3.3 Biological Environment

3.3.1 Aquatic Species

3.3.1.1 Background

This section provides an overview of the federally listed aquatic species and their habitats that are found within fifteen of the AUs. A comprehensive analysis of the aquatic species resources for the Ansel Adams / John Muir AU (the 16th analysis unit) was described in Chapter 3 of the 2005 Pack Stock Management EIS within the Wildlife Section. This Final EIS incorporates that information by reference.

Aquatic species live in a wide variety of wetland habitats. In general, the riparian condition, especially vegetation, is important for all aquatic organisms to complete their life cycles. These organisms hide and seek shade in riparian vegetation. In addition most rely on both terrestrial and aquatic insects for food. The riparian vegetation is important for production of prey items. Within the project area, all Class I and II stream channels (perennial steams; order 3 and higher) provide potential habitat for aquatic species. For reptiles and amphibians, meadow edges, seeps and damp headwater areas as well as the riparian conservation areas surrounding streams provide potential suitable habitat. All management activities can affect aquatic habitat quality. Some changes may be beneficial and some may be detrimental.

Aquatic species and their habitats are susceptible to recreation effects such as loss of vegetation, reduction of streamflow, changes in channel morphology in riffles (loss of spawning habitat) and pools (loss of depth and width), increases in suspended and bedload sediment (from trampling of streambanks and compacting soils), increases in water temperature, changes in dissolved oxygen, presence of fecal coliform (from animal and human wastes), addition of chemicals (e.g. from human soap products) into streams, and changes in the amount of woody debris (Clark and Gibbons 1991). The effects of these changes on aquatic species and the amount of change are dependent on where the recreational activities take place (upland or on the streambank), when they occur (e.g. timing of on-dates for grazing), the duration of the activity, the intensity of use (e.g. number of people or packstock), and how widespread the use is over the species habitat (Clark and Gibbons 1991).

For the aquatic species found within the project area AUs the greatest potential of effect from the management activities proposed in Alternatives 2 and 3 is the increase in the amount of sedimentation into streams and the compaction of soils, changes in riparian vegetation and water temperature.

Increased sedimentation can affect stream water temperature, channel width, macroinvertebrate habitat, and dissolved oxygen levels (Chamberlin et al. 1991; Furniss et al.1991). Other alterations to the stream such as decreased vegetative cover and

changes to channel morphology affect aquatic habitat quality similarly though causes may be different (Meehan 1991).

Streambank vegetation is instrumental in maintaining the proper functioning of riparian areas and suitable habitat for fisheries and other aquatic life. Cover from streambank vegetation can help increase fish production (Boussu 1954; Hunt 1969; Hanson 1977; Binns and Eisermann 1979). Streambank vegetation provides for cover, streambank stability, stream temperature control and production of prey (Platts 1991). It also buffers the stream from incoming sediments and sediments from flood or high water events. It is essential for building and maintaining streambank structure. Natural erosion and rebuilding of streambanks occur as equilibrium over time. If this equilibrium is altered, streambank breakdown can occur faster than banks can be rebuilt (Platts 1991).

If streambank vegetation exists, streambanks can remain more in equilibrium as the vegetation buffers high flow events and traps sediments to rebuild the bank stability. Streambank vegetation also shades the stream and contributes terrestrial insects and detritus to macroinvertebrates. This is critical to the basis of the aquatic food chain. Streambank vegetation directly provides organic material which can make up to 50% of the streams nutrient energy supply (Cummins 1974). When recreational activities occur within the riparian areas the vegetation can be reduced or removed depending on the intensity and type of activity (Clark and Gibbons 1991).

The quality of the aquatic ecosystem is dependent on many factors, such as low percentages of fine material or sediment, stable, well vegetated streambanks with instream woody debris and shading, and low water temperatures. These indicators of health for aquatic ecosystems directly and indirectly contribute to the viability of aquatic species. The effects of management activities on aquatic resources are of concern within the project area analysis units, however, the level of effects from implementation of either Alternative 2 or 3 is expected to minor in comparison to the amount of habitat available (Table 3.40 and Table 3.43).

Aquatic Species Considered

The following information is for the aquatic federally listed, sensitive, and Management Indicator Species (MIS) analyzed throughout this section. Other aquatic species (e.g. Pacific tree frogs) occur within the project area but are not presented in the analysis for this Final EIS since they are not considered federally listed or sensitive at this time. Information on these non-listed aquatic species can be obtained upon request.

The aquatic species that are described are on the federally threatened, endangered, proposed, and candidate species for the Sierra National Forest (based on the October 3, 2006 online database (verified on October 20, 2006) from the U.S.D.I. Fish and Wildlife Service (USFWS; http://sacramento.fws.gov/es/spp_list.htm)) and the aquatic species that are on the U.S.D.A. Forest Service's sensitive species list (based on the Pacific Southwest Region's – Regional Forester's list of June 10, 1998, as amended on March 6, 2001 and May 7, 2003). For further detail on the aquatic species from these two lists

refer to the Aquatic Species Biological Assessment and Biological Evaluation Report (located in the project record).

Management indictor species (MIS) are animal or plant species identified in the Sierra NF LRMP (USDA Forest Service 1992), Pages 3-24 and 3-25), which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Sierra NF LRMP directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitats of each MIS affected by such projects, and (2) at the national forest (forest) or bioregional scale, monitor populations and/or habitat trends of forest MIS, as identified by the LRMP. Forest or bioregional scale monitoring requirements for the Sierra NF's MIS are found in the Monitoring Plan of the LRMP (USDA Forest Service 1992, Chapter 5 of ROD pages 5-6 through 5-9) and in Appendix E of the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement (FEIS) (USDA 2001), as adopted by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision (ROD) (USDA Forest Service 2004). The aquatic MIS report (which can be found in the project record) documents the steps in identifying and analyzing which aquatic species would be selected for project-level analysis. Only those species selected are brought forward into this section of the Final EIS.

There are ten aquatic federally listed, sensitive, and Management Indicator Species (MIS) that were analyzed for this project. However, three of the aquatic species do not occur but have marginally suitable and potentially suitable habitat[1] based only on the elevation in the NED AU. These three aquatic species are not affected by this project and are not analyzed further or in detail for this project. The three aquatic species are:

- **California red-legged frog** (*Rana aurora draytonii*) – Threatened status
- **Foothill yellow-legged frog** (*Rana boylii*) – Forest Service Sensitive species
- **Western pond turtle** (*Clemmys marmorata* (Subspecies *marmorata* and *pallida*)) - Forest Service Sensitive species

The other seven aquatic species and their habitats were analyzed further for this project because they either occur or have suitable or potentially suitable habitat that could be affected within the AUs are:

- **Lahontan cutthroat trout** (*Oncorhynchus (=Salmo) clarki henshawi*) – Threatened status and a Management Indictor Species for the Sierra National Forest
- **Mountain yellow-legged frog** (*Rana muscosa*) – Candidate status and Forest Service Sensitive species
- **Relictual slender salamander** (*Batrachoseps relictus*) – Forest Service Sensitive species

[1] Suitable habitat is considered as surveyed or occupied habitat. Potentially suitable habitat is considered as un-surveyed habitat that could be suitable.

- **Resident trout species – Brown Trout (***Salmo trutta*), **Eastern Brook Trout (***Salvelinus fontinalis*), and **Rainbow Trout (***Oncorhynchus mykiss*) – Management Indicator Species for the Sierra National Forest
- **Yosemite toad** (*Bufo canorus*) - Candidate status and Forest Service Sensitive species.

Each of the seven aquatic species is discussed in brief next for their life history attributes and in detail later in this section on the effects of the alternatives. Table 3.40 summarizes the amount of suitable and potentially suitable habitat for each of the aquatic species by analysis unit and Table 3.43 summarizes the estimated amount of habitat within the Sierra National Forest and the project area and displays the potential amount of habitat affected by the three alternatives.

General Information on Aquatic Species

Lahontan cutthroat trout and the Portuguese Creek Critical Aquatic Refuge

The Lahontan cutthroat trout (LCUTT; *Oncorhynchus (=Salmo) clarki henshawi*) is a federally threatened species and a Sierra National Forest management indicator species (MIS). On the Sierra National Forest this species was introduced into two watersheds; West Fork Cow Creek and West Fork Portuguese Creek. These two populations are managed under the species recovery plan and terms and conditions of two U.S. Fish & Wildlife Service Biological Opinions (1-1-94F-44 and 1-1-95-F-42; refer to Section II above for more details of the consultation history).

Critical aquatic refuges (CARs) were established for these two populations in their respective watersheds in 2001 (USDA Forest Service 2001; USDA Forest Service 2004). Approximately 57% of the West Fork Portuguese Creek population and its associated CAR (2,016 acres) occur within the Clover AU (Figure 3.9) of this project.

This species is monitored annually for population abundance and every five years for habitat characteristics based on the recovery plan objectives, the terms and conditions of the Biological Opinion, and from the Sierra National Forest LMP monitoring requirements. Currently the population in West Fork Portuguese Creek is maintaining its population size. There are no defined California Wildlife Habitat Relationships (CWHR) habitats for this species (CDFG 2002), however they are found in riverine (river, stream, and creek) systems.

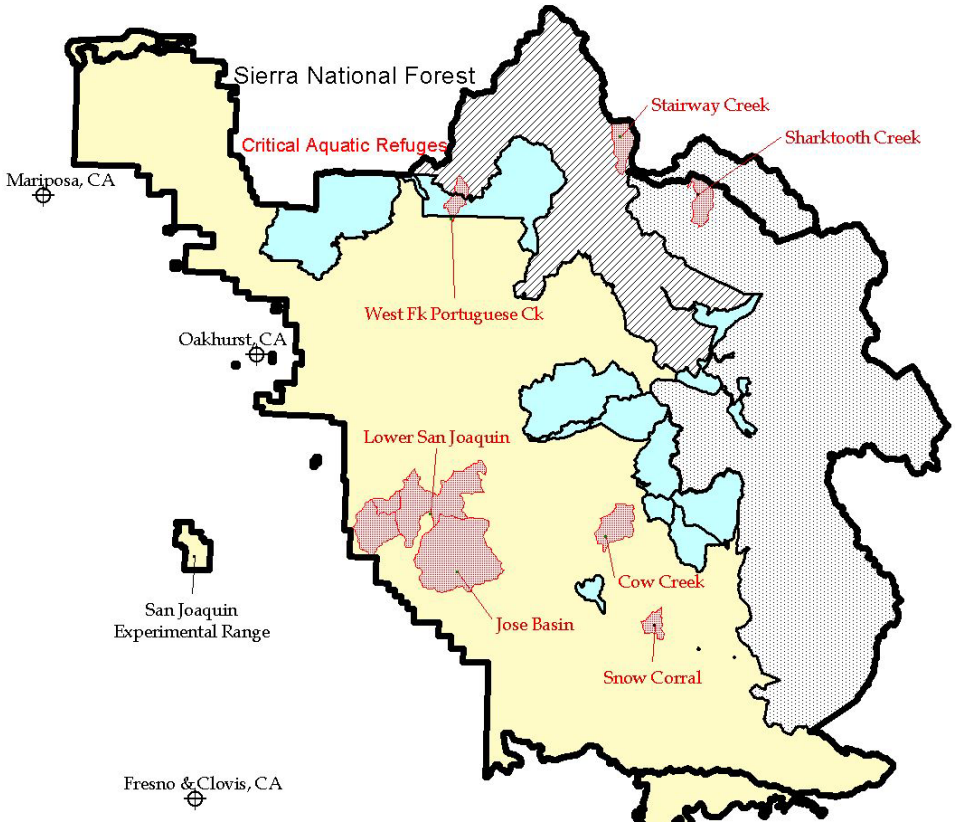

Figure 3.9. Map of the project area analysis units (shown in light blue with the Ansel Adams and John Muir Wildernesses in gray) and the Critical Aquatic Refuges (CAR) on the Sierra National Forest (shown in light red). The West Fork Portuguese Creek population of Lahontan cutthroat trout and its associated CAR is within the Clover analysis unit. Refer to Figure 3.1 for the names of each analysis unit. Map scale is 1:650,000.

Mountain yellow-legged frog

The Mountain yellow-legged frog (RAMU; *Rana muscosa*) is a federal candidate species and a Forest Service sensitive species. The USFWS found that listing was warranted as threatened or endangered for this species however the listing was precluded at the time based on other higher priority issues (68 **FR** 2283). On the Sierra National Forest there are approximately 30 known locations of this species with locations occurring within the Coyote, Nelder, and Nelson analysis units and adjacent to the Edison analysis unit (Figure 3.10). Records of this species from the California Natural Diversity Database (CNDDB) indicated that this species has also been found in the past in the Kaiser and West Huntington analysis units (Figure 3.10).

The CWHR highly suitable habitats (CDFG 2002) for this species that occur within the analysis units of this project are lacustrine, montane riparian, riverine, and wet meadows with mostly submerged and flooded gravels, cobbles, and boulders with trees greater than one inch in diameter, short or tall herbaceous cover, and vegetation and canopy closures greater than 10%. Currently suitable and potentially suitable habitat for this species occurs in the Coyote, Dinkey Lake, Helms, Kaiser, Nelder, and Nelson AUs.

