streamlined Consultation Procedures and applies the NMFS Checklist and Matrix (NMFS 1996a) to evaluate all future proposed actions for adverse effects to steelhead trout and critical habitat. The Forest determines whether actions are likely or not likely to adversely affect any TEPC species, and critical habitat.

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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Kyle Kinports - Los Padres National Forest NEPA Coordinator: project review.

Federal, State, and Local Agencies

California Department of Fish and Game
NOAA Fisheries
Ventura County Board of Supervisors
National Marine Fisheries Service
RRM, Lake Piru Recreation Area
USFWS – Ventura Office

Tribes

Santa Ynez Band of Mission Indians
Tejon Indian Tribe

Others

Scoping letters were distributed to individuals and organizations who specifically requested to be notified of actions on the LPNF. In addition this project has been posted on the LPNF website since 2009.

Literature Cited

Bakke, D. 2007. Analysis of issues surrounding the use of spray adjuvants with herbicides. Pacific Southwest Regional Pesticide Use Specialist. Written Dec. 2002, Revised Jan. 2007.

Baldwin, Bruce G. May 5. 1994. [Letter to Craig Faanes, Field Supervisor, U. S. Fish and Wildlife Service, Ventura Field Office]. On file, Los Padres National Forest, Ojai, Calif.

Ballard, G, and G.R. Geupel. 1998. Songbird monitoring on the San Luis National Wildlife Refuge 1995-1997. Report to the US Fish and Wildlife Service. PRBO.

Bell, M.C. 1986. Fisheries handbook of engineering requirements and biological criteria. Portland, OR: Office of the Chief of Engineers, Fish Passage Development and Evaluation Program, U.S. Army Corps of Engineers.

Berrill, M., S. Bertram, B., L. McGillivray, M. Kolohon, and B. Pauli. 1994. Effects of low concentrations of forest-use pesticides on frog embryos and tadpoles. Environmental Toxicol. and Chemistry 13(4): 657-664.

Big Sur Ornithology Lab. 2000. Breeding Bird Inventory Report. Los Padres National Forest (Monterey Ranger District). Chris Tenney, site coordinator.

Bjornn, T.C., and D.W. Reiser. 1991. Habitat Requirements Of Salmonids In Streams. Pp. 83-138 IN: W.R. Meehan (ed.) Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. American Fisheries Special Publication #19.

Boughton, D. and H. Fish. 2003. New Data on Steelhead Distribution in Southern and South-Central California. NOAA, Southwest Fisheries Science Center.

Boughton, D.A., Adams, P., Anderson, E., Fusaro, C., Keller, E., Kelley, E., Lentsch L., Nielsen J., Perry, K., Regan, H., Smith, J., Swift, C., Thompson, L., and Watson, F. 2006. Steelhead of the South-Central/Southern California Coast: Population Characterization for Recovery Planning. National Oceanic and Atmospheric Administration, Technical Memorandum, National Marine Fisheries Service. NOAA-TM-NMFS-SWFSC-394, 123 pp.

Busby, P. J.; Wainwright, T.C.; Bryant, G.J.; Lierheimer, L.J.; Waples, R.S.; Waknitz, F.W.; Lagomarsino, I.V. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-NWFSC-27.

California Environmental Protection Agency. 2008. Revision of the TMDL for Chloride in the Upper Santa Clara River. Los Angeles Water Quality Control Board.

California Natural Diversity Database (CNDDB). 2011. RareFind 4.0. Sacramento, CA: California Department of Fish and Game. Available at: https://nrmsecure.dfg.ca.gov/cnddb/view/query.aspx

California Natural Diversity Database (CNDDB). 2011. RareFind 4.0. Sacramento, CA: California Department of Fish and Game. Available at: https://nrmsecure.dfg.ca.gov/cnddb/view/query.aspx

Carroll, E.W. 1985. An evaluation of steelhead trout and interstream structures in a California intermittent stream. Eureka, CA: Humboldt State University. MS thesis.

Chubb, S.L. 1998. Biological Assessment for steelhead and Los Padres National Forest Programs as amended by PacFish and Riparian Conservation Strategies. Los Padres National Forest, Goleta, CA. June 1998.

