

4. Natural Resources

4.1 Overview

4.1.1 Introduction

Four broad categories of vegetation are found within the New Melones Lake Area: woodlands, grasslands, wetlands, and serpentine. Management actions include conserving and enhancing oak woodlands, perennial grasslands, chaparral, riparian areas, vernal pool, and serpentine-based communities. These vegetation communities, in combination with the lake itself, shape the wildlife communities. Caves and the cliffs associated with Table Mountain provide important bat habitat, the lake hosts a number of water birds, and ponded swale habitat on Table Mountain provides breeding grounds for amphibians. These limited habitats, in combination with several other habitat types involving grasslands, woodlands, and wetlands, combine to create a diverse wildlife community in the planning area. Wildlife management has been relatively limited to date.

No listed plant species have been documented in the planning area. One delisted¹ animal species, the bald eagle (*Haliaeetus leucocephalus*), occurs primarily in winter, and has been observed nesting at New Melones Lake for at least two years, in 2005 and 2006. Three nests were documented in 2006. Several other special status species have been observed in the RMP area.

The fishery in the lake is managed primarily for sport fishing. Most of the confirmed species have been introduced to the lake, including all but one of the game fish. Both warm and cold water sport fish species are present, and the lake is well regarded for excellent fishing opportunities. Kokanee salmon (*Oncorhynchus nerka*) were introduced to the lake in 1997. Salmon and steelhead that historically ran up the Stanislaus River are now blocked by dams.

Section 4.2 contains a description of fish and wildlife in the New Melones Lake Area, and is organized into the following subsections:

- **General Fish and Wildlife Species and Communities:** This subsection describes fish and wildlife found in the New Melones Lake Area that are not considered sensitive, which are not listed under the Federal Endangered Species Act, and which are not covered under any specific regulations.
- **Endangered, Threatened, Proposed, or Candidate Fauna:** This subsection describes species that appear on the Federal Endangered Species List and their likelihood of being found in the project area.

¹ As of August 9, 2007, the bald eagle is no longer protected under the Endangered Species Act.

- **Critical Habitat for Fish and Wildlife:** This subsection describes proposed or designated critical habitat for listed fish or wildlife species found in the project area.
- **All Other Special Status Fauna:** This subsection describes fish and wildlife species that are considered sensitive or which receive some level of protection under regulations other than the Federal ESA.

Section 4.3 describes vegetation in the New Melones Planning Area, and is organized into the following subsections:

- **General Plant Species and Communities:** This subsection describes plant species and communities found in the area that are not protected under any specific regulations.
- **Endangered, Threatened, Proposed, or Candidate Flora:** This subsection describes plant species that appear on the Federal Endangered Species List and their likelihood of being found in the project area.
- **Critical Habitat for Plants:** This subsection describes any proposed or designated critical habitat for listed plant species found in the project area.
- **All Other Special Status Flora:** This subsection describes plant species that are considered sensitive or which receive some level of protection under regulations other than the Federal ESA.
- **Sensitive Habitat Types:** This subsection describes habitat types that are rare, contain endemic species, are protected under specific regulations, or of which only small areas remain intact.

4.1.2 Management Authority and Relevant Regulations

Natural resources in the New Melones Lake Area are managed under a number of laws, agreements, Executive Orders, and Reclamation-specific guidance, as described below:

Fish and Wildlife

- **Fish and Wildlife Coordination Act of 1934:** This Act requires consultation with USFWS and state agencies whenever the waters or channels of a body of water are modified by a department or agency of the U.S, with a view to the conservation of wildlife resources. It provides that land, water and interests may be acquired by Federal construction agencies for wildlife conservation and development.
- **Sikes Act of 1974:** This Act directs the Secretaries of Interior and Agriculture to, in cooperation with the State agencies, develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish, and game. Such conservation and rehabilitation programs shall include, but are not limited to, specific habitat improvement projects and related activities and adequate protection for species considered threatened or endangered.
- **North American Waterfowl Management Plan of 1986:** This plan was signed between Canada and USA and aims to conserve migratory birds throughout the continent. Further, it

sets population goals for waterfowl and provides guidance as to how these goals can be achieved.

- **Reclamation Manual Directive/ Standard LND 01-01: Implementation of the Cost-Sharing Authorities for Recreation and Fish and Wildlife Enhancement.**

Protected Species

- **Federal Endangered Species Act of 1973:** This Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. It is designed to protect critically imperiled species from extinction due to "the consequences of economic growth and development untempered by adequate concern and conservation".
- **US Migratory Bird Treaty Act of 1918:** This Act establishes a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, ... any migratory bird . . . or any part, nest, or egg of any such bird."
- **Bald Eagle Protection Act of 1940:** This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds.
- **Reclamation Manual Policy ENV P04: Reclamation Consultation under the Endangered Species Act of 1973, as amended.**

Vegetation and Sensitive Habitats

- **Reclamation Manual Policy LND P03: Wetlands Mitigation and Enhancement-** Establishes policy for Reclamation to use in determining appropriate mitigation for all actions affecting wetlands. Encourage activities protecting, preserving, and enhancing wetlands.
- **Federal Noxious Weed Act of 1974:** This Act provides for the control and management of nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Under this Act, the Secretary of Agriculture was given the authority to designate plants as noxious weeds, and inspect, seize and destroy products, and to quarantine areas, if necessary to prevent the spread of such weeds.
- **Executive Order 13112 "Invasive Species":** This EO, signed in 1999, directs Federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. To do this, the EO established the National Invasive Species Council; currently there are 13 Departments and Agencies on the Council.
- **Reclamation Manual Policy LND P03: Wetlands Mitigation and Enhancement.**

4.1.3 Other Plans That Will Be Considered

Reclamation will coordinate natural resource management with regulatory agencies and neighboring land managers to the degree possible. To facilitate this process, Reclamation has invited representatives of these agencies to participate in the RMP/EIS preparation process. In

addition to coordinating directly with agencies, Reclamation will consider management actions from other plans when preparing their own management actions. Other plans to be reviewed may include:

- **Sierra Draft RMP/EIS (BLM 2006).** BLM manages approximately 34,000 acres in Calaveras County and 46,000 acres in Tuolumne County. The Sierra Draft RMP/EIS addresses Federally listed and BLM-listed species and proposes to implement conservation strategies to protect individual special status species. Reclamation coordinates informally with the BLM for a number of joint management issues, including managing special status plants. Although there is no formal management agreement in place between Reclamation and the BLM for issues that require coordination, the two agencies have agreed to better coordinate management on these issues.
- **USFWS Recovery Plans.** A recovery plan for vernal pool ecosystems outlines recovery strategies and criteria for 33 species of plants and animals that occur primarily in vernal pool ecosystems, such as succulent owl's clover (USFWS 2005). A recovery plan for gabbro soil plants of the Central Sierra Nevada foothills, which includes Layne's ragwort, was developed in 2002 (USFWS 2002a). In addition, a recovery plan for Ione plants, including Ione manzanita, is under development (USFWS 2007d). Also under development is a recovery plan for Southern Sierran Foothills plants, which will address Chinese Camp brodiaea, Hartweg's golden sunburst, and California vervain recovery (USFWS 2007c, 2007e, 2007f). Reclamation will incorporate measures from recovery plans for any other listed species that occur in the New Melones Lake Area into the RMP/EIS.

Any management of critical habitat at New Melones Lake will be coordinated with the USFWS.

- **Stanislaus National Forest Plan Direction (USFS 2005).** This document outlines listed species management measures and an integrated weed management program for the Stanislaus National Forest. Although Reclamation does not regularly coordinate weed management with USFS, shared weed issues may be better managed in a cooperative manner.
- **California Department of Fish and Game (CDFG).** Although CDFG does not have specific management plans that Reclamation must comply with, Reclamation will coordinate with CDFG for management of fisheries, wetlands and streambed issues, and for regulation of recreational gold mining.

4.1.4 Trends

Fish and Wildlife. Kokanee salmon were introduced to the lake in 1997 and have increased substantially in numbers. Other sport fish species were introduced by CDFG in 1995, and continue to be introduced, with funding from sportfishing sponsors. Because the lake is relatively new and is managed as a sport fishery including nonnative species, the composition of the fish community and other aquatic organisms is likely to continue to evolve substantially in the next 15 to 20 years. In addition, introduced wildlife species, such as feral pigs and wild turkeys, have increased in abundance at New Melones Lake.

Future increases in recreational use could increase disturbance of wildlife and their habitats in the planning area, necessitating additional management and enforcement actions. Very limited wildlife survey data in the planning area prevent much trend analysis in wildlife populations.

Listed Fish and Wildlife. Bald eagles were delisted on August 9, 2007, but are still protected by the Bald Eagle Protection Act and the Migratory Bird Treaty Act. Numbers of bald eagles have increased substantially across the continental United States since the dam was constructed and the lake filled in the 1970s. Increased recreational use of the lake could increase conflicts between protecting the species and recreational use necessitating an increase in management and enforcement.

The number of species that occur in Calaveras and Tuolumne Counties protected under the Endangered Species Act has increased since the lake was constructed and will likely increase slightly over the next 15-20 years.

Critical Habitat. In recent years, the USFWS has been hesitant to designate additional critical habitat for any species. The exception to this is when it is pressured to do so by the public or required to by a legal challenge. Unless new populations of the species mentioned above are found within the planning area, it is doubtful that new critical habitat will be designated to include Reclamation lands.

Listed Plant Species. None of the listed species have been recorded within the planning area and, due to their distance and distance from the habitat at the lake, are not likely to spread to the project area in the near future. All of the listed species are threatened by habitat loss and invasive species.

Weeds. Many sensitive habitats are currently threatened by noxious weed invasion and unregulated human use (Reclamation 2006b). A trend toward greater regional cooperation among agencies to control weeds has been occurring on public lands in the West and may benefit sensitive habitats in the planning area.

Unregulated human use in the planning area, particularly along the PWMA access road, has facilitated the spread of invasive and noxious weeds (Reclamation 2006b). In addition, weed species such as annual grasses, yellow star thistle, barbed goat grass and medusa head may invade the habitat of serpentine endemic species (BLM 2004, Safford and Harrison 2004, Kruckeberg 1984 in Ayres 2005). The likely source for weed species to spread into the habitat of these special status species would be via the upland annual grassland (Ayres 2005).

4.2 Fish and Wildlife

4.2.1 General Fish and Wildlife Species and Communities

Current Conditions

Fish. The Stanislaus River and New Melones Lake are part of the Sacramento-San Joaquin drainage system, a large interior system draining the west slope of the Sierra Nevada Mountains, the east slope of the Coast Ranges, and the southern Cascade Mountains, Warner Mountains, and Goose Lake to the north (Reclamation 1995). The native fish of the Stanislaus River likely included spring-run chinook salmon (*Oncorhynchus tshawytscha*), rainbow/steelhead trout (*Oncorhynchus mykiss*), Sacramento sucker (*Catostomus occidentalis*), large minnows, such as hardhead (*Mylopharodon conocephalus*), Sacramento squawfish (*Ptychocheilus grandis*), hitch (*Lavinia exilicauda*), and one or two species of sculpin (*Cottus spp.*). Some of the numerous fish species introduced by humans to the Sacramento-San Joaquin system likely also colonized the Stanislaus River prior to dam construction, and others, such as bass (*Micropterus spp.*) and catfish (*Ictalurus catus*, *I. nebulosus*, *I. punctatus*), have been introduced to New Melones Lake as sport fish. Ongoing efforts to stock various species of bass are carried out by local bass clubs and CDFG, and often occur without prior consent from Reclamation.

The Stanislaus River in the region of New Melones Lake would fit two categories in the freshwater classification scheme for California developed by Moyle and Ellison (1991): spring chinook stream and hardhead-squawfish stream. A spring chinook stream is defined as a third to fifth order stream at elevations of 1,500 to 4,500 feet, with deep canyons containing deep cold pools that can sustain spring chinook salmon through summer. A hardhead-squawfish stream is defined as a low- to mid-elevation stream with deep bedrock pools, clear, cool water (below 25 degrees Celsius), and characteristically containing hardhead, Sacramento squawfish, Sacramento sucker, and two to three other species. New Melones Lake would be classified under artificial habitats, as a cool water stratified reservoir.

The fish species known to occur or most likely to occur in the reservoir or its tributaries are listed in Table R-15.

