

# *Appendix L – Best Management Practices*

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## **Lower Klamath, Clear Lake, Tule Lake, Upper Klamath, and Bear Valley Refuges**

Best Management Practices (BMPs) are designed to reduce adverse effects to wildlife and plants and their habitats on lands owned by the U.S. Fish and Wildlife Service (Service). BMPs shall be implemented on Service-owned lands by all project coordinators.

### General BMPs

1. All trash and construction debris shall be disposed of at disposal areas approved in writing by the Service.
2. Standard measures shall be implemented to minimize construction impacts on fish and wildlife, including avoiding unnecessary disturbance to habitats by driving on existing roads, working only in the required area, and minimizing direct disturbance to streams and open water sources.
3. All terms, conditions, and stipulations in regulatory permits and other project authorizations to eliminate or reduce adverse effects to endangered, threatened, and sensitive species and their critical habitats from actions described in the Comprehensive Conservation Plan (CCP), shall be adhered to.
4. Complete restoration activities at individual project sites in a timely manner to reduce disturbance and/or displacement of wildlife in the immediate project area.
5. Use existing roadways or travel paths for access to project sites.
6. Avoid the use of heavy equipment and techniques that will result in excessive soil disturbances or compaction of soils, especially on steep or unstable slopes, except as required for dike maintenance as approved by the refuge manager.
7. Streams, riparian zones, and wetlands shall not be used as staging or refueling areas. Equipment shall be stored, serviced, and fueled a minimum of 150 feet from aquatic habitats and other sensitive areas.
8. A written contingency plan shall be developed for all project sites where hazardous materials (e.g., pesticides, herbicides, petroleum products) will be used or stored. Appropriate materials/supplies (e.g., shovel, disposal containers, absorbent materials, first aid supplies, clean water) shall be available on site to clean up small scale accidental hazardous spill. Hazardous spills shall be reported. Emergency response, removal, transport, and disposal of hazardous materials shall be done in accordance with the U.S. Environmental Protection Agency. Hazardous materials and petroleum products shall be stored in approved containers or chemical sheds and be located at least 150 feet from surface water and in an area protected from runoff.
9. The evaluation of herbicide, pesticide, and fertilizer use shall include the accuracy of applications, effects on target and non-target species, and the potential impacts to aquatic and terrestrial ecosystems. Treatments for the control or removal of invasive plants in

riparian/wetland areas shall be limited to hand or wick applications by qualified personnel. Chemicals shall be applied during calm, dry weather and unsprayed buffer areas shall be maintained near aquatic habitats and other sensitive areas. Chemical applications are prohibited where seasonal precipitation or excess irrigation water is likely to wash residual toxic substances into waterways. All chemicals shall be handled in strict accordance with label specifications. Proper personal protection (e.g., gloves, masks, protective clothing) shall be used by all applicators. The material safety data sheet (MSDS) from the chemical manufacturer shall be readily available to the project coordinators for detailed information on each chemical to be used, in accordance with applicable Federal and State regulations concerning the use of chemicals. Chemicals shall only be considered when other treatments would be ineffective or cannot be applied.

10. Project coordinators shall ensure that all waste resulting from the completion of a project is removed and disposed of properly before work crews vacate the project site.
11. Structures containing concrete or wood preservatives shall be cured or dried a minimum of 36 hours before being placed in streams, riparian zones, or wetlands. No wet concrete or runoff from cleaning tools that have wet concrete slurry or lye dust shall enter aquatic habitats. Runoff control measures shall be employed, such as hay bales and silt fences, until the risk of aquatic contamination has ended.
12. Monitoring is required during restoration project implementation and for at least one year following project completion to ensure that restoration activities implemented at individual project sites are functioning as intended and do not create unintended consequences to fish, wildlife, and plant species and their critical habitats or adversely impact human health and safety. Corrective actions, as appropriate, shall be taken to address potential and existing adverse effects to fish, wildlife, and plants.
13. Prior to equipment use, special status plants and habitats shall be well-marked and communicated to equipment operators to avoid direct and indirect adverse effects.
14. An environmental awareness training program shall be presented to all construction personnel to brief them on the status of the special status species and the required avoidance measures.
15. To protect special status species, the Service will conduct the following activities:
  - (a) trails, roads, and/or areas will be closed to ensure that human access does not disturb special status species;
  - (b) prior to habitat and ground disturbing activities, potential habitat for special status species will be evaluated and, if appropriate, presence/absence surveys and additional mitigation measures taken (e.g., avoid location, change timing of action), if necessary, to ensure that planned activities do not affect special status species; and
  - (c) the Service will comply with all terms and conditions resulting from section 7, Endangered Species Act consultation when specific projects are undertaken.
16. Bank stabilizing vegetation removed or altered because of restoration activities shall be replanted with native vegetation and protected from further disturbance until new growth is well established. Native shrubs, trees, and erosion control seed mixes from only local ecotypes shall be included in the reclamation and restoration of disturbed sites.