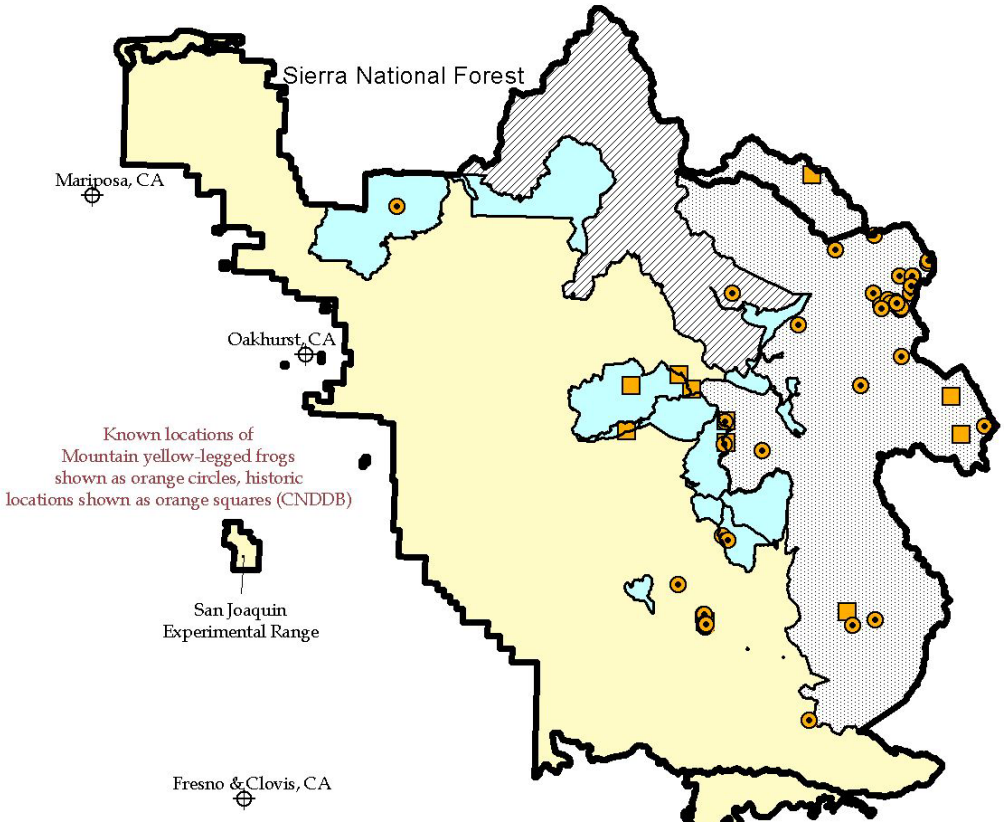

Figure 3.10. Map of the project area analysis units (shown in light blue with the Ansel Adams and John Muir Wildernesses in gray) and the known (orange circles) and historic (orange squares) locations of the mountain yellow-legged frog on the Sierra National Forest. Refer to Figure3.1 for the names of each analysis unit. Map scale is 1:650,000.

Relictual slender salamander

The Relictual slender salamander (RSS; *Batrachoseps relictus*) is a Forest Service sensitive species. This species was listed on the sensitive species list in 1998 prior to research (Jockush et. al.1998; Jockush and Wake 2002; Hansen 2006) being conducted which delineated the relictual slender salamander into four separate species in the Sierra Nevada. Three of the species would now have distributions south of Fresno County with one species, Kings River Slender Salamander (*B. regius)* within the Sierra National Forest.

At one point the relictual slender salamander was described as a subspecies within the Pacific slender salamander species (*B. pacificus*) which co-existed with the Black-bellied slender salamander (*B. nigriventris;* Stebbins 1985). The Gregarious Slender Salamander (*B. gregarius*) as described by Hanson (2006), closely follows the range (though at slightly lower elevations (<6,000 feet)) of the relictual slender salamander extending from Yosemite National Park to the Kern River but the species does not overlap directly with the newly described species Kings River slender salamander. The Black-bellied slender salamander now has a distribution in the far southern and western corner of Fresno County and all along the central and southern coastal mountains (Hansen 2006).

The distribution of the relictual slender salamander was not clearly defined during the creation of the 1998 sensitive species list and as of the fall of 2006 there have not been any updates to the sensitive species list for this species to re-define descriptions, ranges, or listing status. Therefore the Relictual slender salamander is analyzed in this document as if the original, broader description and range of the species from the sensitive species list was still valid from Fresno County, south to the Greenhorn Mountains and Kern River Canyon in Kern County with elevations ranging from 560 feet to 7,600 feet. All of the slender salamander species are extremely difficult to distinguish in the field and it is expected that many of the sightings that have been recorded on the Sierra National Forest may be a combination of the newly defined species Kings River slender salamander and the Gregarious slender salamander and recorded as relictual slender salamander.

The CWHR highly suitable habitats (CDFG 2002) for this species that occur within the project area are montane hardwood, montane hardwood – conifer, montane riparian, and sierra mixed conifer. Habitat for this species is considered to occur in riparian conservation areas (RCAs) of the AUs located at or below 7,600 feet in elevation (Figure 3.11). Nine AUs; Chinqupin, Dinkey Front Country, East Huntington, Edison, Florence, Kaiser, Tule Meadow, West Huntington, and Wishon are considered to have potentially suitable habitat though in varying levels of quality and quantity.

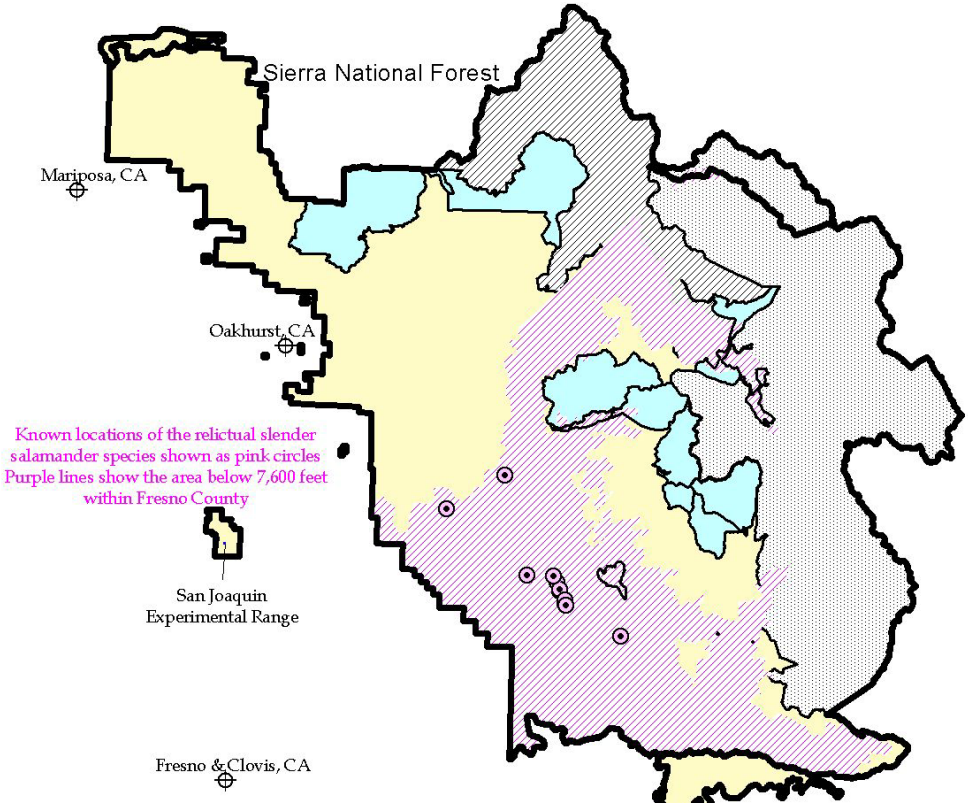

Figure 3.11. Map of the project area analysis units (shown in light blue with the Ansel Adams and John Muir Wildernesses in gray) and the known (pink circles) locations of the relictual slender salamander species on the Sierra National Forest. Also shown are the areas below 7,600 feet (as purple lines) within Fresno County. Refer to Figure 3.1 for the names of each analysis unit. Map scale is 1:650,000.

Resident Trout Species - MIS: Brown Trout, Eastern Brook Trout, Rainbow Trout

Management Indicator Species (MIS) for the Sierra NF are identified in the Sierra NF LRMP (USDA Forest Service 1992, Chapter 3) and in Appendix E of the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement (FEIS) (USDA Forest Service 2001), as adopted by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision (ROD) (USDA Forest Service 2004). The aquatic MIS analyzed for this project were selected from a list of six aquatic MIS identified for the Sierra NF as presented in the Aquatic Species - MIS Report (found in the project record). Three species – all part of the resident trout MIS (Brown trout, Eastern brook trout, and Rainbow trout) were selected for further analysis. A brief description of each of the three resident trout species (Brown trout, Eastern brook trout, and Rainbow trout) is presented next however all three are considered together for the analysis.

Brown trout (*Salmo trutta*) are considered as one of the three resident trout management indictor species for the Sierra National Forest. Brown trout are native to Europe and are fished for sport around the world (Moyle 2002). Adult brown trout are usually found at the bottom of pools between 0.7 and 3.5 meters (m) deep while younger, smaller brown trout tend to inhabit riffle areas less than 30 centimeters (cm) deep (Moyle 2002). The optimum habitat appears to be medium to large, slightly alkaline, clear streams with swift riffles and large, deep pools (Moyle 2002). However, they can be found throughout any stream and/or lake system (Moyle 2002). The preferred water temperature range is between 12 and 20 degrees Celsius (C), avoiding streams that do not reach 13°C (Moyle 2002). Smaller brown trout typically feed on terrestrial insects and aquatic invertebrates while larger brown trout tend to feed on other fish species, crayfish, and dragonfly larvae (Moyle 2002).

Growth in brown trout is affected by water temperature, alkalinity, total dissolved solids, turbidity, population density, and food availability (Moyle 2002). Brown trout can grow up to 7 cm in their first year and reach over 41 cm by their fourth year, with typically living up to 9 years old (Moyle 2002). Usually, they mature by their second or third year (Moyle 2002). Spawning occurs in November or December in streams with pea to walnut sized gravel (approximately 10 to 40 millimeters (mm); Moyle 2002).
Eastern brook trout (*Salvelinus fontinalis*) are the second resident trout species to be listed as a management indicator species for the Sierra National Forest. Eastern brook trout were originally native to the northern half of the Eastern United States and Canada (Moyle 2002). Eastern brook trout have been introduced into streams throughout most of the world, becoming most abundant in Sierra mountain streams and lakes (Moyle 2002). Eastern brook trout prefer clear, cold lakes and streams and have become well established in the small, headwater, spring-fed streams and isolated lakes (Moyle 2002). Water temperatures for Eastern brook trout often range between 14 and 17 degrees C though being able to feed in as cold as 1°C (Moyle 2002). When water temperatures begin to exceed 19°C it starts to slow growth and may become lethal for this species (Moyle 2002). Eastern brook trout mature within the first year for males and second year for females, spawning in the fall and living only for a total of 4 or 5 years (Moyle 2002).

When stream flows are fast and food is abundant, Eastern brook trout will defend their feeding areas against all other trout species (Moyle 2002). In lakes, Eastern brook trout tend to search out springs and cooler water inputs (Moyle 2002). They tend to feed on terrestrial insects and aquatic insect larvae in both streams and lakes, with zooplankton added in at lakes (Moyle 2002). As they become larger in lakes they may begin to feed on other fish species (Moyle 2002).

Rainbow trout (*Oncorhynchus mykiss*) are the third resident trout species to be listed as a management indicator species for the Sierra National Forest. Resident rainbow trout is a generally term used for hundreds of non-anadromous wild and hatchery planted rainbow trout populations existing throughout California (Moyle 2002). Rainbow trout were originally native to Pacific coast streams from Alaska to Baja, California (Moyle 2002). Rainbow trout have been introduced into coldwater streams and lakes throughout most of the world, including waters that were originally fishless (Moyle 2002).

Rainbow trout prefer cool, clear fast-flowing permanent streams and rivers where riffles dominate over pools, invertebrate species for food is abundant, and there is ample riparian vegetation, and undercut banks (Moyle 2002). Water temperatures for rainbow trout often range between 4 and 23 degrees C (Moyle 2002). When water temperatures exceed 24° C it is usually lethal for this species (Moyle 2002). They prefer alkaline waters (pH of 7 to 8).

Smaller rainbow trout will chose shallow areas (less than 50 cm) while juveniles tend to use deeper (50 to 100 cm) and faster areas of the stream (Moyle 2002). Larger rainbow trout will select the deeper areas of runs, pools and behind rocks searching for drifting invertebrates (Moyle 2002). Threats to rainbow trout include birds that prey on the fish if in shallow water and other trout species such as Brown trout (Moyle 2002).
Suitable and potentially suitable habitat is defined as all perennial streams and lakes within the project area and is considered to range from marginal to good habitat. Resident trout species have been found in all AUs except in the Tule Meadow AU and Wishon AU. There is approximately 393 miles of perennial streams and 6,371 acres of lake habitat within the AUs (not including the AA / JM AU) (Table 3.37 and Table 3.38). There are no defined CWHR habitats (CDFG 2002) other than riverine and lacustrine system.

Yosemite toad

The Yosemite toad (BUCA; *Bufo canorus*) is a federal candidate species and a Forest Service sensitive species. The USFWS found that listing was warranted as threatened or endangered for this species however the listing was precluded at the time based on other higher priority issues (67 **FR** 75834). This species occurs above 6,000 feet in elevation in meadows, lake edges, and some stream habitats and can disperse up to 0.6 miles (CDFG 2002) to reach breeding or over-winter habitats. The CWHR highly suitable habitats (CDFG 2002) for this species that occur within the analysis units are wet meadows that have short (< 12 inches) herbaceous plants with vegetation closures greater than 10%.

This species was inventoried for occurrence between 2002 and 2004 across the Sierra National Forest. Over 300 known locations of this species occur on the Sierra National Forest (Figure 3.12) with as many as 105 (approximately 30% of all known sites) occurring within eight of the AUs (Clover, Coyote, Dinkey Lakes, East Huntington, Helms, Kaiser, Nelder, and Nelson; excluding the AA / JM AU). Of the 685 meadows occurring within the AUs (Table 3.42 and Figure 3.13), 523 of them were surveyed for the Yosemite toad with 67 of those meadows (or approximately 10% of all meadows in the project area) known to be occupied with Yosemite toad.