Table R-15: Fish Species of New Melones Lake

Common Name	Scientific Name	Origin	Comments
<u>Minnows and Carps</u>	<u>Cypriniformes</u>		
Sacramento sucker	<i>Catostomus occidentalis</i>	N	C
Common carp	<i>Cyprinus carpio</i>	I	C
Hitch	<i>Lavinia exilicauda</i>	N	P
Hardhead	<i>Mylopharodon conocephalus</i>	N	P
Golden shiner	<i>Notemigonus crysoleucas</i>	I	C
Sacramento blackfish	<i>Orthodon microlepidotus</i>	N	C
Sacramento squawfish	<i>Ptychocheilus grandis</i>	N	C
<u>Catfish</u>	<u>Siluriformes</u>		
White catfish	<i>Ictalurus catus</i>	I	C
Brown bullhead	<i>I. nebulosus</i>	I	C

Common Name	Scientific Name	Origin	Comments
Channel catfish	<i>I. punctatus</i>	I	C
<u>Trout and Salmon</u>	<u>Salmoniformes</u>		
Rainbow trout	<i>Oncorhynchus mykiss</i>	N	C
Kokanee salmon	<i>O. nerka</i>	I	C
Brown trout	<i>Salmo truna</i>	I	C
<u>Livebearers</u>	<u>Cyprinodontiformes</u>		
Western mosquitofish	<i>Gambusia affinis</i>	I	P
<u>Scorpion Fish</u>	<u>Scorpaeniformes</u>		
Prickly sculpin	<i>Cottus asper</i>	N	P
Riffle sculpin	<i>C. gulosus</i>	N	P
<u>Perch, Freshwater Sunfish</u>	<u>Perciformes</u>		
Green sunfish	<i>Lepomis cyanellus</i>	I	C
Bluegill	<i>L. macrochirus</i>	I	C
Red-eye bass	<i>Micropterus coosae</i>	I	C
Spotted bass	<i>M. punctularus</i>	I	U
Largemouth bass	<i>M. salmoides</i>	I	C
White crappie	<i>Pomoxis annularis</i>	I	C
Black crappie	<i>P. nigromaculatus</i>	I	C

Notes: N = native species, I = introduced species, C = confirmed, P = probable, U = unlikely
Source: USGS 2007

Chinook salmon are restricted to the river downstream from New Melones Lake, although chinooks were successfully planted in the reservoir in 1985 by the California Department of Fish and Game (CDFG) to enhance the sport fishery. Those salmon are no longer present, and a Chinook salmon fishery in the reservoir could be maintained only by regular stocking. The present sport fishery in the lake is focused on rainbow and brown trout (*Salmo truna*), largemouth bass (*Micropterus salmoides*), other sunfishes, such as black crappie (*Pomoxis nigromaculatus*) and bluegill, and three species of catfish. Kokanee salmon, which are land-locked sockeye salmon, were introduced to the lake in 1997.

The large native minnows and suckers, and introduced carp, although edible and catchable, are generally ignored by sport fisherman. The bass, crappie, bluegill, and smaller species of catfish (white catfish and brown bullhead) are regarded as shallow-water, warm-water species, and are sought by fisherman, and caught in the warm upper layer of water on the reservoir, mainly around the shoreline. The catfish live on the soft lake bottom, whereas the sunfishes (e.g., bass and crappie) typically occupy territories offering some kind of cover (e.g., snags, logs, rocks, and emergent plants). Thus, prime areas for fisherman seeking sunfishes are shorelines with a lot of relief, such as cliffs or rock outcrops, and especially those narrow arms and coves with many drowned trees, logs, and marsh areas. Shorelines from which trees and brush have been cleared for aesthetic or other purposes are much less important to these species.

Rainbow trout, brown trout, and the large channel catfish are generally restricted to colder, deeper water during the summer when the reservoir has two distinct thermal layers of water, although large brown trout and channel catfish are often caught in shallow water near steep

banks at night, when they ascend in search of food. Rainbow trout generally feed only in the daytime and remain in the deep water. In fall, when the lake “turns over,” thermal stratification disappears and both species of trout may be caught in shallower water through winter and spring. Trout are also vulnerable to shallow-water fishing in tributary arms in late summer, when they enter tributaries to spawn.

The lake’s perennial tributary streams and their associated lake arms are critically important aquatic habitat. The cool, clean water, and gravel beds of these tributaries are likely to be trout spawning and rearing areas. Artificial habitat was created at the time of construction and still exists near the spillway.

Wildlife. The planning area contains a diverse range of wildlife habitats typical of the lower Sierra Nevada foothills, including open water, riparian, and oak woodland communities in the lower lake area to montane hardwood and montane hardwood-conifer woodlands in the upstream canyon area. Consequently, a diverse range of bird, mammal, reptile, amphibian, and invertebrate species are also present. Numbers and species of birds vary by season, habitat, weather, and migration patterns. Section 4.2 (vegetation) contains additional information on vegetation communities that make up wildlife habitats. The following sections describe wildlife resources by habitat type.

Open Water and Riparian Areas. The open water of New Melones Lake, along with associated shoreline vegetation, provides foraging and resting habitat for a variety of waterfowl and shorebirds, such as ruddy (*Oxyura jamaicensis*), ring-necked (*Aythya collaris*), and mallard ducks (*Anas platyrhynchos*), grebes, and coots. Several fish-eating bird species, such as grebes, forage in the open water. Other bird species, such as ducks, herons, and egrets, dabble along the shoreline foraging on seeds and small fish in shallow areas. Fowl hunting is permitted in the New Melones Lake Area, and is regulated by CDFG. Please see Section 7.2 for further discussion of hunting opportunities.

Trees along the shoreline provide nesting substrate for some of these species, such as osprey, adjacent to preferred foraging habitat. Riparian areas along larger tributaries to New Melones Lake provide important habitat for a diverse species assemblage. These shaded, moist, and typically densely vegetated corridors provide food, cover, water, and nesting habitat, and they serve as travel corridors for species such as black-tailed deer (*Odocoileus hemionus columbianus*). Perennial streams provide a year-long source of water for mammals, reptiles, and amphibians and a large assortment of species, including several bird species, require riparian zones for breeding and foraging needs. Deer hunting is permitted in New Melones Lake Area, and is regulated by CDFG. Most deer hunting occurs in Peoria Wildlife Management Area. Other species hunted here include California quail (*Callipepla californica*), wild turkey (*Meleagris gallopavo*), and mourning dove (*Zenaida macroura*). Please see Section 7.2 for further discussion of hunting opportunities.

Oak Woodlands. Oak woodlands are interwoven with grasslands at lower elevations and more conifer-dominated woodlands at higher elevations. In association with a grassy understory, oak woodlands cover virtually all of the gently rolling hills which surround New Melones Lake. Wildlife species within these woodlands vary depending on microhabitat features. Where oak woodland occurs adjacent to open grasslands, many species move between and use resources provided by both communities. Oak woodlands provide important food resources, such as acorns, fungi, lichens, galls, and mistletoe. They also provide shelter, shade, and nesting sites for numerous species, including mule deer (*Odocoileus hemionus californicus*) (wintering in the Railroad Flat area), black-tailed deer (wintering in the Stanislaus River Canyon and Parrotts Ferry areas), western grey squirrel (*Sciurus griseus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), feral pig (*Sus scrofa*), striped skunk (*Mephitis mephitis*), mountain lion (*Felis concolor*), bobcat (*Felis rufus*), California quail, wild turkeys, woodpeckers, and mourning doves. Tree cavities provide nesting opportunities for several species. The Peoria Wildlife Management Area contains large areas of representative high quality oak woodlands.

Grasslands. While grasslands offer relatively few roosting or nesting sites for birds, these areas provide a large number of seeds for seed-eating species, such as mice, voles, quail, meadowlarks (*Sturnella neglecta*), horned larks (*Eremophila alpestris*), and sparrows. These species, in turn, provide food for predatory species, such as black-shouldered kite (*Elanus caeruleus*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and Swainson's hawk (*Buteo swainsoni*), which nest and roost in adjacent oak woodlands, wetlands, and riparian areas.

Chaparral. Often merging with oak woodlands and grasslands, chaparral provides large amounts of dead material and leaf litter, as well as almost impenetrable cover, for reptiles, birds, and smaller mammals. Although not restricted to this habitat type, fence lizards (*Sceloporus occidentalis*), quail, wrentits (*Chamaea fasciata*), deer mice (*Peromyscus maniculatus*), feral pigs, California thrashers (*Toxostoma redivivum*), and bobcats often use chaparral communities for cover and forage.

Table Mountain. The Table Mountain area, located primarily to the west and south of the reservoir, includes unique habitat conditions and opportunities not found elsewhere in the vicinity. The relatively steep cliffs and ledges (including caves and crevices) associated with Table Mountain provide nesting and roosting substrate required by several bird and bat species, several of which are special status species described in Sections 4.1.2. On the top of Table Mountain, vernal swales are interspersed with grassland and rock. Due to their short-lived nature, vernal swales provide habitat for short-lived invertebrates and breeding habitat for amphibians, such as Pacific tree frog (*Hyla regilla*). Species that inhabit surrounding grasslands may also use the pools as a temporary water source. An extremely seasonal water regime in this habitat type provides foraging habitat for

waterfowl and other birds in the spring, as well as habitat for endemic species specifically adapted to vernal swale conditions.

Montane Hardwood. Once established, the montane hardwood community is relatively stable with a dense canopy, supporting wildlife species that rely on acorns as a primary food source or browse on hardwood foliage. The forest floor, as opposed to lower elevation oak woodlands, is covered by a persistent leaf litter that provides habitat for many species of amphibians and reptiles. Representative wildlife species found in this community include gray fox, coyote (*Canis latrans*), striped skunk, opossum (*Didelphis virginiana*), quail, wild turkey, band-tailed pigeon (*Patagioenas fasciata*), Nuttall's (*Picoides nuttallii*) and acorn woodpecker (*Melanerpes formicivorus*), scrub (*Aphelocoma californica*) and Steller's jay (*Cyanocitta stelleri*), titmouse, western gray squirrel, dusky-footed woodrat (*Neotoma fuscipes*), black-tailed deer, black bear (*Ursus americanus*) (in the Camp Nine region), mountain lion, bobcat, California mountain kingsnake (*Lampropeltis zonata*), and western rattlesnake (*Crotalus viridis*). Special status species that use this habitat type are described in Section 4.1.2.

Montane Hardwood-Conifer. Transitional between dense coniferous forests and montane hardwood, mixed chaparral, or open oak woodlands and savannahs, this typically climax community supports a variety of wildlife species. Mature trees provide nest cavities and acorns for some birds and mammals. Variability in canopy cover and understory vegetation provides structural diversity within this community. Representative wildlife species include mule deer, mountain lion, bobcat, pine siskin evening grosbeak (*Pinicola enucleator*), Steller's jay, western bluebird (*Sialia mexicana*), western tanager (*Piranga ludoviciana*), acorn woodpecker, wild turkey, western rattlesnake, and gopher snake (*Pituophis catenifer*). Special status species associated with this community are described in Section 4.1.2.

Limestone Caves/Outcrops. Some limestone caves and outcrops provide temperature, light, and moisture conditions suitable for endemic invertebrate species. Cave and cavity-dwelling mammals, such as bats, may also find suitable habitat in these features. Two genus of bats, *Myotis* and *Corynorhinus* (*Plecotus*), are known to use the caves for roosting and breeding. The interior of some caves provides unique habitats where over 50 species of invertebrates have developed adaptations specific to the cave conditions. Several species of special status bats and invertebrates have been found in this type of habitat in the region and are described in Section 4.1.2.

When New Melones Dam was constructed, many limestone caves were inundated, and species' habitats were lost. To mitigate these effects on the New Melones harvestman (*Banksula melones*), a type of rare arachnid, the USACE transplanted individuals of this species to other caves that would not be affected by inundation. Monitoring of these transplants has found that they have

successfully established in the caves into which they were transplanted (CDFG 2007).

Resource Management

Decision and Guidance Documents. The main decision document that provides guidance for fish and wildlife resources in the New Melones Lake planning area is the Lake Area Master Plan of 1976 (USACE 1976). Internal, non-decision guidance is provided by the 1995 Draft RMP, the Vegetation Management Plan (Reclamation 1997), the Draft Peoria Wildlife Management Area Environmental Assessment (Reclamation 2006b), and the Draft Fire Management Plan (Reclamation 2006c). Management direction relevant to fish and wildlife resources is provided in Table R-16.