17. Sedimentation and erosion controls shall be implemented, when and where appropriate, during wetland restoration or creation activities to maintain the water quality of adjacent water sources.
18. Restoration activities that require prescribed burning shall be planned in coordination with the refuge manager and in accordance with the approved Fire Management Plan.
19. Slash materials shall be gathered by hand or with light machinery to reduce soil disturbances and compaction. Avoid accumulating or spreading slash in upland draws, depressions, intermittent streams, and springs. Slash control and disposal activities shall be conducted in a way that reduces the occurrence of debris in streams. These practices will eliminate or reduce debris torrents, avalanches, flows, and slides.
20. Snags shall be retained on project sites for cavity dependent wildlife species whenever possible.
21. Seedlings, cuttings, and other plant propagules for restoration shall be sourced from local ecotypes.
22. When necessary for invasive plant removal or habitat restoration, trees shall be felled away from streams, riparian zones, and wetlands whenever possible.
23. Livestock crossings and off-channel livestock watering facilities shall not be located in areas where compaction and/or damage may occur to sensitive soils, slopes, or vegetation due to congregating livestock. If livestock fords across streams are rocked to stabilize soils/slopes and prevent erosion, material and location shall be subject to the approval of the refuge manager.
24. Crushed rock is prohibited for use to stabilize fords. Fords shall be placed on bedrock or stable substrates whenever possible.
25. Implement the IPM approach and the best management practices required as part of the IPM Program (Appendix Q) to reduce potentially adverse effects to refuge resources.
26. Construction and habitat management activities shall be implemented during the non-breeding/nesting season for waterfowl to the extent feasible. Disturbance during the breeding/nesting season requires pre-construction surveys to locate active nests and establish buffers around the nest site until a wildlife biologist designated by the Service determines the nest site is abandoned. These and other mitigation measures shall be addressed in site-specific NEPA compliance once the locations of the project areas are identified. New facilities shall be sited in previously disturbed areas, to the extent feasible, and shall be designed to avoid sensitive habitats and affect the least amount of native vegetation.
27. Prior to construction and ground-disturbing activities, project sites and staging areas shall receive pre-watering and other preparations maintaining surface soils in stabilized conditions where support vehicles and equipment will operate.
28. During ground-disturbing activities including clearing, grubbing and earth moving activities, water or an approved dust palliative shall be applied to keep soils moist throughout the process and immediately after completion.

29. Sloping surfaces equal to or steeper than 10% shall be stabilized using soil binders approved in writing by the Service until vegetation can effectively stabilize the slope.
30. Stipulations defined in the Compatibility Determinations shall be implemented in the course of refuge management activities and for refuge use activities conducted under special use permits.

#### Pesticide Application and Integrated Pest Management

31. To protect the health of workers, pesticide applicators shall wear appropriate personal protective gear (e.g., clothing, gloves, and masks) in accordance with state applicators' licensing requirements when applying, mixing, or otherwise handling pesticides on the refuge. Detailed, refuge- and site-specific BMPs are included and implemented through the Service's Pesticide Use Proposal process to protect refuge resources. BMPs for mixing, handling, and applying pesticides for all ground-based pesticide treatments are specified in the IPM Program (Appendix Q).

#### Water/Riparian

32. Ground-disturbing activities shall incorporate the use of sediment barriers or other erosion control devices downstream of the activities.
33. Ground-disturbing activities, vehicles, and machinery are prohibited in water bodies and prohibited within a 150-foot buffer zone surrounding water bodies.
34. Stream crossings will be limited to designated and existing locations.

#### Air and Noise

35. Operation of equipment, machinery, and large vehicles is restricted to daylight hours, between the hours of 8:00 a.m. and 5:00 p.m. unless otherwise specified in writing within the construction contract, special use permit, or by the refuge manager.
36. When hauling operations are being conducted, unpaved access routes shall be wetted each day by the contractor to reduce fugitive dust.
37. To reduce dust, effective cover shall be maintained by the contractor over stockpiled fill or debris materials.
38. Vehicle speeds shall be limited to 15 miles per hour or less in staging areas and on all unpaved access routes; and to 25 miles per hour on paved refuge access roads.
39. Applicable recommendations from the local air quality district shall be implemented to minimize vehicle and equipment emissions during construction and habitat management activities.

#### Hunt-related

40. During movement of hunting blinds and other portable structures, measures shall be taken to minimize generation of dust and erosion. Refuge-specific stipulations are included in the compatibility determinations for hunting for each refuge (Appendix G).
41. Except for spot maintenance by Service staff to remove obstructions, no improvements shall be made to intermittent waterways and no clearing shall be done in forested areas.