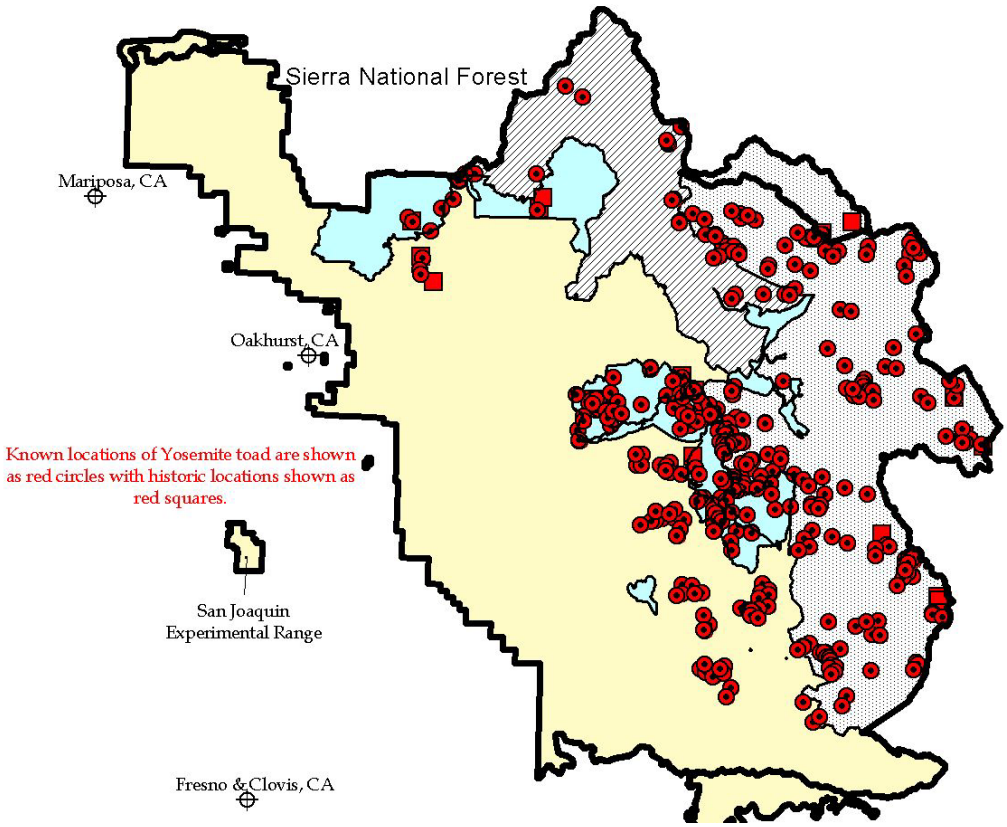

Figure 3.12. Map of the project area analysis units (shown in light blue; the Ansel Adams and John Muir Wildernesses in gray) and the known (red circles) and historic (red squares) locations of the Yosemite toad on the Sierra National Forest. Refer to Figure 3.1 for the names of each analysis unit. Map scale is 1:650,000.

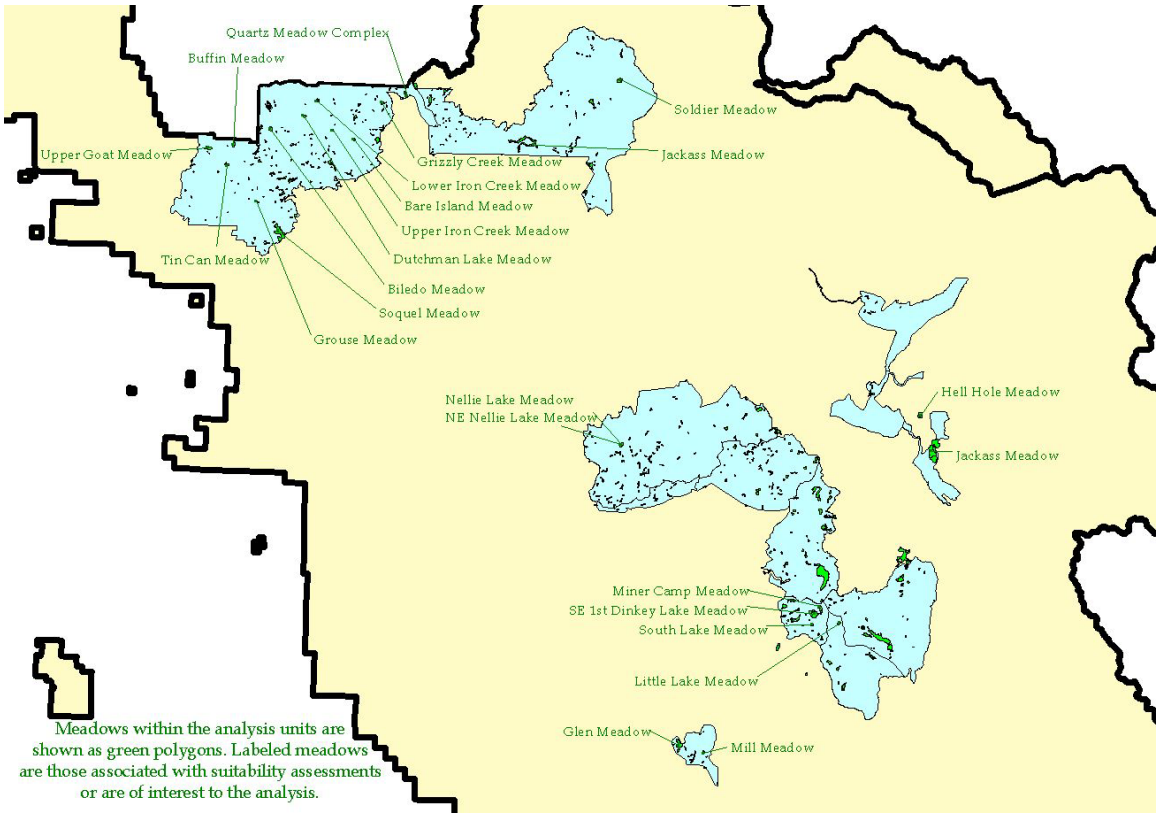

Figure 3.13. Map of the 685 meadows (green polygons) occurring within the analysis units (shown in light blue) for this project. Meadows associated with suitability assessments or are of interest to the analysis are labeled with the meadow name. Refer to Figure 3.1 for the names of each analysis unit. Map scale is 1:400,000.

Table 3.40. The estimated acres (or miles) of habitat within each of the analysis units for the aquatic species analyzed in detail for this project are displayed. LCUTT = Lahontan cutthroat trout, RAMU = Mountain yellow-legged frog, RSS = Relictual slender salamander, RST = Resident trout species, BUCA = Yosemite toad, "-"= not applicable for that species (i.e. species does not occur in the analysis unit due to its range)

Analysis Unit Name	Suitable and Potentially Suitable Habitat					
	LCUTT (acres)	RAMU (acres)	RSS (acres)	RST		BUCA (acres)
				acres	miles	
Chinquapin	–	0	1,479	7	8	24
Clover	1,146	0	–	11	77	411
Coyote	–	178	–	89	32	521
Dinkey Front Country	–	0	2,110	1	10	50
Dinkey Lake	–	99	–	99	9	195
East Huntington	–	0	755	4	23	223
Edison	–	0	431	1,838	15	29
Florence	–	0	2,135	991	15	146
Helms	–	13	–	13	23	482
Kaiser	–	108	1,004	108	54	321
Nelder	–	62	–	62	107	547
Nelson	–	176	–	1,732	15	90
Tule Meadow	–	0	11	0	0	0
West Huntington	–	0	1,559	1,416	5	0
Wishon	–	0	6	0	0	0
Totals	**1,146**	**636**	**9,491**	**6,371**	**393**	**3,039**

3.3.1.2 Methodology

From 1989 to 2006 the perennial and intermittent tributaries, meadows and some lakes of the AUs were surveyed over various times and locations for aquatic species, stream channel characteristics, and / or watershed restoration needs. The most recent information for meadows was gathered during a forest-wide inventory for the Yosemite toad between 2002 and 2004. All aquatic survey data are located at the High Sierra Ranger District – Aquatic Species & Watershed Library office.

One of the primary steps for the analysis of this project was using Geographic Information Systems (GIS) to identify stream miles, lake and meadow acreages, vegetation types (California Wildlife Habitat Relationships – CWHR), and correlations between locations of AUs and aquatic species suitable and potentially suitable habitats and occurrences.

Site specific information for each of the pack station facilities, use trails, campsites, and other project associated areas such as grazing locations were gathered by the project's interdisciplinary team (IDT) between 2003 and 2005. Detailed inventory information for each site visited can be found in the project files.

The IDT determined which areas within selected meadows were suitable for grazing based on criteria such as forage production, stream condition, soil and vegetative condition, trail impacts to meadows, accessibility of water for livestock, range readiness, presence of fens and other critical areas, presence of TES plants and wildlife and/or their potential habitat, slope, and current use and overall resource condition. The summary of the IDT findings can also be reviewed in the watershed and soil section and the botany and range sections of this EIS. Table 2.21 and Table 3.55 display the conditions of meadows assessed for commercial pack stock grazing use.

The purpose of these IDT visits for aquatic species were to assess the areas for suitable and potentially suitable habitat for the aquatic species found on the federal, sensitive, and Management Indicator Species (MIS) lists for Sierra National Forest and to determine if further surveys were needed for aquatic species occurrences. If a species was observed during these IDT field visits or during any species specific occurrence surveys, the data was recorded and field reports were written for each pack station as a basis to begin the analysis of this project. This information is in the project record as field reports between 2003 and 2005.

The following specific management direction from the Sierra National Forest Land Management Plan (USDA Forest Service 1991) and the associated amendment (USDA Forest Service 2004) that guides the implementation of the alternatives and the analysis for aquatic species:

- In stream reaches occupied by fish, any activity that results in trampling and chiseling of stream banks should not exceed 20% of any given stream reach. Controls such as re-routing trails, relocating dispersed campsites, and/or fencing of areas will be used to manage activities and improve riparian conditions in identified areas not meeting this standard. (S/G #76 – USDA Forest Service 1991)

- When existing routes through riparian areas and meadows are not compatible with riparian dependent resources, consider re-routing. (S/G #79 – USDA Forest Service 1991)

- Allow picketing or tethering of stock in meadows and overnight tie-ups no closer than 100 feet of lakes and streams. (S/G #80 – USDA Forest Service 1991)

- Exclude livestock from standing water and saturated soils in wet meadows and associated streams and springs occupied by Yosemite toads or identified as "essential habitat" in the conservation assessment for the Yosemite toad during the breeding and rearing season (through metamorphosis). Wet meadow habitat for Yosemite toads is defined as relatively open meadows with low to moderate amounts of woody vegetation that have standing water on June 1 or for more than 2 weeks following snow melt. Specific breeding and rearing season dates will be determined locally. If physical exclusion of livestock is impractical, then exclude grazing from the entire meadow. This standard does not apply to pack and saddle stock. (S/G #53 – USDA Forest Service 2004)

- Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages. (S/G #96 – USDA Forest Service 2004)

- Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under Special Use Permits, and designated off-highway vehicle routes. (S/G #103 – USDA Forest Service 2004)

- In stream reaches occupied by, or identified as "essential habitat" in conservation assessment for, the Lahontan and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or "essential habitat" stream reach. (Conservation assesses are described in the record of decision (USDA2001a)). Cooperate with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded. (S/G #104 – USDA Forest Service 2004)

- Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the compatibility of livestock management facilities located in riparian conservation areas with riparian conservation objectives. (S/G #119 – USDA Forest Service 2004)

Analysis Elements

For aquatic species the following analysis elements were used for analyzing the alternatives for this project:

1. Aquatic species occurs within or adjacent to the analysis unit;
2. Aquatic species habitat occurs within or adjacent to the analysis unit; and
3. Potential for (or the implication of) impacts (from direct, indirect, or cumulative effects) to aquatic species and or their habitat by the project alternatives.

3.3.1.3 Overview – Common to All

Affected Environment

The AUs are habitat to the seven aquatic federal, sensitive, and management indictor species that are analyzed further for this project (Table 3.40 and Table 3.43). The species live in the aquatic – riparian zone of the project area but can disperse into upland habitats. Additional information on these species and their habitats can be viewed in the Aquatic Species Biological Assessment and Biological Evaluation Report (Sanders 2006a) and the Aquatic Species Management Indicator Species Report (Sanders 2006b) located in the project record at the High Sierra Ranger District, and is available upon request as required by 40 CFR 1502.21. The aquatic species and associated discussions for the Ansel Adams / John Muir AU has already been analyzed under the 2005 Pack Stock Management EIS and are not repeated but incorporated and highlighted as reference.

Within the AUs (excluding the AA / JM AU) there are over 393 miles of perennial streams, 3,080 acres of meadows (685 meadows), and 6,380 acres of lakes (242 lakes including Lake Thomas A. Edison (1,835 acres), Huntington Lake (1,425 acres), and Courtright Reservoir (1,630 acres)) – refer to Table 3.41 for the estimates of miles of trails and stream types and Table 3.42 for the acreage of meadows and lakes.

Table 3.41: Trail and stream miles for the project using stream order to define stream type. Information is based on the current stream Geographic Information System (GIS) layer ("snfstrm982ar" GIS layer – dated September 17, 2002) and the Strahler (1957) method of stream ordering. Abbreviations are Elev=Elevation, Prnl=Perennial, Intmt= Intermittent, Ephml=Ephemeral, ft=feet, mi=miles.

Analysis Unit Name	Elev Range (ft)	Analysis Unit (acres)	System Trails (mi)	Use Trail (mi)	Prnl Order 3+ (mi)	Intmt Seasonal Order 2 (mi)	Ephml Seasonal Order 1 (mi)
Chinquapin	6,600 to 8,900	2,328	3	0	8	8	24
Clover	5,900 to 9,300	27,191	28	5	77	63	205
Coyote	8,300 to 10,000	9,978	12	1	32	36	92

Analysis Unit Name	Elev Range (ft)	Analysis Unit (acres)	System Trails (mi)	Use Trail (mi)	Prnl Order 3+ (mi)	Intmt Seasonal Order 2 (mi)	Ephml Seasonal Order 1 (mi)
Dinkey Front Country	5,500 to 6,600	2,110	3	3	10	8	22
Dinkey Lake	8,900 to 10,500	2,737	8	2	9	9	23
East Huntington	7,000 to 10,200	9,154	9	6	23	25	72
Edison	7,000 to 8,300	4,888	8	4	15	7	20
Florence	7,100 to 7,900	2,383	1	0	15	7	11
Helms	8,200 to 10,100	11,837	10	0	23	19	48
Kaiser	7,000 to 10,200	21,989	29	1	54	52	190
Nelder	4,100 to 9,100	33,990	22	19	107	111	285
Nelson	8,200 to 10,500	6,326	10	1	15	15	42
Tule Meadow	7,000 to 7,060	11	0	0	0.1	0	0
West Huntington	7,000 to 8,100	1,748	9	0	5	3	8
Wishon	6,880 to 7,000	6	0	0	0	0	0.1
Estimated totals		136,676	152	42	393	363	1,042

Table 3.42: The total number and acreage of meadows and lakes for the project within the fifteen AUs is estimated. Some meadows and lakes occur both within and outside an AU. Total acreage of the meadow or lake is given.
Abbreviations are Mdw=Meadow, #=total number of meadows or lakes.