Table R-16: Summary of Current Decisions and Guidance for Fish and Wildlife

Decision	Source
<p>A wildlife management plan has been developed to enhance and protect wildlife resources and mitigate for habitat losses caused by development of the lake. This management plan includes the Peoria Wildlife Management Area which was specifically acquired for mitigation purposes.</p>	<p>Master Plan 1976 Final Report New Melones Lake Fish and Wildlife Resources 1991 Enhancement Plan USACE 1975</p>
<p>The vegetation will be retained in selected areas to provide habitat for the life cycle of warm water game fish species. The vegetation will also maintain the lake’s biological productivity.</p>	<p>Master Plan 1976</p>
<p>Fish attractors, consisting of piles of logs and brush anchored to the ground provide cover for fish. Attractors were constructed in the Glory Hole Recreation Area.</p>	<p>Master Plan 1976</p>
<p>The warm-water fisheries management by agreement is determined by the Department of Fish and Game in conjunction with Reclamation.</p>	<p>Master Plan 1976, MOU</p>
<p>Continue to implement wildlife management objectives for Baseline Conservation Camp Lease by the following actions:</p> <ul style="list-style-type: none"> • Devote 250 person days per year for wildlife enhancement project for Peoria Wildlife Area • Implementing an Annual Operating Plan which include erosion control projects, tree plants, gathering acorns and growing seedlings, constructing fireline to protect wildlife area, and maintaining and constructing water impoundments. • Restricting access of inmates and Forestry/Corrections staff beyond the camp-leased area • Providing at least 40 hours of dozer and operator time to assist development 	<p>Baseline Lease Agreements 1991 Final Report New Melones Fish and Wildlife Resources 1991</p>

Decision	Source
<p>of water impoundments.</p> <p>A new lease agreement is currently under development and will update and refine these current measures.</p>	
<p>If non-game fish become a problem after the lake is operational, consideration should be given at that time to control methods.</p>	Master Plan 1976
<p>Restrict all public vehicles to designated roads.</p>	43 CFR 423, DRMP 1995
<p>Leash or cage all domestic pets when on Reclamation lands.</p>	43 CFR 423, DRMP 1995
<p>Prohibit collection of wildlife except by valid permit.</p>	43 CFR 423, DRMP 1995
Internal Guidance	Source
<p>Support fish habitat restoration volunteer efforts by private groups and associations to rehabilitate and improve fisheries, fish habitat, and resources.</p>	DRMP 1995
<p>Prevent entrapment and death of fish within water impoundment facilities.</p>	DRMP 1995
<p>Prevent disruption and loss of riparian habitat, aquatic habitat, and wetlands.</p>	DRMP 1995
<ul style="list-style-type: none"> • Protect and enhance wildlife movement corridors and refuge areas such as patches of dense riparian cover. 	DRMP 1995
<p>Develop and fund programs which improve habitat for wildlife within New Melones area. Such programs include, but not be limited to:</p> <ol style="list-style-type: none"> 1. Development of wetlands. 2. Oak silviculture for hardwood-dependent species, 3. Maintain snags and install nest boxes for cavity nesting birds, including wood duck. 4. Artificial nest structures for osprey (<i>Pandion haliaetus</i>) to supplement nests subject to inundation. <p>Wildlife water developments, such as quail guzzlers, similar to those constructed in the Peoria Mountain Wildlife Area.</p>	DRMP 1995
<p>When possible, Reclamation will follow directives to provide water releases from New Melones Reservoir to maintain downstream water quality and fisheries. A revised plan of operations is currently under development and will supersede any interim measures. Reservoir operations are beyond the scope of the management of the New Melones Field Office, CCAO or this resource management plan.</p>	RPO
<p>Prohibit release of any introduced species without permit from the CDFG or release of domestic animals into Reclamation lands.</p>	DRMP 1995

Internal Guidance	Source
Throughout the New Melones Lake Management Area, allow hunting in accordance with applicable regulations except where prohibited.	Draft Peoria EA 2006
<p>In the Peoria Wildlife Management Area continue to implement interim management plan by the following actions:</p> <ul style="list-style-type: none"> • Continue to restrict public vehicle use for resource protection, • Build designated trails per trail plan. • Close and restore unauthorized trails. • Implement vegetative management plan • Environmental interpretation. • Limit camping to group permitted camping by reservation only. • Reseed/restore unauthorized roads and impacted areas. • Continue to ban shooting and target practice. <p>Allow hunting in accordance with applicable regulations except where prohibited.</p>	Draft Peoria EA 2006
<p>In the Fire Management Plan continue to implement management objectives by the following actions:</p> <ul style="list-style-type: none"> • Manage vegetation in areas outside of fuel treatment project perimeters to retain sufficient wildlife cover • Conserve sensitive wildlife habitats by minimizing disruption and loss. • Enhance wildlife habitat values, features, and diversity. • Restore wildlife habitat values of damaged areas through re-vegetation and restoration • Fuel breaks and firebreaks will be designed in a manner that minimizes impacts to aesthetic, scenic, and ecological resources, and consider resource objectives for vegetation management, wildlife habitat management, soil stabilization 	DFMP 2006

4.2.2 Federally Endangered, Threatened, Proposed, or Candidate Species of Fauna

Current Conditions

There are eleven species or subspecies Federally listed as threatened or endangered under the US Endangered Species Act that could occur and/or be affected by projects in Calaveras or Tuolumne Counties (Table R-17) (USFWS 2006a). In addition four species are candidates for listing. No species that occur in the counties are currently proposed for listing.

Table R-17: Federal Threatened, Endangered, Proposed, and Candidate Species that Occur in or That May Be Affected by Projects in Calaveras and Tuolumne Counties

Scientific Name	Common Name	Habitat	Status	Potential Occurrence in the Planning Area
			E=Endangered T = Threatened C = Candidate DL = Delisted CH = Critical Habitat	C = Confirmed P = Possible U = Unlikely
Invertebrates				
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	Vernal pools	T	U
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Riparian habitats and associated upland habitats where elderberry grows	T	P
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	Vernal pools	E	U
Fish				
<i>Oncorhynchus (=Salmo) clarki seleniris</i>	Paiute cutthroat trout	Watershed of Silver King Creek and its isolated tributaries in Alpine County	T	U
<i>O. mykiss</i>	Central Valley Steelhead	Sacramento and San Joaquin Rivers and their tributaries (excluding steelhead from San Francisco and San Pablo Bays and their tributaries)	T CH	U
<i>O. tshawytscha</i>	winter-run chinook salmon, Sacramento River	Sacramento River and its tributaries in California	E	U
<i>O. tshawytscha</i>	Central Valley fall/late fall-run chinook salmon	Sacramento River and its tributaries in California	C	U
Amphibians				
<i>Ambystoma californiense</i>	California tiger salamander, central population	Vernal pools and permanent waters in grasslands; burrows in adjacent upland sites	T CH	U
<i>Bufo canorus</i>	Yosemite toad	Lakes or ponds with grassy margins, wet meadows, and quiet areas of streams above	C	U

Scientific Name	Common Name	Habitat	Status	Potential Occurrence in the Planning Area
			E=Endangered T = Threatened C = Candidate DL = Delisted CH = Critical Habitat	C = Confirmed P = Possible U = Unlikely
		4,800 feet elevation		
<i>Rana aurora draytonii</i>	California red-legged frog	Aquatic habitat (for breeding); use a variety of habitat types, including riparian and upland areas	T	P
<i>R. muscosa</i>	mountain yellow-legged frog	Rocky and shaded streams with cool waters above 4,500 feet elevation	C	U
Reptiles				
<i>Thamnophis gigas</i>	giant garter snake	Inhabits natural and artificial wetlands, irrigation supply and drainage canals, freshwater marshes, sloughs, ponds, and other aquatic habitats	T	U
Birds				
<i>Haliaeetus leucocephalus</i>	bald eagle	Large bodies of open water, such as lakes, marshes, coasts, and rivers with accessible fish; also need tall trees for nesting and roosting	T, DL	C
Mammals				
<i>Martes pennanti</i>	fisher	Mature coniferous forest and dense riparian habitats at high elevations	C	U
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Annual grasslands with scattered shrubs and loose soils for burrowing	E	U

Source: USFWS 2006a

The only listed or candidate species that has been confirmed in the planning area is bald eagle. Small numbers of bald eagles commonly use the lake and tributaries for foraging and roosting in the winter. Bald eagle nests exist in the region, and three nests were recorded in 2006 at New Melones Lake. Future eagle nesting at the lake is a possibility.

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) occurs in association with elderberry (*Sambucus spp.*) shrubs in riparian areas and oak savanna habitats. Because these habitat types and elderberry occur in the New Melones Lake area, and the species has been documented nearby, it is possible that the species occurs in the planning area.

The California red-legged frog (*Rana aurora draytonii*) inhabits a variety of aquatic habitats, usually with submerged and emergent vegetation. California red-legged frogs typically inhabit the margins of still or very slow water where bordering and aquatic vegetative cover is very dense and large populations of forage species including aquatic macroinvertebrates, rodents, and Pacific tree frogs (*Hyla (=Pseudacris) regilla*) occur (Storer 1925, Hayes and Tennant 1986, Hayes 1989, Jennings and Hayes 1994 in Barry et al 2007). Most of the low gradient riparian stream zones that may have offered this type of habitat in the New Melones Lake Area were inundated when the lake was filled, and any such habitat in the planning area is remnant and fragmented at best. A 2006-2007 survey of Sierra Nevada foothill streams in the counties north of the project area found that the nearest extant population of CRLF was west of New Hogan Lake, approximately 25 miles northwest of the project area (Barry et. Al 2007). A valid historical record of a CRLF sighting occurred near Columbia, approximately five miles from the lake, but this record was not confirmed during the recent survey. The overall results of this survey indicated that although CRLFs can and do occupy streams at similar elevations as those in the New Melones Lake Area, populations are relatively rare and dependent on high-quality habitat.

No records exist of CRLFs in streams in the planning area, and there is a low probability that the species occurs in the planning area.

The rest of the listed species that could occur in the counties are unlikely to occur in the New Melones Lake Area due to lack of appropriate habitat or documented range, including elevation.

Resource Management

Decision and Guidance Documents. Reclamation complies with requirements of the ESA to consult with USFWS on projects that may affect listed species. The following management actions listed in Table R-18 come from guidance provided by several draft resource documents prepared by Reclamation. Other decisions for fish and wildlife could have more indirect connection to Federal threatened and endangered species.

Table R-18: Management of Listed Species

Decision	Source
Protect wildlife species and habitats legally listed or proposed for listing under the Federal and state Endangered Species Acts.	ESA
Internal Guidance	Source
Allow designation of climbing routes, areas, and route development only if further study shows climbing is not impacting sensitive species.	Draft Peoria EA 2006
During the habitation period, conduct monthly inventories of sensitive bat species such as the mastiff bat on the northwest slope of Table Mountain. Climbing routes in the area are monitored for effects to sensitive species.	DRMP 1995
Conduct semi-annual inventories of eagles, osprey, and other raptors.	DRMP 1995
Maintain, construct, or modify osprey platforms and other nesting structures as needed.	DRMP 1995
Conserve sensitive wildlife habitats, such as cave and riparian habitats, by minimizing disruption and loss.	DRMP 1995, Cave Plan, Final Report New Melones Fish and Wildlife Resources

4.2.3 Federally Proposed or Designated Critical Habitat for Fish and Wildlife

Current Conditions

Two threatened species have critical habitat designated within Calaveras or Tuolumne Counties, Central Valley steelhead (*Onchorhynchus mykiss*) and California tiger salamander (*Ambystoma californiense*), central population (USFWS 2006a). The planning area is not within either of these designated areas (NMFS 1999; USFWS 2006b), but there is critical habitat for both species on the Stanislaus River downstream of Tulloch Lake.

Resource Management

Decision and Guidance Documents. The only decision documents that provide guidance for fish and wildlife resources in the New Melones Lake planning area is the Lake Area Master Plan of 1976 (USACE 1976). Internal guidance for managing these resources or their habitat is found in the Vegetation Management Plan (Reclamation 1997), the Draft Peoria Wildlife Management Area Environmental Assessment (Reclamation 2006b), and the Draft Fire Management Plan (Reclamation 2006c). No management direction directly relevant to critical habitat is contained in any of these documents.