Consortium of California Herbaria (CCH). 2011. Consortium of California Herbaria Search Page. Berkeley, CA: Consortium of California Herbaria. Available at: http://ucjeps.berkeley.edu/consortium/

CWHR. California Department of Fish and Game, California Interagency Wildlife Task Group. 2008. CWHR version 8.2 personal computer program. Sacramento, CA.

DeLoach, C. Jack; Carruthers, Raymond I.; Lovich, Jeffrey E.; Dudley, Tom L.; Smith, Stanley D. 2000. Ecological interactions in the biological control of saltcedar (Tamarix spp.) in the United States: Toward a new understanding. In: Spencer, N.R., ed. Proceedings of the X international symposium on biological control of weeds. 4-14 July, 1999, Bozeman, MT; Montana State University; 819-873.

Elliot, W.J., Scheele, D.L., and Hall, D.E. 1999 Rock:Clime, Rocky Mountain Research Station Stochastic Weather Generator. http://forest.moscowfsl.wsu.edu/fswepp/docs/rockclimdoc.html

Fiedler P. 2012. Calochortus. In B. G. Baldwin et al. (eds.), The Jepson Manual: Vascular Plants of California, Second Edition. Univ. of California Press, Berkeley. Retrieved from ucjeps.berkeley.edu/jepsonmanual/review/ on 9 Nov 2011.

Foster, Mike. 2003a. "Occurrence record for Layia heterotricha found at Quatal Canyon, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003b. "Occurrence record for Layia heterotricha found at Little Dry Summit, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003c. "Occurrence record for Layia heterotricha found at Oak Creek, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003d. "Occurrence record for Layia heterotricha found at Lockwood Valley1, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003e. "Occurrence record for Layia heterotricha found at Lockwood Valley2, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003f. "Occurrence record for Layia heterotricha found at Bear Canyon, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Foster, Mike. 2003g. "Occurrence record for Layia heterotricha found at Lockwood Valley3, Los Padres National Forest." Unpublished report on file, Los Padres National Forest, Ojai, Calif.

Fryxell, P. A. 1988. Malvaceae of Mexico. *Systematic Botany Monographs* 25: 1-522.

Good, T.P., R.S. Waples, P. Adams (editors). 2005. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. U.S. Dep. Commerce, NOAA Tech. Memo. NMFSNWFSC-66, 597p.

Graf, W.L. 1978. Fluvial adjustments to the spread of tamarisk in the Colorado Plateau region. Geological Soc. Am. Bull. 89(10):1491–1501

Griffin, James R. 1993. Pinaceae. In Hickman, James C. (ed.). The Jepson manual: higher plants of California. Berkeley, CA: University of California Press.

Griffin, James R.; Critchfield, William B. 1976. The distribution of forest trees in California. (USDA Forest Service Research Paper PSW—82.) Berkeley, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Griffin, P.C., T.J. Case, and R.N. Fisher. 1999. Radio telemetry study of Bufo californicus, arroyo toad movement patterns and habitat preferences. Contract Report to California Department of Transportation Southern Biology Pool.

Hill, S. R. 2012. Sidalcea. The Jepson eFlora: ucjeps.berkeley.edu/IJM.html, retrieved 25 Jul. 2012.

Hitchcock, C. L. 1957. A study of the perennial species of Sidalcea. Part I. Taxonomy. *University of Washington Publications in Biology* 18: 1-79.

Hoover, Robert. 1970. The vascular plants of San Luis Obispo County. Berkeley, CA: University of California Press.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Jennings, C.W., Strand, R.G., and Rogers, T.H., 1977, Geologic map of California: California Division of Mines and Geology. http://mrdata.usgs.gov/geology/state/state.php?state=CA

Koontz J. and Warnock, Michael J. 2012. Delphinium. In B.G. Baldwin et al. (eds.), Jepson Manual II: Vascular Plants of California. Univ. of California Press, Berkeley. Retrieved from ucjeps.berkeley.edu/jepsonmanual/review/ on [08/01/2011].