Analysis Unit Name	Analysis Unit (acres)	Mdw (#)	Mdw (acres)	Lake (#)	Lake (acres)	Comment
Chinqupin	2,328	5	24	1	7	
Clover	27,191	109	411	3	11	
Coyote	9,978	46	521	46	90	
Dinkey Front Country	2,110	17	50	6	2	
Dinkey Lake	2,737	22	195	18	99	

Analysis Unit Name	Analysis Unit (acres)	Mdw (#)	Mdw (acres)	Lake (#)	Lake (acres)	Comment
East Huntington	9,154	59	223	2	4	
Edison	4,888	8	29	2	1,838	Lake Thomas A. Edison=1,835ac
Florence	2,383	5	146	10	991	
Helms	11,837	32	482	13	13	
Kaiser	21,989	95	321	53	108	
Nelder	33,990	260	547	29	62	
Nelson	6,326	13	90	58	1,732	Courtright Reservoir = 1,630ac
Tule Meadow	11	0	0	0	0	
West Huntington	1,748	14	41	1	1,423	Only Huntington Lake
Wishon	6	0	0	0	0	
Estimated totals	137,587	685	3,080	242	6,380	

Environmental Consequences

Each of the AUs is described for the affected environment and the associated environmental consequences of the three alternatives on the seven aquatic species that occur or have habitat within the project area and are analyzed further in this EIS. Refer to the Aquatic Species Biological Assessment and Biological Evaluation Report (Sanders 2006a) and the Aquatic Species Management Indicator Species (MIS) Report (Sanders 2006b) located in the project record for further information. The aquatic MIS report is written specifically for the project with aquatic species that are listed for the Forest. The specific aquatic MIS report is tiered to the Forest MIS report which is written in broad terms to evaluate species at a Forest level (USDA Forest Service 2006).

For Alternative 1 the reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from non-commercial pack stock, cattle (in certain areas) and recreationists.

For Alternative 2 and 3 the overall effects on aquatic species may be short-term (3 to 6 years) or long term (greater then 10 years) depending on the implementation of measures to protect and upkeep trails, campsites, and meadows. Identified monitoring sites would also be used to adapt management annually on the "on-dates" for grazed meadows in occupied Yosemite toad habitat and in assessing aquatic species habitat conditions. Since one of the only differences between the two alternatives is the establishment of a destination quota for the project, the overall potential effects to aquatic species and their

habitats will be very similar. The two action alternatives (Alternative 2 and Alternative 3) vary only in small details in regards to affects on aquatic species. The overall spatial effect on aquatic species from Alternative 3 might be less than Alternative 2 due to the concentration of use into destination management zones (Table 3.39). Alternative 2 would allow use throughout the project area thus the potential to affect spatially a larger area is expected, though the concentration in those areas may or may not be less.

Alternative 2 has a greater potential to affect the Yosemite toad in the Dinkey Lakes AU where a use trails (DIL02 and DIL03) identified in the Dinkey Lakes Wilderness Trail Management Plan at Swede Lake and at South Lake would be approved through occupied fragile meadow habitat. These two use trails are not approved in Alternative 3. Alternative 2 allows for use across the project area AUs and though it may be dispersed it would be more difficult to pinpoint, and adapt management, if packstock operations were the cause of negative aquatic species habitat effects.

In Alternative 3 there is a greater potential to affect the Yosemite toad in the Coyote AU where a designated stock camp would be established at Rock Meadow, an occupied core site for the species. Alternative 2 does not establish specific destination zones, though the use in Rock Meadow can still occur there. Alternative 3 would concentrate the use in certain areas where management recommendations could be used to annually adapt packstock operations if it is found through monitoring that aquatic species and or their habitat are being negatively affected.

The amount of acres and miles of suitable and potentially suitable habitat found within the Sierra NF, this project, and the AA / JM AU, and the amount expected to be negatively affected[2] by this project are shown in Table 3.43 for each of the aquatic species analyzed further in this EIS. The amount of habitats displayed in Table 3.39 is based on the use of the most recent versions of Geographic Information Systems (GIS) stream and lake information for the Forest and on over 2,200 meadows surveyed between 2002 and 2004 for the Yosemite toad. The values from GIS are what is currently used in this analysis and differ slightly from the overall values given in the Sierra NF LRMP (USDA Forest Service 1992).[3]

The estimated amounts of suitable and potentially suitable habitat are shown for general comparison purposes between what is found on the Sierra National Forest and what the three alternatives have the potential to negatively affect. These estimates represent the best and most current available information and are not meant to be absolutes. It is assumed that the calculations are over estimates since not all acres in a meadow or lake would be affected.

[2] Habitat that is negatively affected is being defined as any potential to disturb or alter suitable or potentially suitable habitat for the aquatic species analyzed in this document.

[3] For further explanation of how the values from GIS were compared to the values found in the Sierra NF LRMP (USDA Forest Service 1992), refer to the aquatic species Management Indicator Species report located in the project record for this EIS.

Table 3.43 shows that in the Sierra National Forest there are approximately 282,232 aquatic habitat units (both acres and miles of suitable and potentially suitable habitat) for the aquatic species analyzed further in this EIS. There are approximately 21,076 units within the project area (or roughly 7.5% of the total available aquatic habitat units on the Sierra National Forest are within the project area analysis units (excluding the Ansel Adams / John Muir AU because that area has already been analyzed in the 2005 Pack Stock Management EIS)).

Table 3.43 shows that Alternative 2 has the potential to negatively affect approximately 81.5% of the available aquatic habitat units in the project area with Alternative 3 at approximately 79.1%. The difference in percentages of habitat negatively affected are primarily found at lake habitats for the mountain yellow-legged frog where the potential to affect any of the lakes within the AUs in Alternative 2 is in contrast to affecting only those that are within destination zones in Alternative 3. These figures seem high since they incorporate total lake acres and all perennial stream miles within the entire AU, regardless of the actual proportion that the packstock operations may affect, which can not be determined for Alternative 2 and can only be calculated at destination zones for lakes in Alternative 3.

When compared to the amount of available aquatic habitat for the aquatic species discussed in this EIS on the Sierra National Forest both Alternative 2 and Alternative 3 add 6.1% and 5.9%, respectively, to the habitat units affected overall on the Forest. The level of effect over this area (when added together with other activities) is expected to be minor (only in isolated areas where packstock and livestock both graze meadows) because the activities proposed are less intense overall in comparison to other management activities (e.g. packstock use along a meadow edge would be less intense than a tractor piling brush for a timber sale). The amount of aquatic habitat affected by other past and present activities, and the amount that could potentially be affected by reasonably foreseeable future activities is difficult to determine and has not been calculated. Monitoring (identified in the ROD for this project) and a better analysis technique to quantify the amount of aquatic habitat affected and the level of effect from the different activities is needed to adequately address the cumulative effects for aquatic species and their habitat across the Sierra National Forest. The official determinations for the aquatic species are shown in Table 3.44 (which follows the guidelines and definitions established by the Pacific Southwest Region of the Forest Service (USDA 1996 and USDA 2000)).

Table 3.43. The estimated suitable and potentially suitable habitat units (acres or miles) for the aquatic species analyzed further in this EIS are displayed. Columns represent the estimated totals for the Sierra National Forest, the Ansel Adams & John Muir Wilderness (AA/JM) AU within the Sierra National Forest, the Project Area AUs excluding the AA/JM AU, and the potential amount affected by each of the alternatives. Refer to Table 3.40 for individual analysis unit totals for the Project Area column. Calculating habitat units is problematic and represents only an estimate of the actual aquatic habitat available, utilized, and affected. CAR = Critical Aquatic Refuge; CWHR = California Wildlife Habitat Relationships; AA/JM AU = Ansel Adams and John Muir Analysis Unit

Species and associated habitat type	Amount of Suitable and Potentially Suitable Habitat (estimated and rounded)					
	Sierra National Forest	AA / JM AU in the Sierra National Forest	Project Area Analysis Units (excluding AA/JM AU)	Potential of Aquatic Species to be Negatively Affected by Implementing		
				Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Destination Management
Lahontan Cutthroat trout (CAR suitable acres)	6,419	0	1,146	0	0	0
Mountain yellow-legged frog (Lake suitable and potentially suitable acres – not including reservoirs)	7,191	6,346	636	0	636	122
Relictual slender salamander (CWHR potentially suitable habitat acres)	218,724	51,243	9,491	0	9,491	9,491
Resident trout species (Lake suitable and potentially suitable acres – including reservoirs)	33,434	6,346	6,371	0	6,371	6,371
Three Resident trout species (Perennial suitable and potentially suitable stream miles)	4,115	1,236	393	0	393	393
Yosemite toad (Meadow suitable acres)	12,349	7,581	3,039	0	291	291
Total (Units)	**282,232**	**72,752**	**21,076**	**0**	**17,182**	**16,668**

Table 3.44: Determinations for the seven listed aquatic species within the fifteen analysis units for each alternative for this project are shown. For more information refer to the project's aquatic species biological assessment and biological evaluation report (Sanders 2006a) and the aquatic management indicator species report (Sanders 2006b).

Species	Status	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Destination Management
Lahontan cutthroat trout & the Portuguese Critical Aquatic Refuge	Federal Threatened and SNF Management Indicator Species	***no effect***	***no effect***	***no effect***
Mountain yellow-legged frog	Federal Candidate and Forest Service Sensitive	***no effect***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***
Relictual slender salamander	Forest Service Sensitive	***no effect***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***
*Resident trout species (Brown Trout, Eastern Brook Trout, Rainbow Trout)	SNF Management Indicator Species	***not alter or contribute to existing forest-wide trends***	***not alter or contribute to existing forest-wide trends***	***not alter or contribute to existing forest-wide trends***
Yosemite toad	Federal Candidate and Forest Service Sensitive	***no effect***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***	***may affect individuals, but is not likely to lead to federal listing or loss of viability***

**No official determination is required for Management Indicator Species (MIS), however project-level analysis of effects to MIS involves an analysis of the effects (direct, indirect, & cumulative) to habitat. Then, conclusions are needed relating the project habitat effects to the forest/bioregional population and/or habitat trends. There are three "conclusion statements" to select from based on the recent November 7, 2006 Prototype for MIS report by the Pacific Southwest Regional Office for project-level habitat impacts on MIS. The one that best represents the effects of the alternatives on the MIS will be what are shown above in the determination table.*

For each of the analysis units a description of the affected environment and the associated effects based on the three alternatives for aquatic species is described next. Some effects are common to all analysis units and are depicted below. Also refer to Sections 3.2.1 (Watershed – Soils, Water Quality and Hydrology) and 3.3.4 (Grazing Resources) for additional specific information on habitat conditions.

Alternative 1

Direct and Indirect Effects

Potential disturbances to the aquatic species analyzed in detail for this project resulting from pack station related activities would be eliminated. These aquatic species would experience a decrease in stress and disturbances resulting from the proximity of horseback riders and other activities associated with the pack station, specifically in and around meadow habitats for the Yosemite toad and at stream crossings for resident trout.

Effects along remote and infrequently traveled trails would be less noticeable. The reduction of pack station related disturbances would apply to the aquatic species and their habitat. Existing dispersed, non-permitted recreational uses (hikers, campers, fishing, biking, OHV use, etc.) would continue within the analysis area, so the potential for disturbances to aquatic species and their habitat would continue at a lesser level than the current condition.

In the Nelder AU, the use trails would not be authorized under this alternative and the trails would need to be rehabilitated in order to be effectively closed to general public use.

A beneficial effect would be expected under Alternative 1 due to the elimination of potential disturbances related to pack station activities particularly at the lakes and meadows as compared to the effects of Alternative 2 and 3 (Table 3.43). This includes the elimination of disturbances resulting from the presence of pack trains and riders, and reduced impacts to meadow vegetation and riparian areas due to the absence of grazing and pack stock related trampling. This beneficial effect may be offset to some degree by other recreational uses which are outside the scope of this analysis. Cattle grazing is authorized in a number of the meadows and would continue no matter which alternative was selected for this project particularly in NE Nellie Lake Meadow (Kaiser AU) where the Yosemite toad also occurs.

Cumulative Effects

There would be no cumulative effects. Continued effects could potentially affect aquatic species from past and current activities (this list is derived from Table 3.1) such as current logging, grazing, recreation (off-highway vehicles, snowmobiling, fishing, camping, hiking, backpacking), however, no new incremental effects would occur from the no action alternative because no direct or indirect effects are expected.

Alternatives 2 and 3

Direct and Indirect Effects

Trails create small habitat fragmentation corridors that amount to a relatively minor habitat reduction for species and their prey. When aquatic species, such as the Yosemite toad, are found within and on the trail corridor, the potential for direct kills and injuries is possible. Yosemite toads have been found trying to burrow into a trail which puts them in direct alignment for trampling. This same issue can occur in meadows where toads breed at or where the burrow habitats are crushed (stepped on) by packstock (Figure 3.14 and Figure 3.15).

For resident trout species the direct and indirect effect would be seen at stream crossings where packstock can dislodge spawning gravels and redds (where eggs are laid). These impacts can cause direct kills to the eggs and loss of appropriate sized gravels.

Figure 3.14. Example of burrow habitat for the Yosemite toad at First Dinkey Lake in the Dinkey Lakes AU. Photo taken on July 18, 2003.

Figure 3.15. Example of Yosemite toad trying to burrow into trail 27E07 (located between occupied meadows at First Dinkey Lake) in the Dinkey Lakes Analysis Unit. Photo taken on July 9, 2002.

Cumulative Effects

In addition to these alternatives other management activities are ongoing and proposed such as timber harvesting, road maintenance, cattle grazing, off-highway vehicle use, and fishing. System trail, use trail, and Forest road use, packstock grazing and tethering, as well as the use of campsites and destinations by commercial pack stock operators and clients can result in compacting soils and trampling of aquatic species and their habitats. These types of impacts may occur at critical times, important to the life cycle of the species such as spawning and breeding and young rearing (Clark and Gibbons 1991). The scientific understanding of how such impacts affect wildlife populations in general, their viability, and habitat use is poorly understood (Gaines et al. 2003, Knight and Gutziller 1995). Since one of the only differences between the two alternatives is the establishment of a destination zones for the project, the overall potential effects to listed aquatic species and their habitats will be very similar.

Table 3.43 shows that Alternative 2 may have the potential to negatively affect approximately 81.5% of the available aquatic habitat units in the project area with Alternative 3 at approximately 79.1%. The difference in percentages of habitat negatively affected are primarily found at lake habitats for the mountain yellow-legged frog where the potential to affect any of the lakes within the AUs in Alternative 2 is in contrast to affecting only those that are within destination zones in Alternative 3. These figures seem high since they incorporate total lake acres and all perennial stream miles within the entire AU, regardless of the actual proportion that the packstock operations

may affect, which can not be determined for Alternative 2 and can only be calculated at destination zones for lakes in Alternative 3.