## Fire Management

42. Prescribed burning plans will be developed; a burning permit will be obtained from the Air Pollution Control District and adhered to; activities will be coordinated with the Air Pollution Control District.
43. The fire management program at Klamath Basin Refuges will comply with the Air Quality Smoke Management Guidelines presented in the Service's Fire Management Handbook.
44. To reduce the likelihood that prescribed burns would generate substantial volumes of smoke that would drift into populated areas of the Klamath Basin, the Service will continue on-going training of fire personnel and site-specific planning prior to ignition in accordance with the refuge's Fire Management Plan.
45. Small unit sizes, wind direction, and distance to receptors will be considered to mitigate adverse effects of prescribed burns.
46. Fire lines shall be located outside of highly erosive areas, steep slopes, intermittent streams, riparian areas, and other sensitive areas.
47. The use of fire retardants and foams are prohibited in riparian areas.
48. At Bear Valley NWR, mechanical thinning (large equipment) are prohibited within 100 feet of intermittent streams and steep slopes (>35% slope);
49. At Bear Valley NWR, mechanical equipment shall be restricted in operations to dry or frozen ground (<20% soil moisture).
50. At Bear Valley NWR, thinning and prescribed fire operations will be concentrated between August 1 and November 15 to avoid potential impacts to nesting and/or roosting bald eagles.
51. During the peak bald eagle roosting period (November 15-April 1), Service personnel may enter the refuge to conduct habitat management (treatment unit) reconnaissance and layout; however, this activity shall only occur in the refuge during the daylight hours when the eagles are not present (approximately between 9:00 a.m. and 3:00 p.m.).
52. During the bald eagle nesting season (April 1 through July 31), prescribed fire will be allowed on some stands in the spring months and thinning efforts will be allowed on some stands during the spring and summer months after consultation with and clearance from an endangered species biologist(s) designated by the Service, and only after meeting the following mitigation measures:
  - (a) work shall be prohibited within ½-mile from active nests;
  - (b) a wildlife observer may be stationed to watch active nests for any disturbance caused by smoke or noise from thinning and prescribed fire activities (on Pearson Butte at Bear Valley NWR);
  - (c) work shall be immediately curtailed in the event that disturbance was observed;
  - (d) backing fires shall be used when possible to limit smoke production. All burns shall be aggressively mopped-up (managed until out); and
  - (e) burn prescriptions shall be written to minimize the potential for high-intensity fire and to avoid severe drought and/or high wind conditions.

53. All sites where improvements are made or obstructions removed will be rehabilitated to pre-fire conditions, to the extent practicable.
54. Whenever consistent with safe, effective suppression techniques, the use of natural barriers will be used as extensively as possible.
55. Following the conclusion of fuels thinning activities, road improvements shall be made, as necessary, to repair damage to the access roads resulting from vehicle and equipment use associated with thinning operations.

#### Fire Management - Cultural Resources

56. Prior to all thinning and prescribed fire activities, cultural resources in treatments areas will be identified and avoided.
57. If unrecorded cultural resources are discovered during thinning and prescribed fire activities, all work in the immediate vicinity of the cultural resource will stop until an archeologist designated by the Service surveys and records the location, and issues a written notice allowing work to resume.
58. Continued training of fire personnel and careful planning prior to ignition would continue to reduce the likelihood that prescribed burns on the refuge lands would escape and become wildfires.
59. No handlines exposing mineral soil will be allowed through cultural sites, and all handlines will be revegetated with an endemic native erosion control seed mix. Erosion control methods will be used on slopes exceeding 30% where handline construction takes place.

#### Cultural Resources

60. Potentially adverse effects to cultural resources shall be minimized through cultural resource reviews, surveys, and compliance with section 106 of the National Historic Preservation Act (NHPA). All sites discovered in the future shall be treated as eligible for listing on the National Register of Historic Places (NRHP) until listed or formally evaluated as ineligible in consultation with the State Historic Preservation Officer (SHPO).
61. Under federal ownership, archaeological and historical resources within a refuge receive protection under federal laws mandating the management of cultural resources, including, but not limited to, Archaeological Resources Protection Act (ARPA), AHPA, Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and National Historic Preservation Act (NHPA). Should any cultural resources be discovered on the refuges, ground-disturbing activities shall be stopped immediately and not resumed until authorized in writing by the Service to do so. The Service will take all necessary steps to comply with section 106 of the NHPA, in consultation with the SHPO and pertinent tribes.
62. Sites identified in the future could be found to contain human remains, funerary items, sacred objects, or items of cultural patrimony and may therefore require consideration under the NAGPRA). The Service will comply with the NAGPRA consultation process and other applicable laws and guidance required for consideration of human remains.

63. Under federal ownership, paleontological resources within a refuge receive protection under federal laws mandating the management of paleontological resources, including, but not limited to, Paleontological Resources Preservation Act (Public Law 111-011) (Omnibus Public Land Management Act of 2009). Collection of paleontological resources is prohibited on the Refuges. Under the provisions of the Act, the Service may restrict access or close areas to further protect paleontological resources or for public safety.

#### Public Use

64. Areas under construction or being restored would be temporarily closed to public use for public safety. These areas will be adequately marked and information on other recreational areas will be provided to the public.
65. Construction will be scheduled during the week or during slower seasons when feasible, to minimize the impacts of construction traffic on public access.

#### **References Cited**

Pacific Flyway Council. 1997. Pacific Flyway management plan for the Central Valley Population of Greater Sandhill Cranes, Pacific Flyway Study Comm. [c/o Pacific Flyway Representative USFWS], Portland, OR 97232-4181. Unpubl. Rept. 44pp. + appendices.