4.2.4 All Other Special Status Fauna

Current Conditions

Twenty special status species (state endangered, state threatened, California special concern, state fully protected, Federal birds of conservation concern) have been documented in the planning area. These species include foothill yellow-legged frog (*Rana boylei*), sharp-shinned hawk (*Accipiter striatus*), tri-colored blackbird (*Agelaius tricolor*), golden eagle (*Aquila chrysaetos*), Barrow's goldeneye (*Bucephala islandica*), western burrowing owl (*Athene cunicularia hypugea*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), Swainson's hawk (*B. swainsoni*), yellow warbler (*Dendroica petechia brewsteri*), California horned lark (*Eremophila alpestris actia*), merlin (*Falco columbarius*), prairie falcon (*F. mexicanus*), bald eagle, northern loggerhead shrike (*Lanius ludovicianus*), osprey, double-crested cormorant (*Phalacrocorax auritus*), bank swallow (*Riparia riparia*), pallid bat (*Antrozous pallidus pacificus*), and western mastiff bat (*Eumops perotis californicus*) (Table R-19). Other species listed in Table R-19 include those that fall into a state or Federal status category that is included in the CNDDDB (2006) for Calaveras or Tuolumne Counties.

Table R-19: Special Status Species* That Occur in or May Be Affected by Projects in Calaveras and Tuolumne Counties

Scientific Name	Common Name	Preferred Habitat	Status	
			Potential Occurrence in the Planning Area	
			SE= CA State Endangered	
			ST = CA State Threatened	
			DL = Federally delisted	
			FP = Fully protect in CA	
			BCC=Birds of Conservation Concern	
			CSC = CA Species of Special Concern	C = Confirmed
			NL = Not listed	P = Possible
				U = Unlikely
Invertebrates				
<i>Ammonitella yatesi</i>	Yates' snail	Inhabits limestone caves and outcroppings; favors north-facing slopes.	NL	U
<i>Aphrastochthonius grubbsi</i>	Grubbs' Cave pseudoscorpion	Caves	NL	P
<i>Banksula martinorum</i>	Martins' cave harvestman	Caves	NL	U
<i>B. melones</i>	New Melones harvestman	Limestone caves with temperatures between 14-16 degrees C & humidity between 82-97%. Found under rocks or wandering on floor or walls.	NL	P
<i>B. tuolumne</i>	Tuolumne cave harvestman	Caves	NL	P
<i>B. tutankhamen</i>	King Tut Cave harvestman	Caves	NL	P

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			SE= CA State Endangered ST = CA State Threatened DL = Federally delisted FP = Fully protect in CA BCC=Birds of Conservation Concern CSC = CA Species of Special Concern NL = Not listed	
<i>Larca laceyi</i>	Lacey's Cave pseudoscorpion	Caves	NL	P
<i>Pseudogarypus orpheus</i>	Music Hall Cave pseudoscorpion	Caves	NL	P
<i>Stygobromus gradyi</i>	Grady's Cave amphipod	Mostly found in caves, but one collection from a spring.	NL	P
<i>S. harai</i>	Hara's Cave amphipod	Mostly found in caves and mine tunnels, though also found near a spring.	NL	U
Fish				
<i>Lavinia symmetricus</i> ssp. 1	San Joaquin roach	Generally found in small, warm, intermittent streams. Most abundant in midelevation streams in the Sierra foothills and in the lower reaches of some coastal streams.	CSC	U
<i>Lavinia symmetricus</i> ssp. 3	Red Hills roach	Small streams in areas with serpentine soil.	CSC	P
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	Sacramento and San Joaquin Rivers and their tributaries (excluding steelhead from San Francisco and San Pablo Bays and their tributaries).	CSC	U
<i>O. tshawytscha</i>	Central Valley fall/late fall-run chinook salmon	Sacramento and San Joaquin River basins and their tributaries, east of Carquinez Strait.	CSC	U
Amphibians				
<i>Bufo canorus</i>	Yosemite toad	Ponds used as breeding areas and nearby meadows that provide food.	CSC	U
<i>Ambystoma californiense</i>	California tiger salamander, central population	Vernal pools and permanent waters in grasslands; burrows in adjacent upland sites.	CSC	U

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			SE= CA State Endangered ST = CA State Threatened DL = Federally delisted FP = Fully protect in CA BCC=Birds of Conservation Concern CSC = CA Species of Special Concern NL = Not listed	
<i>Rana aurora draytonii</i>	California red-legged frog	Aquatic habitat (for breeding); use a variety of habitat types, including riparian and upland areas.	CSC	P
<i>R. muscosa</i>	Mountain yellow-legged frog	Rocky and shaded streams with cool waters.	CSC	P
<i>Hydromantes platycephalus</i>	Mount Lyell salamander	Caves, granite exposures, rock fissures, and seepages from springs and melting snow.	CSC	U
<i>Rana boylei</i>	Foothill yellow-legged frog	Permanent water.	CSC	C
<i>Scaphiopus hammondii</i> (= <i>Spea hammondii</i>)	Western spadefoot	Grasslands; nests in temporary wetlands.	CSC	U
Reptiles				
<i>Emys (=Clemmys) marmorata pallida</i>	Southwestern pond turtle	Permanent or near permanent water bodies with logs, vegetation, or mudflats for basking.	CSC	P
<i>Emys (=Clemmys) marmorata marmorata</i>	Northwestern pond turtle	Permanent or near permanent water bodies with logs, vegetation, or mudflats for basking.	CSC	P
Birds				
<i>Accipiter cooperi</i>	Cooper's hawk	Patchy dense tree stands/riparian areas.	CSC	P
<i>A. gentilis</i>	Northern goshawk	Woodlands with suitable prey source.	CSC	U
<i>A. striatus</i>	Sharp-shinned hawk	Woodlands with suitable prey source.	CSC	C
<i>Agelaius tricolor</i>	Tri-colored blackbird	Marsh vegetation or vegetation near small water bodies.	CSC	C
<i>Aquila chrysaetos</i>	Golden eagle	Cliffs or isolated trees.	CSC	C
<i>Asio otus</i>	Long-eared owl	Riparian areas.	CSC	U
<i>Athene cunicularia hypugea</i>	Western burrowing owl	Flat open grasslands.	CSC	C

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			SE= CA State Endangered ST = CA State Threatened DL = Federally delisted FP = Fully protect in CA BCC=Birds of Conservation Concern CSC = CA Species of Special Concern NL = Not listed	
<i>Bucephala islandica</i>	Barrow's goldeneye	Open water bodies.	CSC	C
<i>Buteo regalis</i>	Ferruginous hawk	Open grasslands.	CSC	C
<i>B. swainsoni</i>	Swainson's hawk	Oak savannah; isolated trees or riparian areas.	ST	C
<i>Circus cyaneus</i>	Northern harrier	Marshlands.	CSC	C
<i>Cypseloides niger</i>	Black swift	Cliffs near waterfalls.	CSC	U
<i>Empidonax traillii</i>	Willow Flycatcher	Riparian areas; dense willows.	SE	U
<i>Dendroica petechia brewsteri</i>	Yellow warbler	Riparian areas; chaparral.	CSC	C
<i>Eremophila alpestris actia</i>	California horned lark	Open grasslands or treeless areas.	CSC	C
<i>Falco columbarius</i>	Merlin	Open areas by woods.	CSC	C
<i>F. mexicanus</i>	Prairie falcon	Mountainous grasslands, open hills, plains, cliffs adjacent to open areas; prairies.	CSC, BCC	C
<i>F. peregrinus anatum</i>	American peregrine falcon	Forages over a variety of habitats where aerial prey are present; nests on cliffs or ledges.	SE, FP, DL, BCC	P
<i>Haliaeetus leucocephalus</i>	Bald eagle	Large bodies of open water, such as lakes, marshes, coasts, and rivers. Also need tall trees for nesting and roosting.	SE	C
<i>Icteria virens</i>	Yellow-breasted chat	Riparian areas; willow thickets.	CSC	U
<i>Lanius ludovicianus</i>	Northern Loggerhead shrike	Open habitat w/scattered perches.	CSC	C
<i>Nycticorax nycticorax</i>	Black-crowned night heron	Dense trees and vegetated wetlands.	CSC	U
<i>Pandion haliaeetus</i>	Osprey	Large water bodies.	CSC	C
<i>Phalacrocorax auritus</i>	Double-crested cormorant	Large water bodies.	CSC	C
<i>Progne subis</i>	Purple martin	Wooded habitats; riparian areas.	CSC	U
<i>Riparia riparia</i>	Bank Swallow	Riparian areas; stream banks.	ST	C

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			SE= CA State Endangered ST = CA State Threatened DL = Federally delisted FP = Fully protect in CA BCC=Birds of Conservation Concern CSC = CA Species of Special Concern NL = Not listed	
<i>Strix nebulosa</i>	Great gray owl	Old growth coniferous forests.	SE	U
<i>Tyto alba</i>	Barn owl	Open habitats, including grassland, chaparral, riparian, and wetlands.	NL	C
Mammals				
<i>Antrozous pallidus pacificus</i>	Pallid bat	Grasslands, shrublands, woodlands; roosts in locations protected from general disturbance.	CSC	C
<i>Aplodontia rufa californica</i>	Sierra Nevada mountain beaver	Dense riparian areas.	CSC	U
<i>Corynorhinus (=Plecotus) townsendii townsendii</i>	Townsend's western big-eared bat	Rocky areas with caves.	CSC	C
<i>Euderma maculatum</i>	Spotted bat	Roosts in caves, crevices and cracks, and canyons.	CSC	U
<i>Eumops perotis californicus</i>	Western mastiff bat	Primarily roosts in high buildings and cliff faces, also trees.	CSC	C
<i>Gulo gulo</i>	California wolverine	High-elevation habitats; open terrain above timberline.	ST	U
<i>Lepus americanus tahoensis</i>	Sierra Nevada snowshoe hare	Boreal zones, riparian communities with thickets of deciduous trees and shrubs.	CSC	U
<i>Martes pennanti (pacifica) DPS</i>	Pacific fisher	Mature and old growth forests; use large areas of primarily coniferous forests with fairly dense canopies and large trees, snags, and down logs.	CSC	U
<i>Taxidea taxus</i>	American badger	Dry, open grasslands, fields, and pastures.	CSC	U

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			SE= CA State Endangered ST = CA State Threatened DL = Federally delisted FP = Fully protect in CA BCC=Birds of Conservation Concern CSC = CA Species of Special Concern NL = Not listed	
<i>Vulpes vulpes necator</i>	Sierra Nevada red fox	Forest openings, meadows, and barren rocky areas associated with its high elevation habitats.	ST	U

Notes: *Special Status species in this table include state-listed threatened and endangered species and California special concern species, USFWS Birds of Conservation Concern (USFWS 2002b) that appear in the California Department of Fish and Game Natural Diversity Database (CNDDDB 2006) for Tuolumne or Calaveras County, or those otherwise documented in the planning area, such as in the Draft RMP (Reclamation 1995)
 Sources: CNDDDB 2006; USFWS 2006a; Reclamation 1995

Resource Management

Decision and Guidance Documents. Guidance for fish and wildlife resources in the New Melones Lake planning area is found in the Lake Area Master Plan of 1976 (USACE 1976). Internal guidance for managing these resources or their habitat is found in the Vegetation Management Plan (Reclamation 1997), the Draft Peoria Wildlife Management Area Environmental Assessment (Reclamation 2006b), and the Draft Fire Management Plan (Reclamation 2006c). Management actions are listed below in Table R-20.

Table R-20: Management of Special Status Species

Decision	Source
Protect wildlife species and habitats legally listed or proposed for listing under the Federal and state Endangered Species Acts.	ESA
Internal Guidance	Source
Allow designation of climbing routes, areas, and route development only if further study shows climbing is not impacting sensitive species.	Draft Peoria EA 2006
During the habitation period, conduct monthly inventories of sensitive bat species such as the mastiff bat on the northwest slope of Table Mountain. Climbing routes in the area are monitored for effects to sensitive species.	DRMP 1995
Conduct semi-annual inventories of eagles, osprey, and other raptors.	DRMP 1995
Maintain, construct, or modify osprey platforms and other nesting structures as needed.	DRMP 1995
Conserve sensitive wildlife habitats, such as cave and riparian habitats, by minimizing disruption and loss.	DRMP 1995, Cave Plan, Final Report New Melones Fish and Wildlife Resources

4.3 Vegetation

4.3.1 General Plant Species and Communities

Current Conditions

Five broad categories of vegetation are found within the planning area: woodlands, grasslands, wetlands, serpentine, and other. These are subdivided into more specific vegetation associations. The most common plant communities, as well as their acreage and percentage of the planning area can be found in Table R-21 (USACE1997).