Kus, B, S. Hopp, R. Johnson, and. B. Brown. 2010. Bell's Vireo (Vireo bellii), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/035.

Lewis, H.. 2012. Clarkia. In B. G. Baldwin et al. (eds.), Jepson Manual II: Vascular Plants of California. Univ. of California Press, Berkeley. Retrieved from ucjeps.berkeley.edu/jepsonmanual/review/ on [08/01/ 2011].

Mann, R.M. and J.R. Bidwell. 2000. Application of the FETAX protocol to assess the developmental toxicity of nonylphenol ethoxylate to Xenopus laevis and two Australian frogs. Aquatic Toxicology 51: 19-29.

Marshall, J.T. 1948. Ecological races of song sparrows in the San Francisco Bay region. Part 1. Habitat and abundance. Condor 50:193-215.

Moyle, Peter B., Yoshiyama, R.M., Williams, J.E., and E.D. Wikramanayake. 1995. Fish Species of Special Concern in California. Department of Wildlife and Fisheries Biology, University of California, Davis. Davis, California. 95616.

National Marine Fisheries Service (NMFS). 1997. Endangered and Threatened Species: Listing of Several Evolutionary Significant units (ESUs) of West Coast Steelhead. Federal Register 62(159):43937-43953.

National Marine Fisheries Service. 2008. Final biological opinion for United Water Conservation District's proposal to operate the Vern Freeman Diversion and Fish-Passage Facility. National Marine Fisheries Service, Southwest Region. July 23, 2008.

National Marine Fisheries Service. 2012. Southern California Steelhead Recovery Plan. Southwest Regional Office, National Marine Fisheries Service. Long Beach, California. January 2012.

Native Range, INC. 2008. Survey Report for the Santa Ynez River Tamarisk and Arundo Project. Ventura, CA

Nolan, V., Jr. 1968f. San Diego Song Sparrow, pp. 1555-1556 in Life histories of North American thrushes, kinglets and their allies (A.C. Bent, Ed.), part 3. U.S. National Museum Bulletin No. 196.

Norris, L. A., H. W. Lorz, and S. V. Gregory. 1991. Forest Chemicals. American Fisheries Society Special Publication 19:207-296.

Painter, E.L. 2004. Individual taxon accounts. Science consistency review report. Unpublished document on file, Cleveland National Forest, San Diego, CA.

Perkins, P.J., H.J. Boermans, and G.R. Stephenson. 2000. Toxicity of glyphosate and triclopyr using the frog embryo teratogenesis assay – Xenopus. Environmental Toxicol. and Chemistry 19(4): 940-945.

Phillips, R.W.; Lantz, R.L; Claire, E.W.; Moring, J.R. 1975. Some effects of gravel mixtures on emergence of coho salmon and steelhead trout fry. Transactions of the American Fisheries Society 104:461-466.

Pritchett, D. W. and S. J. Manning. 2009. Effects of fire and groundwater extraction on alkali meadow habitat in Owens Valley, California. *Macroño* 56: 89-98.

Roberson, D. and C. Tenney 1993. Atlas of the Breeding Birds of Monterey County, California. Monterey Peninsula Audubon Society Monterey, CA

Sala, A., S. Smith and S. Devitt. 1996. Water use by Tamarix ramosissima and associated phreatophytes in a Mojave desert floodplain. Ecological Applications 6(3): 888-898.

Sauer, J. R., J. E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966 - 2004. Version 2005.2. USGS Patuxent Wildlife Research Center, Laurel, MD. http://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Sedgwick, James A. 2000. Willow Flycatcher (Empidonax traillii), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/533.

Shafroth, P.B., J.C. Stromberg and D.T. Patten. 2002. Riparian vegetation response to altered disturbance and stress regimes. Ecological Applications 12(1): 107-123.

Shaforth P.B., J.R. Cleverly, T.L. Dudley, J.P. Taylor, C. Van Riper III, E.P. Weeks and J.N. Stuart. 2005. Control of tamarisk in the western United States: implications for water salvage, wildlife use, and riparian restoration. Environmental Management 35(3): 231-246.