When compared to the amount of available aquatic habitat for the aquatic species discussed in this EIS on the Sierra National Forest both Alternative 2 and Alternative 3 add 6.1% and 5.9%, respectively, to the habitat units affected overall on the Forest. The level of effect over this area (when added together with other activities) is expected to be minor (only in isolated areas where packstock and livestock both graze meadows) because of the nature of the activities proposed are less intense overall in comparison to other management activities (e.g. packstock use along a meadow edge would be less intense than a tractor piling brush for a timber sale).

Each of the AUs are described next for aquatic species affected environment and environmental consequence of each of the alternatives. The analysis units are ordered from North to South starting with the Nelder AU on the Bass Lake Ranger District and finishing with the Wishon AU on the High Sierra Ranger District (refer to Figure 3.1 for a map of the Sierra National Forest showing the location of each AU).

3.3.1.4 Analysis Unit Level Evaluation

NELDER (NED)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat and a known population of mountain yellow-legged frogs in the NED AU occurs on private land in Hoggem Lake and its associate stream system at approximately 8,000 feet in elevation. This population is the northern-most population known on the Sierra National Forest at this time. There is approximately 62 acres of lakes that could all be potential habitat for the mountain yellow-legged frog (Table 3.42) however no mountain yellow-legged frogs have been found outside Hoggem Lake in this AU.

The range of the relictual slender salamander does not extend into this AU.

There are resident trout species and suitable and potentially suitable habitat in 107 miles of perennial streams and 62 acres of lakes occurring within this AU (Tables 3.41 and Table 3.42).

The Yosemite toad and its suitable and potentially suitable habitat are present in this AU primarily in the Polk Salt Log Station Meadow area of White Chief Mountain and the Quartz Meadow complex near the border with Yosemite National Park. Out of the 260 meadows in this AU (Table 3.42), 160 meadows were surveyed with 6 sites occupied with Yosemite toad. Of the meadows analyzed for grazing suitability, over 250 tadpoles and 4 newly morphed Yosemite toads were present in the Quartz Meadow complex in 2004 and suitable breeding habitat is present in Bare Island Meadow.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas (e.g. Bare Island Meadow) where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Two activities have the greatest potential to affect aquatic species in this AU, cattle grazing and off-highway vehicle (OHV) use. Of the 778 aquatic species habitat units found in this AU, all are affected to some degree by the Mugler, Soquel, and Iron Creek cattle allotments. The two OHV routes (Star Lakes and Iron Lakes) in the AU have the potential to affect up to approximately 71 aquatic habitat units in this AU but do not overlap with the project activities. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of three meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

CLOVER (CLO)

Affected Environment

The Lahontan cutthroat trout (and its Critical Aquatic Refuge (CAR)) occur in Portuguese Creek within this AU. Approximately 57% of the CAR is in the CLO AU. There are no sightings, suitable or potentially suitable habitat for the mountain yellow-legged frog within this AU.

The range of the relictual slender salamander does not extend into this AU.
There are resident trout species and suitable and potentially suitable habitat in 77 miles of perennial streams and 11 acres of lakes occurring within this AU (Table 3.41 and Table 3.42).

The Yosemite toad and its suitable and potentially suitable habitat are present in this AU in the Jackass Meadow complex on both private and Sierra National Forest lands. Out of the 109 meadows in this AU (Table 3.42), 84 meadows were surveyed with just the Jackass Meadow Complex occupied with Yosemite toads. Of the meadows analyzed for grazing suitability, Soldier Meadow has suitable breeding habitat.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects
The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles). No direct effects are expected for the Lahontan cutthroat trout due to no proposed activities within the Critical Aquatic Refuge.

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats (though this should be minor since few lakes occur in the AU) could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species. No indirect effects are expected for the Lahontan cutthroat trout due to no proposed activities within the Critical Aquatic Refuge.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. No cumulative effects are expected for the Lahontan cutthroat trout in this AU since there are no direct or indirect effects expected for this species. Three activities have the greatest potential to affect aquatic species in this AU, cattle grazing, off-highway vehicle (OHV) use, and timber harvests. Of the 1,645 aquatic species habitat units found in this AU, all are affected to some degree by the Mugler and South Jackass cattle allotments. The two OHV routes (Red Top and Cattle Mountain) in the AU have the potential to affect up to approximately 62 aquatic habitat units in this AU but do not overlap with the project activities. Past timber harvests (Lodgepole, McCreary, and Strawberry) affected up to approximately 65 aquatic habitat units in this AU with 82% of that overlapping with project activities. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing and timber harvest activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of eight meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2.

Indirect Effects

Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

EDISON (EDI)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

Within 1 mile of this AU occur two known locations of the mountain yellow-legged frog, one to the Northwest of Lake Thomas A. Edison and one to the Southeast, though no suitable and potentially suitable habitat occurs directly within the AU.

Up to 3% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet in the California Wildlife Habitat Relationship (CWHR) vegetation type sierra mixed conifer), though no sightings of the species are known within 5 miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in 15 miles of perennial streams and in 1,838 acres of Lake Thomas A. Edison and in the Mono Creek Diversion Dam Lake (Table 3.41 and Table 3.42).

Suitable and potentially suitable habitat for the Yosemite toad is present in this AU around Boggy Meadow. The nearest sighting of this species is 0.7 miles to the north of the Onion Springs Off Highway Vehicle (OHV) Route section of this AU. Other nearby locations (just over 1 mile) for this species occurs in the Twin Meadows and Graveyard Meadow complex to the north of Lake Thomas A. Edison. There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects
The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Since only resident trout species are known to occur within this AU direct effects are most likely to occur only at stream crossings where the potential for redds to be trampled can occur which could kill emerging fish and dislodge fish eggs. If Yosemite toad were to be found in the AU (the most likely of the species other then resident trout to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling along trails and meadows.

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and from stream crossings where spawning gravel could be crushed. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Two activities have the greatest potential to affect aquatic species in this AU, cattle grazing and off-highway vehicle (OHV) use. Of the 2,313 aquatic species habitat units found in this AU, 1,838 are from Lake Thomas A. Edison (which is habitat for resident trout species) and would not be cumulatively affected by cattle grazing or the OHV use. The remaining aquatic habitat units (478) would all be affected to some degree by the Mono cattle allotment. The Onion Springs OHV route in the AU have the potential to affect up to approximately 26 aquatic habitat unit acres in this AU all overlapping with the project activities. In this AU, the aquatic species of most concern are the resident trout fisheries. Cattle grazing and OHV use activities in combination with the project activities can contribute sediment to perennial streams which may affect spawning habitat. These activities are not expected to affect habitat for resident trout in Lake Thomas A. Edison. Monitoring for affects from this project on aquatic species in this AU is not being recommended at this time.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2.

Indirect Effects

Indirect effects are the same as Alternative 2.

Cumulative Effects

Cumulative effects are the same as Alternative 2.

CHINQUAPIN (CHQ)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable or potentially suitable habitat for the mountain yellow-legged frog within this AU.

Up to 11% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet in the CWHR vegetation type sierra mixed conifer), though no sightings of the species are known within 5 miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in 8 miles of perennial streams and in 7 acres of lake behind the Bear Creek Diversion dam (Table 3.41 and Table 3.42).

Only marginally suitable and potentially suitable habitat occurs for the Yosemite toad near and around the Mono Hot Springs Resort. This species has not been found in the AU but is located approximately 0.2 miles to the south of the AU in Bolsillo Creek downstream of Corbett Lake. There are no meadows proposed for pack stock grazing for this AU.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Since only resident trout species are known to occur within this AU direct effects are most likely to occur only at stream crossings where the potential for redds to be trampled can occur which could kill emerging fish and dislodge fish eggs. If Yosemite toad were to be found in the AU (the most likely of the species other then resident trout to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling along trails and meadows.

Indirect Effects
Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and from stream crossings where spawning gravel could be crushed. Effects on lake habitats (e.g. Bear Diversion) could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Two activities have the greatest potential to affect aquatic species in this AU, cattle grazing and off-highway vehicle (OHV) use. Of the 1,518 aquatic species habitat units found in this AU, almost all are affected to some degree by the Mono and Hot Springs cattle allotments. The Bear Diversion OHV route in the AU has the potential to affect up to approximately 1 miles of aquatic habitat. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of trail 27E69 and the adjacent riparian zone for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3
Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

FLORENCE (FLO)

Affected Environment
The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable, or potentially suitable habitat for the mountain yellow-legged frog within this AU.

Up to 9% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet in the CWHR vegetation type sierra mixed conifer), though no sightings of the species are known within 5 miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in 15 miles of perennial streams and in 991 acres of lake, mostly in Florence Lake (Table 3.41 and Table 3.42).

Suitable and potentially suitable habitat occurs within the Jackass Meadow complex of this AU, however no sightings of this species have been recorded. The nearest known location is in Hell Hole Meadow approximately 0.5 miles to the northwest of the AU in the AA / JM AU. The Yosemite toad in Hell Hole Meadow has not been confirmed. There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Since only resident trout species are known to occur within this AU direct effects are most likely to occur only at stream crossings where the potential for redds to be trampled can occur which could kill emerging fish and dislodge fish eggs. If Yosemite toad were to be found in the AU (the most likely of the species other then resident trout to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling along trails and meadows.

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and from stream crossings where spawning gravel could be crushed. Effects on lake habitats (Florence Lake and Ward Lake) could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Off-highway vehicle (OHV) use has the greatest potential to affect aquatic species in this AU. Of the 3,287 aquatic species habitat units found in this AU, 961 are from Florence Lake (which is habitat for resident trout species) and would not be cumulatively affected by OHV use. The Hooper Diversion OHV route in the AU have the potential to affect up to approximately 173 aquatic habitat units in this AU all overlapping with the project activities. In this AU, the aquatic species of most concern are the resident trout fisheries. OHV use activities in combination with the project activities can contribute sediment to perennial streams which may affect spawning habitat. These activities are not expected to affect habitat for resident trout in Florence Lake. Monitoring for affects from this project on aquatic species in this AU is not being recommended at this time.

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

KAISER (KAI)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat (108 acres of lakes; Table 3.42) for the mountain yellow-legged frogs occur in this AU with a historic sighting found near Bobby Lake north of Kaiser Peak (California Natural Diversity Database)(CNDDB).

Up to 7% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though no sightings of the species are known within five miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in 54 miles of perennial streams and 108 acres of lakes occurring within this AU (Table 3.41 and Table 3.42). The California Department of Fish and Game (CDFG) conducted a fish survey using gill nets on Nellie Lake in June 2001. At that time 41 rainbow trout were captured with fork lengths from 42 millimeter (mm) to 355 mm. The trout were assessed to be primarily in poor condition. Walling Lake was surveyed in July 2000 where 17 Eastern brook trout were captured in excellent to poor condition. Upper Twin Lakes was assessed in July 2001 where 17 Eastern brook trout and 12 rainbow trout were captured in primarily poor condition. Lower Twin Lakes was similar with 9 Eastern brook trout

and 12 rainbow trout but in excellent condition. Jewel Lake was assessed in July 2000 were 9 Eastern brook trout were captured in poor condition.

Out of the 95 meadows in this AU (Table 3.42), 75 meadows were surveyed with 13 of them occupied with Yosemite toads. Of the two meadows analyzed for grazing suitability, NE Nellie Lake Meadow is occupied with Yosemite toad (tadpoles were found in 2002) and Nellie Lake Meadow has suitable breeding habitat for the species.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at NE Nellie Lake, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad and relictual slender salamander. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Cattle grazing have the greatest potential to affect aquatic species in this AU. Of the 1,595 aquatic species habitat units found in this AU, almost all are affected to some degree by the Mt. Tom and Kaiser cattle allotments. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing activities in combination with the project activities can compact the soils

and trample the species or their burrow habitats. Monitoring of seventeen meadows for the Yosemite toad and the Walling Lake destination zone and use trail KAI02 for aquatic species is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

EAST HUNTINGTON (HNE)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable, or potentially suitable habitats for the mountain yellow-legged frog within this AU.

Up to 5% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though no sightings of the species are known within 5 miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in 23 miles of perennial streams and 4 acres of Huntington Lake and Deer Lake combined occurring within this AU (Table 3.41 and Table 3.42).

Out of the 59 meadows in this AU (Table 3.42), 50 meadows were surveyed with 11 of them occupied with Yosemite toads. There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and damaging their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad and relictual slender salamander. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Two activities have the greatest potential to affect aquatic species in this AU, cattle grazing and off-highway vehicle (OHV) use. Of the 1,595 aquatic species habitat units found in this AU, almost all are affected to some degree by the Blasingame and Kaiser cattle allotments. The Dusy-Ershim OHV route in the AU has the potential to affect up to approximately 43 aquatic habitat units. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing and OHV activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of eleven meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2.

Indirect Effects

Indirect effects are the same as Alternative 2.

Cumulative Effects

Cumulative effects are the same as Alternative 2.

WEST HUNTINGTON (HNW)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

A historic sighting of the mountain yellow-legged frog occurs in the northern portion of Huntington Lake in Line Creek (CNDDB) near meadow number 516M243 (5.8 acres). This species has not been found in this AU since 1989 and very little suitable and potentially suitable habitat exists.

Almost 100% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though no sightings of the species are known within five miles of this AU.

There are resident trout species and suitable and potentially suitable habitat in five miles of perennial streams and 1,416 acres of Huntington Lake within this AU (Table 3.41 and Table 3.42).

Though no locations of Yosemite toad are found within this AU, a number of sites occur directly along its border in the KAI AU and outside this project area on forest lands. Suitable and potentially suitable habitat within the AU is marginal and considered minimal due to the highly populated area around Huntington Lake. There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Since only resident trout species are known to occur within this AU direct effects are most likely to occur only at stream crossings where the potential for redds to be trampled can occur which could kill emerging fish and dislodge fish eggs. If Yosemite toad were to

be found in the AU (the most likely of the species other then resident trout to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling along trails and meadows.