Table R-21: Plant Communities Found in the Planning Area

Plant Community	Acreage	Percentage of Study Area
<i>Woodlands</i>		
Blue oak woodland	7,915	52 %
Blue oak-foothill pine woodland	2,082	14%
Montane hardwood woodland	592	4%
Montane hardwood-conifer woodland	257	2%
<i>Grasslands and chaparral</i>		
Annual grassland	1,709	11%
Chamise chaparral	1,090	7%
<i>Wetlands</i>		
Valley and foothill riparian woodland	249	2%
Wet meadow	91	< 1%
Vernal pool	53	< 1%
<i>Serpentine-based communities</i>		
Serpentine foothill pine-chaparral	669	4%
Blue oak woodland & serpentine foothill pine-chaparral	84	< 1%
<i>Other land-use designations</i>		
Non-classified	203	1%
Barren land	148	1%
Residential or park	18	< 1%
Total	15,168	

Source: USACE 1997

The two most common vegetative communities in the planning area are blue oak woodland and blue oak-foothill pine woodland, with annual grassland as the third most common vegetation type (USACE 1997).

Montane hardwood and montane hardwood-conifer woodlands are the dominant vegetative communities in the northeasterly portion of the planning area. Wetland vegetation is found in some locations along the edges of the lake and in moist canyons. There are many riparian communities, seeps, and wet meadows in the upper reaches of streams tributary to the lake (Reclamation 1995). Each vegetation community is described in detail below.

Blue oak woodland (Sawyer and Keeler-Wolf 1995: blue oak series). In this community, blue oaks average 47 percent of the vegetation cover and grasses comprise nearly 100 percent of the understory (Allen et al. 1989 in Reclamation 1995). Oaks usually form an open canopy on hills and ridges, usually on less steep slopes (less than 45% slope), particularly on the rolling hills surrounding the lake (Reclamation 1995). Blue oak woodlands grow on all types of soils and parent materials (Allen et al. 1989 in Reclamation 1995) and occur in the planning area between 300-1000 feet in elevation. Characteristic plant species include blue oak (*Quercus douglasii*), bromegrass (*Bromus* sp.), and wild oats (*Avena* sp.). Other species that may be found in blue oak woodland communities are ponderosa pine (*Pinus ponderosa*), California buckeye (*Aesculus californica*), manzanita (*Arctostaphylos* spp.), ceanothus (*Ceanothus* spp.), yerba santa (*Eriodictyon californicum*), foothill pine (*Pinus sabiniana*), scrub oak (*Quercus berberidifolia*), black oak (*Quercus kelloggii*), valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), coffeeberry (*Rhamnus californica*), redberry (*Rhamnus crocea*), holly-leaved cherry (*Prunus ilicifolia*), and needlegrass (*Stipa* sp.) (USACE 1997).

Blue oak woodland is a common community type within the Tuttle town, Dam and Spillway, Glory Hole, Greenhorn Creek, and West side management areas. It is also the most extensive plant community in the Peoria Wildlife Management Area (PWMA); it occurs along the southern two-thirds of the PWMA access road and is also present at the Peoria Basin trailhead site (Reclamation 2006b). Within the Peoria Wildlife Area management area, blue oak woodlands are particularly prevalent where steep rock outcrops and fields with boulders occur, including the talus slopes of Table Mountain and the rocky slopes overlooking the lake and the dam output. Stands of blue oak woodland also occur in a riparian corridor in the Peoria Wildlife Area management area (Evens et al. 2004).

Blue oak woodlands are common but are under considerable development and grazing pressure in the California foothills (Reclamation 1995). The main issue that may affect the future of blue oak woodlands is a lack of recruitment from new seedlings (Reclamation 1995). Throughout the state, deer herd size has shown a general increase from year to year, resulting in greater browsing pressure on oak seedlings. Several statewide surveys of oaks have shown a shortage of small trees for certain oak species. If this shortage continues, then oak stands will gradually be lost (IHRMP, in USACE 1997). Inadequate blue oak regeneration has been found in areas around the lake, and it is likely that blue oak regeneration at the lake is inadequate to sustain existing blue oak stands (Swiecki 1997, in USACE 1997). Blue oaks can also reproduce vegetatively, as stumps sprout after fire, but as fire has been increasingly controlled, even this mode of reproduction has declined (Reclamation 1995). Other activities threatening oaks in the planning

area, particularly along the PWMA access road corridor, include illegal ORV traffic, and unregulated camping, fire building, trash dumping, and woodcutting (Reclamation 2006b). Soil compaction from concentrated recreational use, such as camping, also threatens oak trees. In addition, fluctuating levels in the reservoir impact oaks, since high water levels occasionally inundate lower growing oaks and cause mortality.

The lack of blue oak regeneration is a concern in the Tuttle town, Bear Creek, Peoria Wildlife Area, Dam and Spillway, Glory Hole, and Westside management areas (Reclamation 1995). Blue oak woodland covers more than half of Reclamation's lands; as such, oak conservation and regeneration are significant issues to consider when making land management decisions (USACE 1997).

Blue oak-foothill pine woodland (Sawyer and Keeler-Wolf 1995: blue oak series). In this community, mixed stands of oak and pine occur. The open oak canopy ranges from 20-40 feet in height with occasional less open pine canopies above. Frequent fire favors blue oak over pine. This community occurs between 500-3000 feet in elevation (Verner in GWH 1988 in Reclamation 1995) on steep, rocky or exposed, largely north-facing sites along ridges or canyons with poor or shallow soils (Holland 1986 in Reclamation 1995). Dominant species in this woodland are foothill pine and blue oak, with associated species including California buckeye, coast live oak (*Quercus agrifolia*), scrub oak, valley oak, interior live oak, poison oak (*Toxicodendron diversilobum*), woodland star (*Lithophragma heterophylla*), sugar cups (*Saxifraga californica*), shooting stars (*Dodecatheon hendersonii*), Chinese houses (*Colinsia heterophylla*), and gooseberry (*Ribes quercetorum*) (USACE 1997).

Blue oak-foothill pine woodlands are found in the Westside, Bowie Flat, and Peoria Wildlife Area management areas on gentle to moderate slopes with variable parent material. In particular, this community type occurs on all of the slopes at the immediate base of Table Mountain, with foothill pine, blue oak, California buckeye, and toyon as the common species (Ayres 2005, Evens et al. 2004). Additionally, mixed oak woodlands are found in the Bear Creek planning area.

Montane hardwood woodland (Sawyer and Keeler-Wolf 1995: Interior live oak series). Vegetation in this community is broad-leaved and grows up to 50 feet tall, where dense canopy closure and abundant, persistent leaf litter preclude an herbaceous understory (Holland 1986 in Reclamation 1995). It occurs on north-facing hillsides further upstream and at higher elevations (300-3,000 feet) than the blue oak woodland, above the reservoir's historic high water mark (GWH 1988 in Reclamation 1995). Slopes where this vegetation occurs are steep to very steep. Dominant plant species include interior live oak, blue oak, buckeye, and California bay laurel (*Umbellularia californica*). Species that are less abundant in the montane hardwood woodland include canyon oak (*Quercus chrysolepis*), elderberry (*Sambucus mexicana*), western redbud (*Cercis occidentalis*), redberry (*Rhamnus crocea*), buck brush (*Ceanothus cuneatus*), and poison oak. Special status plant species that may occur in this woodland include Layne's butterweed (*Scenecio laynea*), and Red Hills soaproot (*Chlorogalum grandiflorum*) (Reclamation 1995). A more detailed discussion of special status plants can be found in Sections 4.2.2 and 4.2.4 below.

This community type can be found in the Camp Nine management area at elevations ranging from 1,500-2,000 feet. Upstream of Camp Nine, the Stanislaus River flows through very narrow, steep canyons. Montane hardwood woodland vegetation such as interior live oak, canyon oak, and black oak is found along the canyon walls. Stands of this community type occur throughout the Peoria Wildlife Area management area, usually on somewhat steep, cool slopes with moderately high rockiness. In particular, it is found on the north-facing slope of Table Mountain and on the metavolcanic slopes overlooking the lake (Evens et al. 2004). In addition, montane hardwood woodland is present along the northern third of the PWMA access road and on the slopes between the road and Table Mountain.

Montane hardwood-conifer woodland (Sawyer and Keeler-Wolf 1995: Black oak series OR canyon live oak series). This community occurs most commonly on north-facing slopes (between 25-66 percent grade) in canyons upstream from the lake between 1,000-2,400 feet in the planning area. It occurs mainly on soils having sandstone parent material, but metamorphic and igneous parent materials are also known to support this community (Allen et al. 1989 in Reclamation 1995). Species of this community are less tolerant of dry conditions than montane hardwood woodland, and are adapted to regular but light ground fires (Holland 1986 in Reclamation 1995). Dominant species are black oak, canyon oak, interior live oak, and coast live oak. Species that may associate with this community type include foothill pine, California buckeye, mariposa manzanita (*Arctostaphylos viscida*), deer brush (*Ceanothus intergerrimus*), toyon (*Heteromeles arbutifolia*), redbud, mountain mahogany (*Cercocarpus betuloides*), and poison oak (USACE 1997).

The composition and diversity of these woodlands has changed as a result of fire suppression throughout California (USACE 1997). In particular, densities of incense cedar (*Calocedrus decurrens*) and white fir (*Abies concolor*) have increased in previously ponderosa pine-dominated forests (Vankat 1970, in USACE 1997). Continuation of fire suppression policies may further shift the dominant species in the montane woodlands to incense cedar and white fir (USACE 1997).

Annual grassland (Sawyer and Keeler-Wolf 1995: California annual grassland series). This vegetation type is characterized by dense to sparse cover of annual grasses and some perennial bunchgrasses. Flower heads are generally 1-2 feet in height, although they may be as tall as 8 feet in a moist year. Annual grasslands occur between 800-3000 feet on relatively flat plains and rolling hills of valleys or on steep slopes of foothill regions. Perennial grasslands are often found on finely textured, moist soils. Common annual plant species include wild oats, soft chess (*Bromus mollis*), ripgut (*Bromus diandrus*), fiddleneck (*Amsinckia* sp.), longbeak stork's bill (*Erodium botrys*), and redstem stork's bill (*Erodium cicutarium*). Dominant perennial grasses may include triple-awned grass (*Aristida* spp.), wheat grass (*Agropyron* spp.), bent grass (*Agrostis* spp.), wild-rye (*Elymus triticoides*), melic grass (*Melica* spp.), needle-grass (*Stipa pulchra*, *S. cernua*, *S. lepida*), and muhly (*Muhlenbergia* spp.). Other plant species that may be associated with grasslands are foothill pine, blue oak, California poppy (*Eschscholzia californica*), and lupines (*Lupinus* spp.) (USACE 1997).

Annual grasslands are found within the Peoria Wildlife Area, Bowie Flat, and Glory Hole management areas. It is the principal plant community on the top of Table Mountain.

Throughout these areas, grasslands are often correlated with areas burned in the mid-1990's or along roads and powerlines where native shrub vegetation has been cleared. They are also found on relatively gentle volcanic and serpentine substrates, particularly the long, narrow draws on the ridgetop of Table Mountain that collect more soil than the surrounding, more exposed rocky areas of the ridgetop (Evens et al. 2004). Annual grassland also occurs in a narrow band along the PWMA access road and is a component of the understory of the oak woodlands along the PWMA access road corridor. In this area, the characteristic grasses are soft chess, ripgut brome, medusahead (*Taeniatherum caput-medusae*), and Italian ryegrass (*Lolium multiflorum*). The forb component is diverse, composed of both native and non-native species, including winecup clarkia (*Clarkia purpurea*), popcornflower (*Plagiobothrys* sp.), yellowflower tarweed (*Holocarpha virgata*), sky lupine (*Lupinus nanus*), winter vetch (*Vicia villosa*), and clover (*Trifolium* sp.) (Reclamation 2006b).