Smith, S. et al. 1998. Water relations of riparian plants from warm desert regions. Wetlands 18:687-696.

Stephenson, John R.; Calcarone, Gena M. 1999. Southern California mountains and foothills assessment: habitat and species conservation issues. (General Technical Report GTR-PSW-172.) Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

SERA (Syracuse Environmental Research Associates, Inc.). 2009. Preparation of Environmental Documentation and risk assessments for the USDA/Forest Service. SERA TP 11-23- 01-012, ATT-3 and SERA MD-2011-01b. November 11, 2011. Syracuse Environmental Research Assoc., Inc. Manlius, New York.

SERA (Syracuse Environmental Research Associates, Inc.). 2011. Imazapyr – Human Health and Ecological Risk Assessment – Final Report. SERA TR 052-43- 29-03a. December 16, 2011. Syracuse Environmental Research Assoc., Inc. Manlius, New York.

SERA (Syracuse Environmental Research Associates, Inc.). 2011. Triclopyr – Human Health and Ecological Risk Assessment – Final Report. SERA TR 52-25-03a. May 24, 2011. Syracuse Environmental Research Assoc., Inc. Manlius, New York.

Stoecker, Matt and Elise Kelley. 2005. Santa Clara river steelhead trout: assessment and recovery opportunities. Prepared for the Santa Clara River Trustee Council and The Nature Conservancy. Stoecker Ecological. December 2005.

Syracuse Environmental Research Associates. 2011b. Imazapyr Human Health and Ecological Risk Assessment Final Report.

Sweet, S.S. 1992. Ecology and status of the arroyo toad (Bufo microscaphus californicus) on the Los Padres National Forest of southern California, with management recommendations. Report to United Sates Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California.

Talley, Steven N. 1974. The ecology of Santa Lucia fir (Abies bracteata), a narrow endemic of California. Ph.D. dissertation, Duke University, Durham, NC.

Titus, R.G., D.C. Erman, and W.M. Snider. 2000. History and status of steelhead in California coastal drainages south of San Francisco Bay. California Department of Fish and Game and the University of California. Draft manuscript July 12, 2000.

Tropicos. 2011. Name search. Saint Louis, Missouri: Missouri Botanical Garden. Available at: http://tropicos.org/

Tucker, G. C. 2002. Cladium. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford Vol. 23. Available at: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=107172

Tucker, G. C. 2012. Cladium. The Jepson eFlora: ucjeps.berkeley.edu/IJM.html, retrieved 5 Jul. 2012.

(USDA (U.S. Department of Agriculture), and USDI (U.S. Department of the Interior). 1995b. Decision Notice/Decision Record Finding of No Significant Impact, Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon, and Washington, Idaho, and portions of California (PACFISH).

U.S. Department of Agriculture Forest Service. 1984. Pesticide background statements, Vol. 1, Herbicides. Agriculture Handbook No. 633. U.S. Department of Agriculture, August 1984.

USDA Forest Service. 1997. Sespe Watershed Analysis. Los Padres National Forest, Santa Barbara County, CA.

USDA Forest Service. 1998. Trends in riparian bird abundance across four National Forests in southern California, 1988-1996. Unpublished report by John Stephenson.

USDA Forest Service. 2000a. Arroyo Seco Watershed Analysis. Los Padres National Forest, Santa Barbara County, CA.

USDA Forest Service. 2000c. Sisquoc Watershed Analysis. Los Padres National Forest, Santa Barbara County, CA.

USDA Forest Service. 2004. Assessment of Herbicide Best Management Practices: Status of Our Knowledge of BMP Effectiveness. Pacific Southwest Research Station, Albany, CA.

USDA Forest Service. 2005. Final Environmental Impact Statement, Land Management Plan Los Padres National Forest.

U.S. Department of Agriculture Forest Service (USDA FS). 2005. Southern California National Forests Land Management Plan Amendment. Species Accounts – Animals. Available at. http://www.fs.fed.us/nepa/nepa_project_exp.php?project=35130

U.S. Department of Agriculture Forest Service (USDA FS). 2012. Ring-necked Snake- southern California lineage: Diadophis punctatus. Region 5 Sensitive species account. Unpublished document on file with the USDA Forest Service Region 5. Vallejo, CA.