Indirect Effects
Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and from stream crossings where spawning gravel could be crushed. Effects on lake habitats (Huntington Lake) could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Of the 2,980 aquatic species habitat units found in this AU, almost all are affected to some degree by the Kaiser cattle allotment and the recreational activities surrounding Huntington Lake. In this AU, the aquatic species of most concern are the resident trout fisheries. Cattle grazing and recreational residences near perennial streams in combination with the project activities can contribute sediment to perennial streams which may affect spawning habitat. These activities are not expected to affect habitat for resident trout in Huntington Lake. Monitoring for affects from this project on aquatic species in this AU is not being recommended at this time.

Alternative 3
Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

COYOTE (COO)

Affected Environment
The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat around 90 acres of lakes and known populations of mountain yellow-legged frogs in and adjacent to the COO AU occur within Lakecamp Lake and its associate meadow systems and downstream of Ershim Meadow (approximately 88 acres of meadows) along the Dusy-Ershim OHV route at approximately the 9,000 foot elevation zone.

The range of the relictual slender salamander does not extend into this AU.

There are resident trout species and suitable and potentially suitable habitat in 32 miles of perennial streams and 89 acres of lakes within this AU (Table 3.41 and Table 3.42). The California Department of Fish and Game (CDFG) conducted a fish survey using gill nets on Coyote Lake in August 2001. At that time 3 Eastern brook trout and 12 Rainbow trout were captured with fork lengths from 102 millimeter (mm) to 366 mm. The Eastern brook trout were assessed to be in poor condition and the rainbow trout from poor to excellent condition.

Out of the 46 meadows in this AU (Table 3.42), 35 meadows were surveyed with 13 of them occupied with Yosemite toads. There are no meadows proposed for pack stock grazing. Rock Meadow, a destination zone for Alternative 3, is occupied with Yosemite toads.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Cattle grazing and off-highway vehicle (OHV) use have the greatest potential to affect aquatic species in this AU. Of the 820 aquatic species habitat units found in this AU, all are affected to some degree by the Blasingame cattle allotment. The two OHV routes (Dusy-Ershim and Coyote/Red) affect approximately 550 aquatic species habitat units. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing and OHV activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Alternative 2 would have slightly less effects on aquatic species than Alternative 3 because a designated stock camp would not be established in Rock Meadow, an occupied core site for the Yosemite toad. Monitoring of three meadows for the Yosemite toad and two meadows for aquatic species is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3
Direct Effects
Direct effects are the similar to Alternative 2 except that direct effects would be a concern for this alternative in occupied locations of Rock Meadow for the Yosemite toad due to it being designated as a stock camp.

Indirect Effects
Indirect effects are the similar to Alternative 2 except that indirect effects would be a concern for this alternative in occupied locations of Rock Meadow for the Yosemite toad due to it being designated as a stock camp.

Cumulative Effects
Cumulative effects are similar to Alternative 2 except that a designated stock camp would be established at Rock Meadow, an occupied core site for the Yosemite toad, thus the effects on aquatic species would be slightly more than in Alternative 2. Monitoring of five meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

DINKEY LAKES (DIL)

Affected Environment
The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat for the mountain yellow-legged frogs occur in the 99 acres of lakes (Table 3.42) however no sightings of this species have been found in this AU.

The range of the relictual slender salamander does not extend into this AU.

There are resident trout species and suitable and potentially suitable habitat in 9 miles of perennial streams and 99 acres of lakes within this AU (Table 3.41 and Table 3.42). The California Department of Fish and Game (CDFG) conducted a fish survey using gill nets on Rainbow Lake in November 1995. At that time 13 rainbow trout were captured with fork lengths from 91 millimeter (mm) to 211 mm. Condition assessments on the trout were not conducted for this lake. In July 1999 surveys in First Dinkey Lake found 1 rainbow trout and 66 Eastern Brook trout ranging in size from 100 mm to 283 mm. In Mystery Lake in October 1995 eighty-four Eastern brook trout (and 1 rainbow trout) were captured with primarily a condition of poor health but ranged from excellent to poor. Similar findings were found in South Lake (Eastern brook trout), Swede Lake (rainbow trout), Second Dinkey Lake (Eastern brook trout), and Island Lake (golden trout).

Out of the 22 meadows in this AU (Table 3.42), 20 meadows were surveyed with seven of them plus two additional sites between meadows and lakes along trails occupied with Yosemite toads. Swede Lake has suitable breeding habitat and a juvenile Yosemite toad was found along the requested use trail in 2003. All three meadows assessed for grazing (Miner Camp Meadow, South Lake Meadow, and SE 1st Dinkey Lake Meadow) are occupied with Yosemite toad (in both 2002 & 2003 all life stages were found). None of these meadows are proposed for grazing.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles), specifically at the use requested trail at Swede Lake (DIL02) and around South Lake (DIL03).

Indirect Effects
Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Recreational use has the greatest potential to affect aquatic species in this AU. Of the 402 aquatic species habitat units found in this AU, all are affected to some degree by the recreational use (non-commercial use). In this AU, the aquatic species of most concern is the Yosemite toad. Recreational use in combination with the project activities can compact the soils and trample the species or their burrow habitats. Alternative 2 has a greater potential to affect the Yosemite toad in the Dinkey analysis unit where a use trail around Swede Lake and South Lake would be approved through occupied fragile meadow habitat. Monitoring of five meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects
Direct effects are similar to Alternative 2 except that the use trail around Swede Lake (DIL02) and South Lake (DIL03) would not be approved through occupied fragile Yosemite toad habitat, thus the direct effects on the Yosemite toad there from this activity would not occur.

Indirect Effects
Indirect effects are similar to Alternative 2 except that the use trail around Swede Lake (DIL02) and South Lake (DIL03) would not be approved through occupied fragile Yosemite toad habitat, thus the indirect effects on the Yosemite toad there from this activity would not occur.

Cumulative Effects
Cumulative effects are similar as Alternative 2 except that the use trail around Swede Lake (DIL02) and South Lake (DIL03) would not be approved through occupied fragile habitat, thus the effects on aquatic species would be slightly less than in Alternative 2. Monitoring of five meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

HELMS (HEL)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat for the mountain yellow-legged frogs occur in the 13 acres of lakes (Table 3.42) however no sightings of this species have been found in this AU.

The range of the relictual slender salamander does not extend into this AU.

There are resident trout species and suitable and potentially suitable habitat in 23 miles of perennial streams and 13 acres of lakes within this AU (Table 3.41 and Table 3.42). Out of the 32 meadows in this AU (Table 3.42), 30 meadows were surveyed with 7 of them occupied with Yosemite toads. There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could

include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Cattle grazing and Off-highway vehicle (OHV) use have the greatest potential to affect aquatic species in this AU. Of the 531 aquatic species habitat units found in this AU, 62 are affected to some degree by the Blasingame cattle allotment. The Dusy-Ershim OHV route affects approximately 78 aquatic species habitat units. In this AU, the aquatic species of most concern is the Yosemite toad. Cattle grazing and OHV activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of four meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3
Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

NELSON (NEL)

Affected Environment
The Lahontan cutthroat trout does not occur within this AU.

Suitable and potentially suitable habitat in approximately 102 acres of lakes and known populations of mountain yellow-legged frogs within the NEL AU occur at approximately 9,200 feet in three meadows (approximately 74 acres) along a tributary to Nelson Creek.

The range of the relictual slender salamander does not extend into this AU.

There are resident trout species and suitable and potentially suitable habitat in 15 miles of perennial streams and 1,732 acres of lakes, mostly from Courtright Reservoir (Table 3.41 and Table 3.42). The California Department of Fish and Game (CDFG) conducted a fish survey using gill nets on Cliff Lake in October 1996. At that time 21 Eastern brook trout were captured with fork lengths from 78 millimeter (mm) to 240 mm. The trout were assessed to be from poor to excellent condition. Nelson Lake was surveyed in August 1998 were 7 Eastern brook trout were captured in excellent condition in the upper lake and 36 Eastern brook trout were captured in poor to excellent condition in the lower lake.

Twenty-eight Eastern brook trout were captured in Little Lake and 26 in Rock Lake in July and September of 1996 in primarily excellent condition. In July 1997 twenty-eight Eastern brook trout and 2 rainbow trout were captured in excellent condition in Bullfrog Lake.

Out of the 13 meadows in this AU (Table 3.42), 10 meadows were surveyed with five of them occupied with Yosemite toads and two meadows were occupied with mountain yellow-legged frogs (one of which both Yosemite toads and mountain yellow-legged frogs co-existed in along with Pacific tree frogs). There are no meadows proposed for pack stock grazing.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects on aquatic species.

Indirect Effects

There would be no indirect effects on aquatic species.

Cumulative Effects

The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Direct effects to aquatic species include killing or seriously injuring individual species and their burrow habitats from hoof trampling. This can occur in areas where species like the Yosemite toad may be located at, at any of their life stages (e.g. newly morphed tadpoles).

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and campsites. Effects on lake habitats could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Of the 2,013 aquatic species habitat units in this AU, there are no other activities that have great potential to affect aquatic species other than this project. In this AU, the aquatic species' of most

concern are the Yosemite toad and mountain yellow-legged frog. Monitoring of six meadows for the Yosemite toad is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project). Monitoring the population status for the mountain yellow-legged frog in the known occupied habitats within this AU is suggested but has not been added to the recommended monitoring plan at this time due to their distance from project activities.

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

DINKEY FRONT COUNTRY (DFC)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable, or potentially suitable habitats for the mountain yellow-legged frog within this AU.

Almost 100% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though known occurrences of this species are located approximately 3.5 miles to the east and south of the AU.

There are resident trout species and suitable and potentially suitable habitat in 10 miles of perennial streams and 1 acre of lakes occur within this AU (Table 3.41 and Table 3.42).

Out of the 17 meadows in this AU (Table 3.42), the 7 that occur above the 6,000 foot elevation zone were surveyed with none of them occupied with Yosemite toads. Only three of the meadows are suitable for Yosemite toad breeding. The nearest sighting of this species is approximately 1.8 – 2.0 miles to the east in Laurel Creek and Exchequer Meadow. Of the two meadows proposed for grazing (Glen Meadow and Mill Meadow) neither have sightings of Yosemite toad.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects
The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects
Since only resident trout species are known to occur within this AU direct effects are most likely to occur only at stream crossings where the potential for redds to be trampled can occur which could kill emerging fish and dislodge fish eggs. If relictual slender salamanders or Yosemite toad were to be found in the AU (the most likely of the species other then resident trout to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling along trails and meadows.

Indirect Effects
Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the Yosemite toad. Indirect effects may also be caused by reduction of pool habitat in streams for resident trout species by sedimentation from poorly maintained and designed trails and from stream crossings where spawning gravel could be crushed. Effects on lake habitats (which are expected to be minor since very little actual lakes occur within this AU) could include compaction of soil and denudation of vegetation near campsites and trails on lake edges leading to a decrease in dispersal and breeding habitat for aquatic species.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Two activities have the greatest potential to affect aquatic species in this AU, cattle grazing and timber harvests. Of the 2,171 aquatic species habitat units found in this AU, all are affected to some degree by the Dinkey cattle allotments and the Kings River Project (krew_prv_1 and glen_mdw_1 management units). In this AU, the aquatic species of most concern is the Relictual slender salamander. Cattle grazing and timber harvest activities in combination with the project activities can compact the soils and trample the species or their burrow habitats. Monitoring of five meadows for the Relictual slender salamander is recommend to determine if new occupied sites occur or if declines in population numbers or deterioration of habitat conditions occur based on project activities (refer to the project monitoring plan located in the Record of Decision for this project).

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

TULE MEADOW (TUL)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable, or potentially suitable habitats for the mountain yellow-legged frog within this AU.

Approximately 32% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though known occurrences of this species are located more than 5 miles to the east of the AU.

There are no sightings, suitable, or potentially suitable habitats for resident trout species within this AU.

There are no sightings, suitable, or potentially suitable habitats for the Yosemite toad within this AU.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects
The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects

Since only the relictual slender salamander has potential habitat in this AU, it is not expected that direct effects would occur on aquatic species. If relictual slender salamanders were to be found in the AU (the most likely of the seven species to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling.

Indirect Effects

Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the relictual slender salamander.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Of the 11 aquatic species habitat units in this AU, there are no other activities that have great potential to affect aquatic species other than this project. In this AU, the aquatic species of most concern is the relictual slender salamander. Monitoring for affects from this project on aquatic species in this AU is not being recommended at this time due to the limit extent of the AU.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2.

Indirect Effects

Indirect effects are the same as Alternative 2.

Cumulative Effects

Cumulative effects are the same as Alternative 2.

WISHON (WIS)

Affected Environment

The Lahontan cutthroat trout does not occur within this AU.

There are no sightings, suitable, or potentially suitable habitats for the mountain yellow-legged frog within this AU.

Approximately 70% of this AU could be considered as potentially suitable habitat for the relictual slender salamander (below 7,600 feet mostly in the CWHR vegetation type sierra mixed conifer), though known occurrences of this species are located more than 5 miles to the east of the AU.

There are no sightings, suitable, or potentially suitable habitats for resident trout species within this AU.

There are no sightings, suitable, or potentially suitable habitats for the Yosemite toad within this AU.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects on aquatic species.

Indirect Effects
There would be no indirect effects on aquatic species.

Cumulative Effects
The reduction of pack station activities would reduce the amount of disturbance to aquatic species, particularly in and around meadow habitats, however there would still be some amount of disturbance from private pack stock, cattle (in certain areas) and recreationists. Continued effects on aquatic species would still occur from other activities ongoing and planned in the AU but no new incremental effects would occur.

Alternative 2

Direct Effects
Since only the relictual slender salamander has potential habitat in this AU, it is not expected that direct effects would occur on aquatic species. If relictual slender salamanders were to be found in the AU (the most likely of the seven species to occur) direct effects would include killing or seriously injuring individuals and their burrow habitats from hoof trampling.

Indirect Effects
Indirect effects to aquatic species include compaction of soil which may reduce potential burrow habitat for species like the relictual slender salamander.

Cumulative Effects
In addition to this alternative other management activities are ongoing and proposed and are presented at the beginning of Chapter 3 of this document. Of the 6 aquatic species habitat units in this AU, there are no other activities that have great potential to affect aquatic species other than this project. In this AU, the aquatic species of most concern is the relictual slender salamander. Monitoring for affects from this project on aquatic species in this AU is not being recommended at this time due to the limit extent of the AU.

Alternative 3

Direct Effects
Direct effects are the same as Alternative 2.

Indirect Effects
Indirect effects are the same as Alternative 2.

Cumulative Effects
Cumulative effects are the same as Alternative 2.