Nonnative annual grasses dominate annual grasslands and cannot be eliminated under current rangeland management practices (USACE 1997). Further, grazing livestock and wildlife depend on some introduced species for forage, such as soft chess (*Bromus hordeaceus*), wild oats (*Avena fatua*), slender wild oats (*Avena barbata*), and annual ryegrass (*Lolium multiflorum*).

Chamise chaparral (Sawyer and Keeler-Wolf 1995: *Chamise series*). This community type is dominated by the chamise shrub (*Adenostoma fasciculatum*), generally 3-10 feet tall. Vegetation can be very dense, reaching 50 percent cover in 10 years. This community is adapted to frequent fires by stump sprouting, and plants will reach maturity in 25-60 years in the absence of fire. Chamise chaparral occurs between 1000-2000 feet in elevation on dry, south or west facing slopes and ridges. Limestone soils in the middle basin above the reservoir but not far upstream in the lake area support chamise. Species that may co-occur with chamise in this community include several manzanitas (*Arctostaphylos glauca*, *A. tomentosa*, *A. viscida*), ceanothus species (*Ceanothus cuneatus*, *C. papillosus*), mountain mahogany, buckwheat (*Eriogonum fasciculatum*), yerba santa, deer brush, holly-leaf cherry, and scrub oak (USACE 1997).

Chamise chaparral occurs on various substrates throughout the Peoria Wildlife Area management area (Evens et al. 2004). This community type is intermixed with oak woodland in the PWMA access road corridor (Reclamation 2006b). In addition, several stands were located on the volcanic ridgetop of Table Mountain (Evens et al. 2004).

Similar to montane woodlands, fire suppression is likely decreasing the biodiversity in chaparral communities (Meadows 1996, in USACE 1997). If management of chaparral is unchanged, the community would continue to decrease in biodiversity, reducing its sustainability and value to wildlife (USACE 1997).

Valley and Foothill riparian woodland (Sawyer and Keeler-Wolf 1995: *California sycamore series*). Vegetation in this community consists of tall, dense, winter-deciduous, broadleaved, riparian forest whose canopy may be closed with a shade tolerant understory. It grows on relatively fine-textured alluvium, somewhat receded from river channels, in the flood plains of low gradient streams and rivers. Dominant species in this community include box elder (*Acer negundo californica*), sycamore (*Platanus racemosa*), Fremont cottonwood, and several willow species (*Salix gooddingii variabilis*, *S. laevigata*, *S. lasiandra*). White alder (*Alnus rhombifolia*)

and big-leaf maples (*Acer macrophylla*) are less common species (USACE 1997). California vervain (*Verbena californica*) is a special status plant species that may grow in valley and foothill woodlands, particularly near streams that run through serpentine areas, as in the northernmost reach of the north fork of the Stanislaus River (USACE 1997).

Little riparian vegetation exists along the shoreline because fluctuating water levels makes it hard for riparian vegetation to establish (USACE 1997). Riparian vegetation is more commonly found in the upstream reaches of some of the perennial drainages that flow into the reservoir, within the Stanislaus River Arm, Tuttle town, Greenhorn Creek, Carson, and Coyote Creek management areas. Other management areas that support riparian vegetation include: Camp Nine, Parrotts Ferry, Mark Twain, Bear Creek, and Dam and Spillway.

Wet meadow (Sawyer and Keeler-Wolf 1995: Sedge series). This community is comprised of generally grass (or grasslike) species and forbs ranging from 6 inches to 3 feet in height. Cover may be sparse to dense depending on the intensity of grazing, if any. In the planning area, wet meadows are found at elevations between 800-2000 feet. This natural community develops on flats or in bowl-like basins which may have rapid drainage or none at all. Soils may vary from 20 percent organic material to sandy loam with almost no organic material. In wet meadows, water is at or near the soil surface most of the growing season, rather than having standing water (Holton Associates 1987 in USACE 1997). They may dry up in the summer or stay ponded all year. Meadow-type indicator species include short-hair sedge (*Carex exserta*), shorthair (*Calamagrostis breweri*), gentian-aster (*Gentian newberryi aster* sp.), few-flowered spikerush (*Heleocharis pauciflora*), carpet clover (*Trifolium monathum*), bentgrass (*Agrostis scabra*), pull-up muhley (*Muhlenbergia filiformis*), beaked sedge (*Carex rostrata*), Nebraska sedge (*Carex nebrascensis*), Kentucky bluegrass (*Poa pratensis*), longstalk clover (*Trifolium longipes*), and tufted hairgrass (*Deschampsia caespitosa*) (Ratliff 1982 in Reclamation 1995). Special status plant species that grow in wet meadows are California vervain and Cusick's speedwell (*Veronica cusickii*).

Field observations at the Angels Creek arm, conducted by the USACE in 1997, found no typical wet meadow community or topography, despite previous documentation of wet meadows in this planning area (Reclamation 1995). However, the bunch grass (reed canarygrass) found on a hillside at Angels Creek grows in moist areas, indicating a seep-like condition which is considered a wetland community (USACE 1997). Such a unique upland site with more available water than the surrounding upland areas increases wildlife habitat values and the overall biodiversity at the lake.

Vernal pool (Sawyer and Keeler-Wolf 1995: Northern basalt flow vernal pools). Vernal pools are an ephemeral wetland vegetative community with predominantly low-growing, ephemeral herbs. Germination and early growth occur in winter and early spring, often while plants are submerged, and pools dry out by summer. Flowering is often in bands at the margins of the pools. This community type occurs in shallow depressions, ranging from a few meters to tens of meters in diameter. Characteristic plant species found in vernal pools are Pacific foxtail (*Alopecurus saccatus*), common blennosperma (*Blennosperma nanum*), Cleveland's shooting star (*Dodecatheon clevelandii* var. *patulum*), toothed downingia (*Downingia cuspidata*), spiny-sepaled button-celery (*Eryngium spinosepalum*), hedge-hyssop (*Gratiola ebracteata*), Fremont's

goldfields (*Lasthenia fremontii*), Douglas' meadowfoam (*Limnanthus douglasii* var. *rosea*), white-headed navarretia (*Navarretia leucocephala* ssp. *leucocephala*), adobe popcorn flower (*Plagiobothrys acanthocarpus*), miniature popcorn flower (*Plagiobothrys stipitatus* var. *micranthus*), Sacramento pogogyne (*Pogogyne zizyphoroides*), Delta woolly marbles (*Psilocarphus brivissimus* var. *multiflorus*), greater duckmeat (*Spirodela polyrrhiza*), and Wildenow's clover (*Trifolium willdenovii*) (Stone et al. 1993 in Reclamation 1995). Special status plant species that may grow in the planning area vernal pools include Sacramento orcutt grass (*Orcuttia viscida*), slender orcutt grass (*Orcuttia tenuis*), Bogg's Lake hedge-hyssop (*Gratiola hetersepala*), and legenere (*Legenere limosa*).

Within the planning area, intermittently-formed pools appear after rainfall or snowmelt on top of Table Mountain between 1,200 feet in elevation in the south and 2,600 feet in the north. Although these pools share some of the characteristics of some vernal pools in the Central Valley, they are not true vernal pools in that they do not have a clay underlayer that prevents percolation. Instead, they form in swales in the rocky surface of Table Mountain. The soil is poorly drained and the parent material on Table Mountain is a Pliocene lava flow (andesite). Intermittent pools occur on Table Mountain in seasonally wet to saturated rocky meadows that have slight soil development (Evens et al. 2004). They are interspersed within the annual grassland (Reclamation 2006b). Intermittent pools at Table Mountain do not support the range of species found in vernal pools in the Central Valley, possibly due to differences in substrate (primarily shallow, rocky substrate versus clay substrate in valley vernal pools). Although vernal pool habitats are very delicate and easily disturbed in general, this is even more pronounced on Table Mountain where soils are poor, shallow, and loose.

To date, vernal pools have resisted invasion by exotic plant species, probably due to their ephemeral nature (USACE 1997). However, the scientific community is concerned that exotic plants may colonize vernal pool communities, possibly displacing the highly specialized native vernal pool species (USACE 1997). Despite these concerns, there is no supporting evidence that this change is occurring in vernal swales found on Table Mountain (USACE 1997).

Serpentine foothill pine-chaparral (Sawyer and Keeler-Wolf 1995: *Foothill pine series*). This natural community consists of an open woodland with some chaparral on "Redhills" soils derived from serpentine. Serpentine soils are high in magnesium, iron, silicates, and asbestos and low in nitrogen and phosphorus (USACE 1997). Serpentine soils in the planning area are of the Delpiedra and Henneke Series. The Redhills form a rounded, rolling terrain, and occur at elevations between 800-2000 feet. Characteristic plant species on Delpiedra soils are foothill pine and buckbrush, while on Henneke soils manzanitas (*Arctostaphylos manzanita* and *A. viscida*), chamise, and toyon are prevalent. A number of special status plant species prefer serpentine foothill-pine chaparral habitat, including Rawhide hill onion (*Allium tuolumnense*), Chinese camp brodiaeae (*Brodiaea pallida*), Red Hills soaproot, Congdon's lomatium (*Lomatium congdonii*), shaggyhair lupine (*Lupinus spectabilis*), veiny monardella (*Monardella douglasii* ssp. *venose*), Cleveland's butterweed (*Packera clevelandii*), Layne's butterweed, and California vervain.

Stands of this community type have been found in the southwest and lower central portions of the Peoria Wildlife Area planning area on serpentine parent material (Evens et al. 2004).

Serpentine soils provide habitat for only very specialized plant species that are highly adapted to the relatively inhospitable soil type. There is no evidence of ecological stages in serpentine vegetation (Kruckeberg 1984, in USACE 1997). Therefore, unless severely disturbed by human-induced or natural causes, the composition and structure of serpentine-based vegetative communities at the lake will likely change little over time.

Blue oak woodland and serpentine foothill pine-chaparral (Sawyer and Keeler-Wolf 1995: foothill pine series). This type of chaparral is similar to serpentine foothill pine-chaparral, with blue oaks interspersed throughout. It occurs in upland on gentle to steep slopes. Soils are shallow, infertile, moderately to excessively drained. The soil surface may be covered with stones and rock outcrops. Foothill pine emerges from a shrub canopy composed of blue oak, black oak, California buckeye, coast live oak, Coulter pine, interior live oak, valley oak, and western juniper. Vegetation height is less than 70 feet and occurs at elevations between 1,000 and 7,000 feet.

Serpentine chaparral plant communities can be found in the Stanislaus River Canyon, Peoria Wildlife Area and Dam and Spillway planning areas (Reclamation 1995).

Resource Management

Decision and Guidance Documents. Documents that provide internal guidance regarding vegetation resources in the New Melones Lake area include the Peoria Wildlife Management Environmental Assessment (Reclamation 2006b), Vegetation Management Plan (VMP) (USACE 1997), vegetation classification and mapping of Peoria Wildlife Area report (Evens et al. 2004), and Reclamation survey for special status plant species on Peoria Wildlife Area serpentine (Ayres 2005). Management actions for vegetation are listed below in Table R-22.