USDA Forest Service. 2011a. Management Indicator Species Account for Song Sparrow in the Southern California Province. Unpublished report on file with the Los Padres National Forest. Goleta, CA.

USDA Forest Service. 2011b. Management Indicator Species Account for Arroyo Toad in the Southern California Province. Unpublished draft report on file with the Los Padres National Forest. Goleta, CA.

U.S. Environmental Protection Agency. 1998. Reregistration eligibility decision (RED) – Tricloppyr. EPA738-R-98-011. U.S. Environmental Protection Agency, Washington DC. October 1998.

U.S. Environmental Protection Agency. 2006. Reregistration eligibility decision (RED) – Imazapyr. EPA738-R-06-007. U.S. Environmental Protection Agency, Washington DC. June 2006.

U.S. Environmental Protection Agency. 2007. Risks of imazapyr use to federally listed California red-legged frog (Rana aurora draytonii). Pesticide effects determination. Environmental Fate and Effects Division Office of Pesticide Programs. Washington DC. July 20, 2007.

U.S. Environmental Protection Agency. 2009. Risks of triclopyr use to federally threatened California red-legged frog (Rana aurora draytonii). Pesticide effects determination. Environmental Fate and Effects Division Office of Pesticide Programs. Washington DC. October 19, 2009.

U.S. Department of the Interior Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo; Final Rule. Federal Register Volume 59, Number 22.

U.S. Department of the Interior Fish and Wildlife Service. 1998. Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service. Portland, OR. 139 pp.

U.S. Department of the Interior Fish and Wildlife Service. 1999. Arroyo southwestern toad (Bufo microscaphus californicus) recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

U.S. Department of the Interior Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher Recovery Plan. U.S. Fish and Wildlife Service. Albuquerque, New Mexico. i-ix + 210 pp., Appendices A-O.

U.S. Department of the Interior Fish and Wildlife Service. 2007. Kern primrose sphinx moth (Euproserpinus euterpe) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Field Office. Sacramento, California.21 pp.

U.S. Department of the Interior Fish and Wildlife Service. 2009. Arroyo southwestern toad (Bufo californicus (=microscaphus)). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Ventura, California. August 2009.

U.S. Department of the Interior Fish and Wildlife Service. 2010. Blunt-nosed leopard lizard (Gambelia sila) 5-year review: Summary and evaluation. U.S. Fish and Wildlife Service. Sacramento Fish and Wildlife Field Office. Sacramento, California. 79 pp.

U.S. Department of the Interior Fish and Wildlife Service. 2011. Endangered and Threatened Wildlife and Plants; 5-Year Reviews of Species in California, Nevada, and the Klamath Basin of Oregon. Contact: U.S. Fish and Wildlife Service. Sacramento Fish and Wildlife Field Office. Sacramento, California. 6 pp.

U.S. Department of the Interior Fish and Wildlife Service. 2012. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To Delist or Reclassify From Endangered to Threatened Six California Species. U.S. Fish and Wildlife Service. Sacramento Fish and Wildlife Field Office. Sacramento, California. 6 pp.

USDI Fish and Wildlife Service. 2014. Arroyo toad (*Anaxyrus californicus*) Species Report. Available at:
http://www.fws.gov/ventura/docs/Arroyo%20Toad%20Final%20Species%20Report.pdf

U.S. Fish and Wildlife Service. 1997. Draft recovery plan for the Pedate Checkermallow (*Sidalcea pedata*) and the Slender-Petaled Mustard (*Thelypodium stenopetalum*). U.S. Fish and Wildlife Service. Portland, Oregon. 65 pp.

Wetherwax, Margriet. 2012. Orobancheae, Scrophulariaceae. In B. G. Baldwin et al. (eds.), Jepson Manual II: Vascular Plants of California. Univ. of California Press, Berkeley. Retrieved from ucjeps.berkeley.edu/jepsonmanual/review/ on 13 May 2011.