ANSEL ADAMS/JOHN MUIR (AA/JM)

(See Wildlife Section)

3.3.2 Wildlife

3.3.2.1 Background

This section provides an overview of the species or habitat found within the analysis units, and then describes the affected environment and environmental consequences for three analysis elements: 1) presence of species or suitable habitat, 2) disturbance to suitable habitat and 3) noise disturbance to the species A comprehensive analysis of the wildlife resources for the Ansel Adams/John Muir (AA/JM) AU wildernesses was described in Chapter 3 of the 2005 Pack Stock Management EIS on page III-134. This Final EIS incorporates that information by reference.

Species Considered

The species considered in this analysis fall into five categories: Federally listed threatened, endangered and proposed species, Pacific Southwest Region 5 Forest Service Sensitive Species, and management indicator species identified in the 1992 Sierra National Forest LRMP. The federally listed threatened, endangered and proposed species, and Forest Service Sensitive species portions of this analysis are taken from the Biological Evaluation and Biological Assessment prepared to comply with Forest Service policy (Forest Service Manual Direction 2670) and can be found in the project record. It is located on the High Sierra Ranger District, and is available upon request as required by 40 CFR 1502.21. There is a separate report for management indicator species that also can be found in the project record.

Of the five species listed as threatened and endangered, there is only one, the bald eagle, which has habitat within the analysis units. The rest are eliminated from consideration because their habitat is either below the elevation of the analysis units (Fresno kangaroo rat, Valley elderberry longhorn beetle) or above the elevation of the analysis units (Sierra Nevada bighorn sheep and California condor).

There are five threatened and endangered species.

Endangered Species	
Fresno kangaroo rat	*Dipodomys nitratoides exilis*
Sierra Nevada bighorn sheep	*Ovis candadensis californiana*
California condor	*Gymnogyps californianus*
Threatened Species	
Bald eagle	*Haliaeetus leucocephalus*
Valley elderberry longhorn beetle	*Desmocerus californicus dimporphus*

There are 12 Forest Service sensitive species of which ten (Peregrine falcon, California spotted owl, marten, fisher, wolverine, Sierra Nevada red fox, Northern goshawk, great gray owl, willow flycatcher and Townsend's big-eared bat) will be addressed because habitat and/or sightings occur in the project area.

There are twelve Forest Service sensitive species.

Peregrine falcon	*Falco peregrinus anatum*
California spotted owl	*Strix occidentalis occidentalis*
American marten	*Martes americana*
Pacific fisher	*Martes pennanti pacifica*
Wolverine	*Gulo gulo luteus*
Sierra Nevada red fox	*Vulpes vulpes necator*
Northern goshawk	*Accipter gentiles*
Great gray owl	*Strix nebulosa*
Willow flycatcher	*Empidonax traillii*
Western red bat	*Lasiurus blossevillii*
Pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*

The analysis units are not habitat for the Western red bat; therefore, the species will be dropped from further analysis. There are two other species (California mule deer and osprey) and three of the four avian guilds (Meadow, Riparian, and Mixed-conifer avian guilds) that will be addressed. These are management indicator species (MIS) for the Forest and are not in any of the above listed categories. None of the pack stations have associated activities within the oak woodland habitat; therefore, the oak woodland guild will not be addressed further in the document.

Osprey	*Pandion haliaetus*
California mule deer	*Odocoileus hemionus*

Avian guilds
Meadow avian guild
Mixed conifer avian guild
Oak woodland avian guild
Riparian avian guild

General information on species
The following information is life history for species that are analyzed throughout this section. The contents of these reports are summarized in the Environmental Consequences section. Further detail for species can be found in the Biological Assessment/Biological Evaluation and the Management Indicator Species Report in the project record located at the High Sierra Ranger District, and is available upon request.

Bald eagle
The bald eagle is a federally listed threatened species. The species population has steadily increased throughout its range according to the U. S. Fish and Wildlife Service. The Service proposed to de-list the species in 1999, but has not moved forward with the process.

The Sierra National Forest provides wintering and nesting habitat for bald eagles. Surveys have occurred intermittently for a number of years. Surveys include mid-winter

bald eagle surveys and Audubon Christmas Bird Counts. Winter habitat includes day perches, roost sites, and foraging sites. Generally, perches are trees with large and open branching adjacent to foraging sites. Roosts sites are located in timber stands which provide protection from inclement weather. Winter concentrations occur at reservoirs with open waters, and with abundant prey. Winter prey are waterfowl, fish, and to a lesser extent, small mammals. Bald eagles are on the winter range from late October or early November to early May.

Winter concentrations on the Sierra National Forest occur at Huntington Lake, Millerton Reservoir, Pine Flat Reservoir, Bass Lake and Redinger Lake. In June of 1998, a pair of bald eagles was observed performing pair-bonding behaviors, including nest building attempts on an abandoned osprey nest, at Bass Lake. Eagles reproduced successfully all but one of the last six years at Bass Lake. Also in May of 1999, the first pair of nesting bald eagles was discovered on Shaver Lake. The pair successfully fledged one bird. Bald eagles have also recently been observed in the spring months at Mammoth Pool Reservoir, and during the summer in the vicinity of Courtright Reservoir. There is a pair of nesting eagles at Lake Edison. The species habitat overlap to a minor degree with commercial pack stock operations along day rides near Huntington Lake in the non-wilderness. A pair of bald eagles is known to nest along Huntington Lake. There have been repeated incidental sightings at Florence Lake, and a breeding pair is possible there, as well; however, a nest has not been located to date. It is probable that with expanding bald eagle populations, lake habitats with suitable nesting trees on the forest may become occupied by eagle pairs. Continued monitoring is needed to locate and protect nesting eagle pairs.

Peregrine falcon

Peregrine falcons use a broad array of habitats during fall and spring migration, including urban. In winter, there is extreme habitat variability because of the enormous geographical range. Other than resident populations, which occupy breeding habitats, this falcon uses open-relief habitat devoid of cliffs, man-grove, coastal, or wetland areas, major river valleys and lake shores, pasture lands, featureless terrain devoid of cover and containing waterbirds or pigeons and doves, and especially urban areas (BNA 2006). Peregrine falcon feed mostly on birds, passerines to small geese, occasionally mammals, and rarely amphibians, fish, and insects (BNA 2006). Most of the prey is captured in the air, while the Peregrine is in flight; prey is also taken from the surface of water or ground; they also may walk on the ground is search of nestling birds and rodents (BNA 2006 referencing Harris and Clement 1975; Dekker 1980, 1995, 1999; and Rosenfield et al. 1995).

California spotted owl

Suitable west-side California spotted owl nesting habitat contains 70 percent or greater canopy closure and suitable west-side foraging habitat contains 40 percent or greater canopy closure.

Owls used stands in the 4G and 4N timber strata for nesting significantly more than expected, based on the proportion of those strata (SNFPA FEIS Volume 3, Chapter 3, p.

72-73). In general, stands suitable for nesting and roosting have 1) two or more canopy layers, 2) dominant and co-dominant trees in the canopy averaging at least 24 inches in dbh, 3) at least 70 percent total canopy cover (including the hardwood component), 4) higher than average levels of very large, old trees, and 5) higher than average levels of snags and downed woody material (SNFPA FEIS Volume 3, Chapter 3, p. 72-73). Protected Activity Centers (PACs) are delineated to include the above stand attributes and, in descending order of priority, California Wildlife Habitat Rating (CWHR) classes 6, 5D, 5M, 4D, and 4M (SNFPA ROD p. 37). The '6' classification stands for a multi-layer tree component; '5' stands for medium/large trees (>24"dbh); and '4' stands for small trees (11"-24" dbh). The 'D' classification stands for dense cover (60%-100% canopy closure); and the 'M' stands for moderate cover (40%-59% canopy closure) (Mayer and Laudenslayer 1988).

Nesting activities are initiated in March, with egg-laying occurring in April. Incubation lasts about 30 days with peak hatching in early to middle May. Young fledge or leave the nest about 35 days after hatching, and become independent in September. Management activities (i.e. timber sale activities, prescribed fire)as well as recreational activities have the potential to disrupt spotted owl nesting efforts and reproductive success. In recent years this risk has been diminished by applying protections to known nest stands and limiting disruptive activities during the spotted owl breeding season within ¼ mile of known nest sites. Habitat disturbance surrounding nest sites has been diminished through designation and protection of 300 acre PACs (FEIS Volume 3, Chapter 3, p. 81). HRCAs, containing 300 additional acres, have been designated to encompass the best available spotted owl habitat in the closest proximity to the owl PACs where the most concentrated owl foraging activity is likely to occur (SNFPA, ROD p. 39).

In general, stands suitable for owl foraging have: 1) at least two canopy layers, 2) dominant and co-dominant trees in the canopy averaging at least eleven inches in dbh, 3) at least 40 percent canopy cover in overstory trees, (30% canopy cover in the red fir type), and higher than average numbers of snags and downed woody material. Although canopy covers down to 40 percent are suitable foraging, they appear to be only marginally so. Radio tracking data from the Sierra National Forest showed that owls tended to forage more in sites with greater than 50% canopy cover than predicted from their availability; stands with 40 to 50 percent canopy cover were used about in proportion with their availability (FEIS Volume 3, Chapter 3, p. 72-73).

The northern flying squirrel is the preferred prey of spotted owls in mixed conifer forests; while the dusky footed woodrat is the preferred prey of owls in the lower elevation woodland (Verner et al 1992). In the Sierra Nevada the northern flying squirrel is found primarily in west-side mixed conifer and red fir forests above 4,000 feet in elevation. Spotted owl sites are based on historical information, and recent surveys (1989-2005), most to established survey protocols. California spotted owl nest or roost sites are mainly located in mixed conifer forests (80 percent), and to a lesser extent in red fir (10 percent), and ponderosa pine/hardwoods (7 percent) (USDA Forest Service 1993a). Typically, mixed conifer stands on the Sierra National Forest are common to elevations under 7,500

ft. Red fir stands and associations are common to areas above 7,000 feet. California spotted owls do not commonly frequent areas above 8,500 feet. Most nesting activities in the Sierra National Forest are below 7,500 feet. A few spotted owls also nest in low elevation, foothill riparian areas with hardwoods. Some California spotted owls undergo an altitudinal migration and may winter at lower elevations.

FOREST CARNIVORES *(Fisher, Marten, Wolverine, Sierra Nevada Red Fox):*
Carnivore Surveys: The Forest has been designated as the Southern Sierra fisher conservation area (SSFCA) because of the known occupied range of the Pacific fisher in the Sierra Nevada (SNFPA FSEIS ROD, p. 41). The SSFCA is approximately 720,606 acres on the Forest.

The only forest wide forest carnivore survey effort was in 1998 and 1999 when the Sierra National Forest was surveyed as part of the Pacific Southwest Research Station's Sierran-wide effort to determine the geographic range of fishers, martens, and other mammalian carnivores (Zielinski et al. 2000). This survey involved the use of track-plates and cameras in a grid system to detect forest carnivores from June 1 to November 1. All survey points within the grid that was in the Sierra National Forest were between 2,640 and 8,910 feet in elevation. In the Sierra National Forest, four of the sample units detected marten, and seven of the sample units detected fisher. All of the marten detections and the majority of the fisher detections were south of the San Joaquin River.

There have been several other forest carnivore surveys in the Sierra National Forest. On the north side of the San Joaquin River, the Browns Meadow Furbearer Management Area (FMA) was surveyed in 1994. This was a track plate survey, conducted over about 8,500 acres, with only one fisher detection in the vicinity of Brown's Creek (Pat Stygar personal comm. 2000). The only other record of fisher north of the San Joaquin River was in 1992 near Clover Meadow when a fisher was seen carrying a marten in its mouth (Ron Cummings personal comm. 1999).

Forest carnivore surveys have been more extensive in the portion of the Sierra National Forest that is south of the San Joaquin River (High Sierra Ranger District). In 1991 and 1992, the Sierra NF contracted a forest carnivore survey on the Pineridge Ranger District, in the vicinity of Kaiser Wilderness and Huntington Lake(within KAI, HNE and HNW AUs), between 4,600 and 10,000 feet in elevation (Laymon et al. 1992). Marten were detected at 43 survey points and a fisher was detected at one survey point. No Sierra Nevada red fox were detected.

From 2001 to 2003, camera stations have been set up each winter on Over Snow Vehicle (OSV) trails on the High Sierra Ranger District (formerly Pineridge Ranger District) to determine the presence or absence of furbearers within the trail system. The Kaiser Pass Trail, in HNE AU, has been established as a control site per the state OSV grant program. The following are the results from the camera stations in 2001-2003. In 2001, there were eight stations and three martens were detected at the camera stations; 2002 there were nine stations and no furbearers were detected at the camera stations; 2003 there were nine stations and one marten was detected.

A focused study on marten with regards to OHV use was initiated in 2004 by PSW. Four runs were scheduled. This entails each sample unit run for 12 consecutive days, and checked every three days. Different sample units were established on three consecutive days, then the same sites are revisited and checked on the following three, 3-day cycles. The survey is ongoing and preliminary results have not been released (pers. comm. Zielinski 2005).

Marten

Marten appear to be common inhabitants within the non-wilderness pack station operating areas in forested habitats of the Sierra Nevada mountain range, primarily associated with mature and old growth mixed conifer, red fir, and lodgepole pine and Sierran Mixed conifer forests generally above 8,000 feet (Freel 1992). Radio telemetry studies in the southern Sierra Nevada found marten most often in mixed conifer and true fir habitat. They were not found in montane hardwood and mixed hardwood/conifer habitats as often as fisher (Zielinski and Barrett 1994). Marten often occur at elevations approximately 4,000 to 13,000 feet with an average of 8,300 feet. *Snags and logs* are an important component of the habitat. Conifer seeds and Hypogeous fungi that has been associated with the abundance of downed logs provides a food source for squirrels and other small mammals that marten prey upon. Douglas squirrels *(Tamiasciurus douglasi)* are an important prey species for marten. Low quality habitat is characterized by 30-40 percent canopy closure and characterized by single or multi-storied timbered stands. Moderate quality habitat is characterized by single or multi-storied timbered stands with 41-70 percent canopy closure, high quality habitat has greater than 70 percent canopy closure. The latter two have a high number of large snags (2-3 per acre) and down logs (Freel 1992).