Table R-22: Management of Vegetation

Internal Guidance	Source
Manage oak woodlands for long-term viability or sustainability so oak stands replace themselves.	VMP 1997
Rejuvenate oak woodlands affected by brush encroachment through the use of prescribed burns where possible.	DFMP 2006, VMP 1997
Increase biodiversity in montane woodland communities.	VMP 1997
Prevent severe invasions of exotics (such as yellow starthistle). Invasive exotics should comprise less than 5 percent of the total plant cover.	VMP 1997
Protect and promote native perennial grasslands.	VMP 1997
Manage grasslands for sustainability.	VMP 1997
Minimize disturbance to grassland communities.	VMP 1997
Enhance the biodiversity, and a variable structure and age composition in chaparral communities.	VMP 1997

Internal Guidance	Source
Prohibit clearing or conversion of chaparral to any other plant community; only type conversion by natural processes is recommended.	VMP 1997
Rejuvenate brushlands through the use of prescribed burns where possible.	VMP 1997
Protect the riparian zone and riparian vegetation from degradation, including prevention of soil compaction, head-cutting, and undercutting.	VMP 1997
Restore or enhance lost or degraded riparian communities where sustainable.	VMP 1997
Promote streambank and reservoir shoreline stability to encourage establishment of riparian vegetation.	VMP 1997
Protect any seep vegetation and wet meadow communities from loss or degradation.	VMP 1997
Protect vernal pool communities from loss or degradation, including the invasion of exotic plants.	VMP 1997
Preserve serpentine-based communities and special status plants such <i>Chlorogalum grandiflora</i> , and <i>Allium tuolumnense</i> .	VMP 1997
<p>Prescribed burning may be used to achieve the following vegetation management goals, objectives, and benefits:</p> <ul style="list-style-type: none"> • Enhance wildlife habitat by increasing access and diversity <p>Rejuvenate chaparral for wildlife forage</p>	DFMP 2006, VMP 1997
Use of herbicides as a vegetation treatment option will be carefully examined, for potential impacts to water sources, wildlife habitat, and cultural/traditional uses.	DFMP 2006, VMP 1997
Protect serpentine-based communities from erosion and high-impact uses that would degrade habitat values (including building roads).	VMP 1997

4.3.2 Federally Endangered, Threatened, Proposed or Candidate Species of Plants

Current Conditions

The project area encompasses portions of Tuolumne and Calaveras counties. Within these counties, the six Federally-listed plant species that may occur include Ione manzanita (*Arctostaphylos myrtifolia*), Chinese Camp brodiaea (*Brodiaea pallida*), succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Hartweg's golden sunburst (*Pseudobahia bahifolia*), Layne's ragwort (*Packera layneae*), and California vervain (*Verbena californica*) (US Fish and Wildlife Service [USFWS] 2007a). These are presented in Table R-23 and described in detail below.

Table R-23: Federally Endangered, Threatened, Proposed or Candidate Plant Species That Occur in or May Be Affected by Projects in Calaveras and Tuolumne Counties

Scientific Name	Common Name	Preferred Habitat	Status	Potential Occurrence in the Planning Area
			E = Endangered T = Threatened	C = Confirmed P = Possible U = Unlikely
<i>Arctostaphylos myrtifolia</i>	lone manzanita	Chaparral or oak-dominated, open-canopied woodlands.	T	U
<i>Brodiaea pallida</i>	Chinese Camp brodiaea	Valley and foothill grassland, vernal swales, or serpentine clay.	T	U
<i>Castilleja campestris</i> ssp. <i>succulenta</i>	Succulent owl's clover	Margins of vernal pools, swales, and some seasonal wetlands, often on acidic soils.	T	U
<i>Pseudobahia bahifolia</i>	Hartweg's golden sunburst	Valley and foothill grasslands at the margins of blue oak woodland.	E	
<i>Packera layneae</i>	Layne's ragwort	Dry serpentine or gabbroic soils in chaparral and foothill pine/oak woodlands.	T	P
<i>Verbena californica</i>	California vervain	Cismontane woodland, valley and foothill grassland, and foothill pine-blue oak woodland.	T	

Source: CNPS 2007; CDFG 2007; Reclamation 2006b; USFWS 2007b; Ayres 2005

Ione manzanita. This species is Federally-listed as threatened and is found in Calaveras and Amador counties (CNPS 2007). It is an evergreen shrub, with white flowers that bloom November through February (CNPS 2007).

This species may grow in chaparral or oak-dominated, open-canopied woodlands lower in elevation than coniferous forests (though conifers may be present). It grows on Ione clay with chaparral associates (CDFG 2007). Common associates include Mariposa manzanita (*Arctostaphylos mariposa*), Indian manzanita (*A. mewukka*), chamise (*Adenostoma fasciculatum*), Bisbee peak rush-rose (*Helianthemum suffrutescens*), goldwire (*Hypericum concinnum*), and Sonoma sage (*Salvia sonomensis*) (CDFG 2007). It often makes up 50 to 80 percent cover and can be found at elevations of 250 to 1,800 feet (CDFG 2007). The California Natural Diversity Database (CNDDDB) does not have a recorded occurrence of this species within the project area (CDFG 2007), and the plant has not been documented in surveys of the area (Evens et al. 2004).

Chinese Camp brodiaea. This species is Federally-listed as threatened and is found in the Central Sierra Nevada foothills, near Chinese Camp, in Tuolumne County (Reclamation 2006b).

It is a perennial, bulbiferous herb, with pale purple flowers that bloom May through June (CNPS 2007). The species hybridizes with *B. elegans* ssp. *elegans* (CNPS 2007).

Chinese Camp brodiaea is known from only two occurrences near Chinese Camp. Part of one occurrence was destroyed by construction in 1982; the remainder is threatened by residential development (CNPS 2007). The species may grow in valley and foothill grassland, vernal swales, or on serpentine clay, and has been recorded in rocky, vernal wet streams on serpentine at 1,250 feet elevation (Reclamation 1995; Reclamation 2006b). The CNDDDB does not have a recorded occurrence of this species within the project area; further, surveys conducted on Peoria Wildlife Area serpentine did not record the species either (CDFG 2007; Reclamation 2006b).

Succulent owl's clover. This species is Federally-listed as threatened and is listed as endangered under the California ESA (CDFG 2007). It is found only along the rolling lower foothills and valleys along the eastern San Joaquin Valley in the Southern Sierra Foothills Vernal Pool Region, which includes the planning area (USFWS 2006b). It is an annual partially parasitic herb, with bright yellow to white flowers that bloom in April and May (USFWS 2007b; CNPS 2007).

The species grows on the margins of vernal pools, swales, and some seasonal wetlands, often on acidic soils (USFWS 2007b). It is never dominant and it is found in only a few of the pools in an area (USFWS 2007b). It grows in between 80 and 2,450 feet elevation and is not recorded within the project area (CDFG 2007).

Hartweg's golden sunburst. This species is Federally- and state-listed as endangered (CDFG 2007). It is a slender, woolly annual and is only found in the Central Valley (USFWS 2007c). The species has yellow flowers that bloom in March and April (USFWS 2007c).

The species occurs in valley and foothill grasslands at the margins of blue oak woodland, primarily on shallow, well-drained, fine-textured soils (USFWS 2007c; CDFG 2007). They can also be found along shady creeks, near vernal pools, or around the margins of volcanic boulders (CDFG 2007). They are often found on the northern slopes of knolls 1-6 feet high and 10-100 feet in diameter at the base. These are interspersed with basins that may pond water in the rainy season (USFWS 2007c; CDFG 2007). The species has not been recorded within the project area (CDFG 2007).

Layne's ragwort. This species is Federally-listed as threatened and is listed as rare in California (CDFG 2007). It is a perennial herb, with yellow flowers (CNPS 2007). Layne's ragwort has 8-13 ray flowers and less than 40 disk flowers that bloom April through July (Reclamation 1995; Reclamation 2006b).

The species can be found on dry serpentine or gabbroic soils in chaparral and foothill pine/oak woodlands (Ayres 2005). It has been found in the Red Hills area, approximately 10 miles south of the lake area (BLM 2006), and a possible population was recorded in a drying stream margin in Peoria basin (Ayres 2005). The CNDDDB does not have a recorded occurrence of this species within the project area (CDFG 2007).

California vervain. This species is Federally-listed as threatened and is found in Tuolumne County (CNPS 2007). It is a perennial or biennial herb, with violet to purple flowers that bloom May through September (CNPS 2007; Reclamation 1995).

The species is known from ten occurrences in the Red Hills, and is threatened by grazing, mining, development, recreation, and vehicles (CNPS 2007). It is protected in part at Red Hills ACEC on BLM land (CNPS 2007). California vervain may grow in cismontane woodland, valley and foothill grassland, and foothill pine-blue oak woodland (CDFG 2007; Ayres 2005). It has been found on mesic sites on Delpiedra serpentine, usually seeps, creeks, swales, or in wet meadows at 830 to 1,300 feet (CDFG 2007; BLM 2006; Ayres 2005). It is often associated with Cleveland’s butterweed (Ayres 2005). The CNDDDB does not have a recorded occurrence of this species within the project area; further, surveys conducted on Peoria Wildlife Area serpentine did not record the species (CDFG 2007; Reclamation 2006b). California vervain has been recorded at Yosemite Junction, approximately seven miles from the lake area (Reclamation 1995).

Resource Management

Listed plant species are managed in accordance with ESA requirements. Management actions used by Reclamation to accomplish this are generally not directed at preservation of a particular species, but instead towards preserving habitats where listed or sensitive species may be found. Other decisions for general vegetation and for maintenance of listed fish and wildlife habitat could have more indirect connection to Federal threatened and endangered species. Management actions for listed plant species are listed below in Table R-24.

Table R-24: Management of Listed Plant Species

Internal Guidance	Source
Protect serpentine-based communities from erosion and high-impact uses that would degrade habitat values (including building roads).	VMP 1997
Preserve serpentine-based communities and special status plants such <i>Chlorogalum grandiflora</i> , and <i>Allium tuolumnense</i> .	VMP 1997
Restore or enhance lost or degraded riparian communities where sustainable.	VMP 1997
Promote streambank and reservoir shoreline stability to encourage establishment of riparian vegetation.	VMP 1997
Protect any seep vegetation and wet meadow communities from loss or degradation.	VMP 1997
Protect vernal pool communities from loss or degradation, including the invasion of exotic plants.	VMP 1997
Protect the riparian zone and riparian vegetation from degradation, including prevention of soil compaction, head-cutting, and undercutting.	VMP 1997

4.3.3 Federally Proposed or Designated Critical Habitat for Plants

Current Conditions

Within Tuolumne county, there is designated critical habitat for four special status plant species: succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Hoover's spurge (*Chamaesyce hooveri*), Colusa grass (*Neostapfia colusana*), and Greene's tuctoria (*Tuctoria greenei*) (USFWS 2007a).

For all species, critical habitat was designated in Federal Register (FR) 68:46683, on August 6, 2003. The designation was revised in FR 70:46923 on August 11, 2005 and species by unit designations were published in FR 71:7117 on February 10, 2006 (USFWS 2007b). The critical habitat in Tuolumne County is present as a small band on the western edge of the county, outside of the planning area.

Succulent owl's clover. Succulent owl's clover occurs on the margins of vernal pools, swales and some seasonal wetlands, often on acidic soils. It is never dominant and it is found in only a few of the pools in an area (USFWS 2007b). It has not been recorded within the planning area.

Hoover's spurge. Hoover's spurge grows in relatively large, deep vernal pools and tends to occur where competition from other species has been reduced by prolonged seasonal inundation or other factors (USFWS 2007g). It has not been recorded within the planning area and is unlikely to occur, given the size and depth of the vernal pools on Table Mountain.

Colusa grass. Colusa grass occurs in large or deep vernal pools with substrates of high mud content (USFWS 2007h). It has not been recorded within the planning area and is unlikely to occur, given the size and substrate of the vernal pools on Table Mountain.

Greene's tuctoria. Green's tuctoria grows in the dried bottom of vernal pools (CDFG 2007). It has not been recorded within the planning area or within either Calaveras or Tuolumne County.

Resource Management

Since critical habitat does not exist at New Melones, it is not a managed resource.

4.3.4 Other Special Status Plant Species

Current Conditions

A list of other special status plant species that may occur within the planning area was compiled from USFWS, CNDDDB, and CNPS lists for Tuolumne and Calaveras counties (USFWS 2007a; CDFG 2007; CNPS 2007).

The Peoria Wildlife Area has documented occurrences of special status plant species. Other planning areas may have suitable habitat for several special status species, but have not been surveyed. In addition, special status plants have been documented on lands near to, but not within, the planning area. These species may occur within the planning area, particularly in areas that have not been surveyed.

Table Mountain. On Table Mountain, *Allium jepsonii* occurs near Rawhide Flat (Reclamation 1995). In addition, *Eryngium spinosepalum* is found in vernal pools of the Sierra Nevada foothills and may occur on Table Mountain (Reclamation 1995).

Peoria Wildlife Management Area. In the Peoria Wildlife Area management area, several occurrences of *Lupinus spectabilis*, and one occurrence of *Packera clevelandii* and *Monardella douglasii* ssp. *venosa* have been documented (Ayles 2005; Vasquez 2007). Populations of *Allium tuolumnense* and *Allium jepsonii* have been identified in the lower Peoria basin (Ayles 2005, Vasquez 2007), and this species also occurs on Rawhide Hill and in the BLM Red Hills Management Area adjacent to the planning area (Reclamation 1995). *Chlorogalum grandiflorum* is endemic only to the Red Hills of Tuolumne County, as well as El Dorado and Placer Counties, south of the planning area (Reclamation 1995). Potential populations of this species have been found in the Peoria basin (Ayles 2005; Evens et al. 2004) and the species was found adjacent to the PWMA access road (Reclamation 2006b). *Lomatium congdonii* can be found in the Red Hills Management Area (Reclamation 1995) and has been recorded throughout the Peoria basin (Ayles 2005, Evens et al. 2004).