Personnel communications

Austin, Terry. Forester, Ojai District, Los Padres National Forest. [Conversation with Mike Foster, Forest botanist, Los Padres National Forest.] 2003.

Wilken, Dr. Dieter. Vice-president, Programs and Collections, Santa Barbara Botanic Garden. [Telephone conversation with Mike Foster]. February 7, 2003.

Internet sources:

USFS. 2005. MIS species accounts created for the 2005 southern California LMPs. http://fsweb.cleveland.r5.fs.fed.us/sccs/animals/

California Partners in Flight. California Partners in Flight, Bird Conservation Plan: Song sparrow. http://www.prbo.org/calpif/htmldocs/species/riparian/sospacct.html

California Wildlife Habitat Relationships System, Song sparrow. http://www.dfg.ca.gov/whdab/html/B505.html

Big Sur Ornithological Lab, Ventana Wilderness Society. P.O. Box 894 Carmel Valley, CA. http://www.ventanaws.org/lab.htm.

www.werc.usgs.gov/hq/pdfs/bozeman1.pdf [2005, July 13]

Appendices

Appendix A - General Herbicide Properties

General characteristics for the proposed herbicides are displayed below; these were compiled from the R6 2005 FEIS, label information and SERA Risk Assessments, the San Bernardino Palm Canyon Tamarisk EA, and the Umatilla, and Wallowa-Whitman Invasive Plants EIS.

Imazapyr

There are no studies on the effects of imazapyr on soil invertebrates, and incomplete information on the effects on soil microorganisms.

- One study indicates cellulose decomposition, a function of soil microorganisms, can be decreased by soil concentrations higher than concentrations expected from USDA Forest Service applications.
- There is no basis for asserting adverse effects to soil microorganisms.
- Imazapyr degrades in soil, with a half-life of 25 to 180 days.
- Degradation rates are highly dependent on microbial action.
- Anaerobic conditions slow degradation.
- Adsorption increases with time as soil dries and is reversible.
- Field studies indicate that imazapyr remains in the top 20 inches of soil and do not indicate any potential for imazapyr to move with surface water.
- In forest field studies, imazapyr did not run off and there was no evidence of lateral movement.
- Modeling results indicate imazapyr runoff is highest in clay and loam soils with peaks after the first rainfall.
- Imazapyr percolation is highest in sandy soils

Triclopyr

The five commercial formulations of triclopyr contain one of two forms of triclopyr, BEE (butoxyethyl ester) or TEA (triethylamine). Triclopyr BEE is much more toxic to aquatic organisms than triclopyr TEA. A breakdown product, TCP (3,5,6-trichloro-2-pyridinol), is more toxic than either form of triclopyr. Site-specific cumulative effects analysis buffer determinations need to consider the form of triclopyr used and the proximity of any aquatic triclopyr applications, as well as toxicity to aquatic organisms.

- Triclopyr has not been studied on soil invertebrates.

- Soil fungi growth was inhibited at concentrations 2 to 5 times higher than concentrations expected from USDA Forest Service application rates.
- Triclopyr has an average half-life in soil of 46 days, while TCP has an average half-life in soil of 70 days. Warmer temperatures decrease the time to degrade triclopyr.
- Soil adsorption is increased as organic material increases and decreased as pH increases. Triclopyr is weakly adsorbed to soil, though adsorption varies with organic matter and clay content. Both light and microbes degrade triclopyr.

Appendix B - Five-Step Project Screening Process for Riparian Conservation Areas

The five-step screening process for riparian conservation areas is used to ensure that RCAs are recognized, emphasized, and managed appropriately during project planning and implementation. In RCAs that include perennial and intermittent streams, lakes, and wetlands, the LMP allows only actions that maintain or improve long-term aquatic and riparian ecosystem health including quantity, quality, and timing of stream flows.

Step 1: Determine RCA widths based on criteria outlined in the LMP.

RCA widths are applied across the LPNF as 328 feet (100 m) on each side of the bank full edge of perennial streams, and 98 feet (30 m) on each side of seasonally flowing or intermittent streams. For streams in inner gorge (adjacent stream slopes < 70% gradient), the RCA extends from the stream channel to the top of the inner gorge on both sides. Special aquatic features such as lakes, wetlands, seeps, and springs also receive 328 ft RCAs (LMP Part 3, Appendix E).

Step 2: Determine additional protective RCA widths specific to individual species of concern.

For streams identified as Critical Habitat for steelhead, the project description includes 328 feet RCA widths along these streams.

Step 3: Compare project proposal to LMP riparian and aquatic desired conditions (Part 1 Goals 5.2 and 6.2) and recovery plans for federally listed riparian dependent species to determine if proposal is neutral or will move the area closer towards desired conditions:

This project was screened against the desired conditions of Goal 5.2 and 6.2 (see LMP Goals section). The purpose of the Tamarisk Removal Project is to eliminate and or reduce the spread of invasive non-native tamarisk. The project design standards and incorporated resource protection measures will minimize or prevent adverse effects to aquatic species of concern and their habitat at the site scale and minimize effects to these species at the watershed scale, thus will have a neutral effect on threatened, endangered and sensitive species.

Implementation of the project will improve riparian stability where invasive plants have colonized along stream channels and out-competed native species. Long-term beneficial effects from the reduction of invasive plants and subsequent increases in desirable vegetation in riparian areas, wetlands, and streams will result in improved riparian function, RCAs that are more resilient to disturbance and generally improved watershed conditions. Overall, tamarisk removal will maintain or improve existing riparian vegetation conditions, improve the structure and species diversity of plant communities in RCAs and improve overall channel processes at both the site and watershed scales. All aspects of the Tamarisk Removal Project will move treatment areas towards desired conditions.

Step 4: Ensure that the project incorporates one or more of the listed strategies of LMP riparian management objectives (LMP Part 2, Appendix B Program Strategies and Tactics, WAT-1 and WAT-2).

WAT-1 (Watershed Function) Protect, maintain and restore natural watershed functions including slope processes, surface water and groundwater flow and retention, and riparian area sustainability:

Restore, maintain and improve watershed conditions.

Manage Riparian Conservation Areas (RCA) to maintain or improve conditions for riparian dependent resources.

Achieve and maintain natural stream channel conductivity, connectivity and function

WAT-2 (Water Management) Manage groundwater and surface water to maintain or improve water quantity and quality in ways that minimize adverse effects.

Protect and improve water quality by implementing best management practices and other project-specific water quality protection measures for all national forest and authorized activities.

Conserve and protect high-quality water sources in quantities adequate to meet national forest needs

Invasive and noxious plants such as tamarisk are a threat to overall watershed ecological condition. The Tamarisk Removal Project incorporates several listed strategies under WAT-1 and WAT-2. Removing invasive non-native tamarisk plants from RCAs will improve existing riparian vegetation conditions by allowing native species to re-establish, by promoting an increase in the species diversity of plant communities in RCAs and by increasing riparian area soil cover. Long-term beneficial effects from the reduction of invasive plants in riparian areas, wetlands, and streams and subsequent increases in desirable vegetation will result in improved structure and function of RCAs.

Removal of tamarisk will have positive long term benefits to stream channel function by allowing channel form processes, sediment regimes and flow regimes to return to more natural patterns over time. The function of natural stream channel lateral movements will also be restored. Proposed treatments will return intermittent water sources to more natural wet and dry period timing increasing surface water availability and improving habitat conditions for riparian dependent species.

Project activities move treated RCAs towards being more resilient to disturbance which could decrease impacts to riparian zones from future fires and floods.

Step 5: Refer to Forest Service Handbook (FSH 2509.22) - Forest Supplement for specific guidance about management tactics to apply when conducting activities within RCAs.

All pertinent aspects of FSH 2509.22 have been integrated into the project design and into selected applicable BMPs (Appendix A).

Project actions may result in slight increases in soil erosion and sediment delivery to stream channels for the first season following treatment. Any project generated sediment is expected to be within the range of natural variation for these ecosystems and is not expected to degrade water quality or alter channel or riparian conditions to make them less favorable for aquatic and riparian dependent species.