Resource Management

Reclamation undertakes the following actions to manage sensitive plant species, as shown below in Table R-25.

Table R-25: Management of Sensitive Plant Species

Internal Guidance	Source
Protect serpentine-based communities from erosion and high-impact uses that would degrade habitat values (including building roads).	VMP 1997
Preserve serpentine-based communities and special status plants such <i>Chlorogalum grandiflora</i> , and <i>Allium tuolumnense</i> .	VMP 1997
Restore or enhance lost or degraded riparian communities where sustainable.	VMP 1997
Promote streambank and reservoir shoreline stability to encourage establishment of riparian vegetation.	VMP 1997
Protect any seep vegetation and wet meadow communities from loss or degradation.	VMP 1997
Protect vernal pool communities from loss or degradation, including the invasion of exotic plants.	VMP 1997
Protect the riparian zone and riparian vegetation from degradation, including prevention of soil compaction, head-cutting, and undercutting.	VMP 1997

4.3.5 Sensitive Habitat Types

Current Conditions

Several sensitive habitat types occur in the planning area. These are serpentine communities and wetlands such as vernal pools and valley and foothill riparian woodlands.

Serpentine communities. Serpentine is considered an ultramafic rock formation, meaning that it is high in ferromagnesian silicate minerals (Kruckberg 1984, US Fish and Wildlife Service 2002 in Ayres 2005). These minerals produce soils with several unique characteristics, including 1) low calcium levels, 2) high magnesium levels 3) high concentrations of heavy metals (especially iron, chromium, and nickel), and 4) levels of nitrogen, potassium, and phosphorus below that needed to grow agricultural crops (Kruckberg 1984 in Ayres 2005). These chemical characteristics usually co-occur with a distinctive vegetation pattern of sparse amounts of plant biomass, even in areas known for their productivity, such as coastal forests. The sparse vegetation in these environments contributes to low turnover of nitrogen and phosphorus, high temperatures, high water stress, and low soil stability (Kruckberg 1984, US Fish and Wildlife Service 2002 in Ayres 2005). The coexistence and interdependence of these biochemical factors in the same environment has been dubbed the “serpentine effect” (Kruckberg 1984 in Ayres 2005). However, this sparse vegetation is also characterized by a high degree of endemic plant species (found only in California or only on west coast serpentine). In California, endemic serpentine species make up 10% (215 taxa) of the total endemic flora of California (2125 taxa) while serpentine soils only makeup 0.6% of the area of California (Raven and Axelrod 1978, Kruckberg 1984 in Ayres 2005). In addition, many of these endemic species are endangered, threatened, or rare. Of the 6 Federally listed plant species potentially occurring in the planning area, 3 are found on serpentine soils (Section 4.2.2).

This community’s small land area and high proportion of endemic plant species makes it particularly important to the preservation of biodiversity. Further, the barren appearance of serpentine communities falsely indicates that they lack ecological value; as a result, they are threatened by disturbance and degradation (e.g. grazing or mining) (USACE 1997). Serpentine communities are found within the West Side, Peoria Wildlife Area, and Dam and Spillway planning units.

Wetlands. In California's Mediterranean climate with hot, dry summers, wetlands have always been scarce and limited in size. These small, isolated areas are very productive because associated plants have longer growing periods. Further, wetlands are valuable to animals because they provide abundant food and water. Since the distribution of wetlands has generally declined, associated plants and animals have, in some cases, become rare and endangered (Reclamation 1995). Further, wetlands play a critical role in the watershed as the most productive of all ecosystems, as habitat for many sensitive plant and wildlife species, as flood control areas, as natural water quality purification systems, and as buffers against erosion (Reclamation 1995). Wetlands are found in all planning areas.

Vernal pools. The ponded water in vernal pools prevents annual grasses and other introduced forbs from growing in these depressions. Instead, the depressions are host to a number of native plants that may be limited in distribution to the pools of one particular area. Many vernal pool

plants are known for their medicinal value (BLM 2006). Frequently, the endemic plant species are considered endangered or threatened due to lack of habitat caused by development and urban encroachment (Reclamation 1995). Due to their ephemeral nature, vernal pools provide habitat for short-lived invertebrates and breeding habitat for amphibians, such as the pacific tree frog and western toad. Species that inhabit surrounding grasslands may also use the pools as a temporary water source. An extremely seasonal water regime provides foraging habitat for waterfowl and a number of bird species during spring migrations, as well as habitat for endemic species specifically adapted to vernal pool edaphic conditions (Reclamation 1995). More than 70 rare species are restricted to vernal pools, with new species discovered on a regular basis (BLM 2006).

Only about 10-25% of the vernal pools which originally occurred in California remain. The two biggest threats to vernal pools right now are development and agricultural conversion (USFWS 2007i). Vernal pools have not been documented in the New Melones Lake Area, although vernal swales may be found on the top of Table Mountain.

Valley and foothill riparian woodland. Riparian areas along larger streams tributary to New Melones Lake provide important habitat for a diverse array of species, including nesting habitat for a great variety of birds. More than 225 species of mammals, birds, reptiles, and amphibians rely on riparian areas. These shaded, moist, and typically well-vegetated corridors serve as escape cover and facilitate movement and dispersal of several species, such as black-tailed deer. Perennial stream courses also provide a year-long source of water for mammals, reptiles, and amphibians; a large range of species require riparian zones for breeding and foraging needs (Reclamation 1995).

Riparian systems are vulnerable and are easily altered by human activities. Even a slight change in the vegetation can modify the flow of the system, the temperature and pH of the water, the amount of oxygen in the water, and even the substrate. All of these changes have a subsequent impact on the species that depend on the systems. River corridors and riparian areas with natural flows and qualities are becoming a diminished resource throughout all of California (BLM 2006). Riparian woodlands can be found in the Camp Nine, Stanislaus River Canyon, Parrotts Ferry, Mark Twain, Tuttletown, French Flat, Bear Creek, Dam and Spillway, Greenhorn Creek, Carson, and Coyote Creek Planning Areas.

Resource Management

Reclamation undertakes the following actions listed in Table R-26 below, to manage sensitive habitat types.

Table R-26: Management of Sensitive Habitat Types

Internal Guidance	Source
Protect serpentine-based communities from erosion and high-impact uses that would degrade habitat values (including building roads).	VMP 1997
Preserve serpentine-based communities and special status plants such <i>Chlorogalum grandiflora</i> , and <i>Allium tuolumnense</i> .	VMP 1997

Internal Guidance	Source
Restore or enhance lost or degraded riparian communities where sustainable.	VMP 1997
Promote streambank and reservoir shoreline stability to encourage establishment of riparian vegetation.	VMP 1997
Protect any seep vegetation and wet meadow communities from loss or degradation.	VMP 1997
Protect vernal pool communities from loss or degradation, including the invasion of exotic plants.	VMP 1997
Protect the riparian zone and riparian vegetation from degradation, including prevention of soil compaction, head-cutting, and undercutting.	VMP 1997

4.3.6 Invasive Species

Current Conditions

Non-native species have been documented within the Peoria Wildlife Area planning area, and it is likely that non-native species may be found to some extent throughout the planning area. Surveys are needed to document non-native species in other planning areas, however.

In the Peoria Wildlife Management Area, 74 non-native species have been recorded (Evens et al. 2004). Of these, 11 are on the California Invasive Plant Council's (Cal-IPC) list of species of ecological concern (Evens et al. 2004). Table R-27 shows rankings and characteristics of these species, along with several of the other most abundant non-native species within the Peoria Wildlife Area planning area.

Table R-27: Common and Invasive Non-Native Species within Peoria Wildlife Area Planning Area

Species Name	Cal-IPC Ranking	Characteristics
<i>Ailanthus altissima</i>	List A-2 ¹	Tree; found to occur only in two locations within the Peoria Wildlife Area: along the banks of the Stanislaus river, south of the New Melones Dam and in a drainage in the central portion of the Peoria Wildlife study area.
<i>Avena barbata</i>	Annual Grass List ²	Annual grass; very widespread
<i>Avena fatua</i>	Annual Grass List ²	Annual grass; very widespread
<i>Brachypodium distachyon</i>	Annual Grass List ²	Annual grass.
<i>Bromus diandrus</i>	Annual Grass List ²	Annual grass; very widespread, but monotypic stands uncommon.
<i>Bromus hordeaceus</i>	None	Annual grass; very widespread, but primarily in converted annual grasslands.
<i>Bromus madritensis</i> ssp. <i>rubens</i>	List A-2 ¹	Annual grass.
<i>Bromus tectorum</i>	List A-1 ³	Annual grass.
<i>Carduus pycnocephalus</i>	List B ⁴	Biennial forb; the most abundant of the exotic thistles

Species Name	Cal-IPC Ranking	Characteristics
		within the study area. It was found in 30 associations, ranging in cover from <1% to as high as 40%.
<i>Centaurea melitensis</i>	List B ⁴	Annual forb; the second most abundant of the exotic thistle species. It occurs in 24 associations ranging in cover from <1% to as high as 20%.
<i>Centaurea solstitialis</i>	List A-2 ¹	Annual forb; found in 11 associations, ranging in cover from as low as <1% to as high as 34%. There were only two stands where its cover was greater than 5%.
<i>Cirsium vulgare</i>	List B ⁴	Biennial forb; widespread, can be very problematic regionally.
<i>Cynodon dactylon</i>	List A-2 ¹	Perennial grass; common landscape weed.
<i>Ficus carica</i>	List A-2 ¹	Tree; found in three associations with cover of less than 1%; it occurs in drainages with intermittently flowing streams and the species was found as scattered individuals rather than dense thickets.
<i>Gastridium ventricosum</i>	None	Annual grass.
<i>Hypochaeris glabra</i>	None	Annual forb; widespread; impacts appear to be minor; some local variability.
<i>Lolium multiflorum</i>	Annual Grass List ²	Annual grass; widely used for post-fire erosion control; widespread; impacts can vary with region.
<i>Phalaris aquatica</i>	List B ⁴	Perennial grass; limited distribution; can be highly invasive locally.
<i>Polypogon monspeliensis</i>	None	Perennial grass; widespread; impacts appear to be minor.
<i>Taeniatherum caput-medusae</i>	List A-1 ³	Annual grass; found in seven associations ranging in cover from less than 1% to 50%. Though widespread across the study area, the highest concentrations occur primarily along the roads and powerline corridors on Peoria Ridge.
<i>Torilis arvensis</i>	None	Annual forb; expanding range; appear to have moderate ecological impacts.
<i>Trifolium hirtum</i>	None	Annual forb; widely planted in California; impacts relatively minor in most areas.
<i>Vicia villosa</i>	None	Annual forb; widespread but impacts minor in wildlands.
<i>Vulpia myuros</i>	None	Annual grass; widespread; rarely forms monotypic stands, but locally problematic

¹ Notes: Cal-IPC - Ranking: List A-2 - Most invasive wildland pest plants, regional

²Cal-IPC - Annual Grass List - Grasses that are abundant and widespread in California that pose significant threats to wildlands but for which there is currently no treatment information

³Cal-IPC - Ranking: List A-1 - Most invasive wildland pest plants, widespread

⁴Cal-IPC - Ranking: List B - Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Sources: Evens et al. 2004; Cal-IPC 2006

Resource Management

Reclamation undertakes the following actions listed in Table R-28 to manage invasive weeds.

Table R-28: Management of Invasive Species

Internal Guidance	Source
Monitoring for pest species, detection of new types of pests, and increased severity of invasive species is coordinated with Calaveras Agricultural Department.	Integrated Pest Management Plan
Evaluate all pest problems and previous pest control measures.	DRMP 1995
When pesticide application is necessary for invasive species control, targeted chemicals will be used when available such as Transline for thistle control.	Integrated Pest Management Plan
Use Integrated Pest Management strategies that determine the acceptable level of pest populations rather than attempting to eradicate populations; apply pesticides only when necessary, considering alternative measures first or as a means of complementing pesticide application.	DRMP 1995