Preferred foraging habitat for marten includes riparian lodgepole pine associations and meadows (Spencer et al. 1983). In the southern Sierra, preferred resting sites for marten are logs, rock outcroppings, rootwads and burrows (Zielinski and Kucera 1995). In winter, logs provide martens with access to subnivean (under snow) areas for foraging and resting (Ruggiero et al. 1994). Most litters are born in March and April, some are born as late as June. Young stay with their mothers until autumn. Marten den sites are often found in snags and logs. Selection of den sites may depend on ambient air temperatures. Subnivian (below the snow surface) sites and logs used as winter dens may reduce thermo-regulatory stress. Martens use riparian areas extensively (as revealed by a study on marten ecology underway at the University of California's Sagehen Creek Station, California) (Simon 1980). Ruggiero et al (1994) found that occasional one or two lane forest roads with moderate levels of traffic should not limit marten movements. Marten home ranges are on the average order of 589 acres for males and 173 acres for females (Zeiner et al 1990a).

Fisher

Fisher make extensive use of forested riparian areas for travel, foraging and resting (Heinemyer and Jones 1994). Occasional one or two lane forest roads with moderate levels of traffic should not limit fisher movements (Ruggiero et al. 1994).

Fishers have large home ranges, with those of males considerably larger than those of females (Buck et al. 1983; Kelly 1977; Truex et al. 1998; Mazzoni 2002; Zielinski et al. 2004). Home range size varies with quality of habitat; it is likely that fishers use larger areas in poorer quality habitat and therefore exist at lower densities (Freel 1992; Truex et al. 1998; Zielinski et al. 2004). Black oak (Quercus kelloggii) is a common constituent of forests occupied by fisher, providing cavities used as rest sites (Zielinski et al. 2004) and acorns used as food by prey of fishers (Zielinski et al. 1999). In the southern Sierra Nevada, female fishers may be able to meet their cover and food needs in a smaller area because of the abundance of black oak in the Sierra Nevada Montane Hardwood and Montane Hardwood Conifer types. Females are found at higher densities in the Sierra than the coastal areas, further supporting this conclusion (Zielinski et al. 2004). On the Sequoia NF, Zielinski et al. (2004) noted a high frequency of hardwood-dominated forest types in fisher home ranges. They also found that males included more red fir and less ponderosa pine types in their home ranges than females, indicating greater use of the higher elevation portions of the study area than females. Female home ranges occupied the more productive, lower-elevation portions of the study area where the ponderosa pine type is most common. Thus, to access females, males may often have to cross one or more high elevation ridges.

Wolverine and Sierra Nevada red fox

Wolveine and Sierra Nevada red fox could potentially range throughout the entire analysis area, although the highest probability habitats for their occurrence would be in the forested sub-alpine landscapes according to The California Department of Fish and Game Status Report of Rare, and Threatened, Endangered Plants and Animals of California (CDFG 2005). The report notes the wolverine has been reported in habitats from 1,600 feet to over 14,000 feet. Habitat where sightings have occurred generally consists of open terrain near or above timberline. The report notes that the species can inhabit a variety of habitat types in the above elevation range. The same report states that the Sierra Nevada red fox is known to inhabit similar vegetative types as the wolverine from 3,900 feet to 11,900 feet, with the preferred habitat as red fir and lodgepole pine forests. The report lists the status of both species as unknown.

Little is known of Sierra Nevada red fox habitat requirements. Sierra Nevada red fox observations have been in habitats similar to those used by marten and wolverine. Summer habitat is considered to be lodgepole, red fir, subalpine conifer and alpine dwarf shrub interspersed with meadows or alpine fell-fields. In winter they may move to lower elevations in ponderosa pine and mixed conifer. Dense vegetation, rocky areas, hollow logs, and stumps are used for cover and den sites. In the southern Sierra, this fox has been observed between 3,900 and 11,900 feet, but most likely found between 5,500 to 9,700 feet (Schempf and White 1977).

The Sierra Nevada red fox hunts in open areas such as meadows, wetlands, and fell-fields. Prey includes small to medium sized mammals such as ground squirrels, gophers, mice, marmot, woodrats, pikas and rabbits. They will also take ground nesting birds and eggs, other vertebrates, insects, carrion, fruits and earthworms. During winter, carrion and lagomorphs are important foods (Ziener et al. 1990a).

Northern goshawk

The Sierra NF is within the summer and winter range of the Northern Goshawk. During the winter, some goshawks may move downslope to the foothill hardwood habitat, but downslope movement occurs irregularly and is probably more related to the availability of prey rather than weather (Ziener et al. 1990b).

Goshawks breed in older-age coniferous, mixed, and deciduous forest *habitat* located in middle to high elevations. Northern goshawks also occur in northern and montane forests. Habitat provides large trees for nesting, a closed canopy for protection and thermal cover, and open space allowing maneuverability below the canopy (Fowler 1988). Habitat that is suitable for the California spotted owl is also suitable for goshawks.

Nest sites are frequently associated with meadows, riparian areas, gentle to moderate slopes (0 to 50 percent), and north to east aspects. Nest sites are generally composed of the larger trees (medium to large timber), and high tree densities within a stand. Frequently, nest sites have an open understory, and are adjacent to, or include small openings. Sixty to 100 percent canopy closure is optimal, 50 percent is suitable, and 30 to 49 percent closure is marginal for nest sites. Within-stand, nest-site habitat structure and composition are among the best-studied aspects of northern goshawk habitat relationships (Squires and Reynolds 1997). As stated in the SNFPA, although absolute differences in structural characteristics may differ between vegetation types and geographical regions, relative habitat use patterns are consistent such that northern goshawks use nest-sites with greater canopy cover, greater basal area, greater numbers of large diameter trees, and lower shrub/sapling/understory cover and numbers of small diameter trees, and gentle to moderate slopes relative to non-used, random sites. High canopy cover is the most consistent structural feature similar across studies of northern goshawk nesting habitat. This habitat provides large trees for nest sites, a closed canopy for protection from predators and thermal cover, and open understories that provide for maneuverability and detection of prey below the canopy. In Oregon, nests were usually located in large, live trees (11" avg dbh), in the fork of large, horizontal limbs close the trunk, at the bottom of live canopy, and about 19 to 82 feet above ground (Reynolds et al 1982).

Goshawks are well distributed on the Sierra Forest and known nest sites are protected. As directed in the Sierra NF LRMP a total of 50 goshawk territories have been established forest-wide. As of 1998, 20 of the 50 territories have been incorporated into the Regional Forest Service database. They were included for submittal to the regional database based on the following: 10 have at least one active nest site for which the nest location is known; 4 are historical nest sites for which the nest location is unknown; 4 are based on observations of young; 2 are based on observations of territorial defense or repeated

sightings. The remaining 30 territories are based on incidental sightings of goshawk and/or suitable goshawk habitat and are not part of the Regional database. A detailed account of the goshawk territories on the Sierra NF in contained within the Goshawk Network Management Guidelines, approved by the forest supervisor in 1997 (USDA Forest Service 1997).

Great gray owl

In the Sierra Nevada, great gray owl nest in mature mixed conifer, red fir, or lodgepole pine forest from 2,400 to 8,800 feet in elevation. The most southern distribution of great gray owls occurs in the Sierra Nevada. The estimated population in California is 100 to 200 birds, with Yosemite National Park having the greatest amount of owls. Great gray owls spend 90% of their time within 600 ft. of montane meadows, or meadow complexes which are 26 acres or larger, and all nests have been found within 845 ft. of meadows (Winter 1986). Nest and roost forest stands are generally in excess of 60% canopy closure (Bull and Henjum 1990). Nests are usually in large broken top snags or in abandoned hawk nests.

Great gray owls prey mostly on small rodents mostly in meadows, and occasionally in other open areas such as clearcuts and thinning units (Greene 1995). The most common prey are pocket gophers (Botta's and mountain subspecies), and voles (montane and long tailed subspecies). Vole populations may be a requirement for great gray owls to breed and successfully rear young (Winter, 1986). These voles occupy areas with dense herbaceous vegetation common in meadows and riparian areas, perennial grasslands, and in herbaceous understories of forested habitat. Optimal vegetation height for voles is assumed to be 5 to 15 inches tall (Beck 1985), although other studies suggest herbaceous heights of 12” are preferred (Green 1995) (SNFPA FSEIS, Vol. 1, p. 153).
Nesting activities are initiated in March or early April with incubation lasting about 33 days. Young fledge in early June to early July, sometimes before they can fly. They become independent in late August.

Willow flycatcher

Two willow flycatcher (WIFL) subspecies occur in the Sierra Nevada bioregion. They are the: *Empidonax traillii brewsteri* and the *Empidonax traillii adastas.* The species and habitat account for WIFL is taken from the draft Life History and Analysis of Management Indicator Species of the Sierra National Forest (2006). In California, WIFL are a rare to locally uncommon summer resident in wet or moist meadows and montane riparian habitats from 2,000 to 8,000 feet in elevation in the Sierra Nevada and Cascade Range (CWHR 2005). In the Sierra Nevada bioregion, WIFL occur at elevations from 1,200 to 9,500 feet, although 88% occur between 4,000 and 8,000 feet (USDA 2006 referencing Serena 1982, Harris et al 1988, Stafford and Valentine 1985, Bombay et al 1998, and S Armentrout pers. comm.). Studies suggest that over the past 4 decades, WIFL breeding populations have been extirpated from most lower elevation riparian areas in California, and the species may no longer breed at elevations below 3,000 feet in the Sierra Nevada, Central Valley and in the valleys of the central coast (USDA 2006 referencing Gaines 1974, Klebenow and Oakleaf 1984, Zeiner et al 1990, and Lynn et al 1998).

WIFL breed in shrubby vegetation in meadow and riparian communities. They are consistently associated with meadows that have high water tables resulting in standing water and abundant riparian shrubs (specifically willows) (USDA 2006 referencing Serena 1982, Harris et al 1987 &1988, and Fowler et al 1991). There is usually at least some surface water or saturated soil within defended territories during the early part of the breeding season (USDA 2006 referencing Valentine 1987, Sanders and Flett 1989, and Bombay 1999). Standing or running water is not necessarily present at the latter stages of the breeding cycle but is always available during early stages of breeding and pair formation. Shrub layer is typically 6.5 to 13 feet in height, with the lower 6.5 feet comprised of dense woody vegetation. The live foliage density is moderate to high and uniform from the ground to the shrub canopy (USDA 2006 referencing Valentine 1987, Sanders and Flett 1989, and Bombay 1999). WIFL are significantly more likely to be detected at sites where the herbaceous community is consistent with high water tables and late seral conditions, and riparian deciduous shrubs are abundant (USDA 2006 referencing Bombay 1999).

WIFL have nested in meadows <1 acre (USDA 2006 referencing KRCD 1985) and as large as several hundred acres (USDA 2006 referencing Serena 1982, Harris et al 1987 &1988, and Bombay 1999). However, 80% of WIFL occur in meadows >20 acres in size (USDA referencing Serena 1982 and Harris et al 1987 &1988). In mountain meadows, WIFL (*E.t. brewsteri*) prefer to nest on the fringes of willows or alders near streams (USDA 2006 referencing Valentine et al 1988, and Sanders and Flett 1989). Nests are usually placed in a vertical fork of a riparian deciduous shrub and built around supporting twigs (USDA 2006 referencing Stein 1963, Flett and Sanders 1987, Valentine et al 1988, Sanders and Flett 1989, and Harris 1991). Nests are generally constructed about 1.5 to 10 feet above ground Zeiner et al 1990 referencing Stein 1963).

Willow flycatchers are Neotropical migrants. Males arrive in the breeding area in late May and early June; females arrive about one week later. Egg laying and hatching occurs from late June to late July. Incubation of 3-4 eggs last about 12-13 days (Zeiner et al 1990). The nestling period is about 13-14 days (Zeiner et al 1990 referencing Stein 1963). The territory for a pair of breeding willow flycatchers is about 2.5 acres (Stafford and Valentine 1985). Adults and fledglings leave the breeding area in August, with transients noted through mid September (Zeiner et al 1990).

Willow flycatchers *(E.t. brewsterii)* forage primarily on wasps, bees, beetles, flies, caterpillars, moths, and grasshoppers, and occasionally on berries (Zeiner et al 1990 referencing Sumner & Dixon 1953). Fledglings capture grasshoppers by hopping from lower branches of shrubs onto the ground (USDA 2006 referencing pers. obs. by Bombay). Thus, grasshoppers might be very important to WIFL during a brief, but critical, life stage.

The major decline of willow flycatcher populations can be attributed to alterations of lowland riparian habitat in California. Other factors include grazing, nest parasitism by brown-headed cowbirds, and disturbance in wintering areas. The Willow Flycatcher

Conservation Assessment identified meadow degradation, which can result in meadow drying, loss of nesting and foraging substrates, and increased predator access to meadow interiors, as a key factor likely responsible for the decline of the WIFL.

Currently on the SNF, there are 2,205 sites consisting of 10,725 acres that are identified as WIFL habitat. Out of these, there are: (1) 13 sites consisting of 371 acres identified as "occupied" habitat, (2) 141 sites consisting of 4,334 acres identified as "emphasis" habitat, and (3) 709 sites consisting of 3,515 acres identified as "suitable" habitat (calculated from the 2001 SNF GIS WIFL layer). The remaining acres may be in one of the categories, however, they have not been ground verified. Comparison of past (1990-1994) and current (1999-2001) high & moderate WIFL habitat acreages reveal that habitat trend on the SNF is significantly declining (USDA 2006). Calculations made to arrive at this trend status are not presented in the document, however, because the document referenced (USDA 2006) is still in draft and habitat acreages are currently not finalized. Nevertheless, the trend status determination is considered an accurate reflection of habitat decline on the SNF.

The SNFPA ROD (S&G # 59) requires that habitat condition and trend data be collected every 3 years for WIFL sites receiving late season grazing. Range condition and trend data was collected in some WIFL sites and this may provide some indication of habitat condition and trend for WIFL meadows on the SNF. On the SNF, range condition and trend data was collected on 8 emphasis sites. Out of these, trend was "up" on 1 site, "stable" on 3 sites, and "down" on 4 sites (USDA 2006). Nevertheless, this data is not statistically significant and should be viewed cautiously because the 8 meadows with data collected represent only a very small sample of the total WIFL sites existing on the SNF (USDA 2006).

Surveys for willow flycatcher have been completed on the Sierra NF and adjacent private lands. Willow flycatchers have been documented at seven sites on the Sierra NF, and at six sites on private land inholdings within the forest boundary (Serena 1982; Schlorff 1985; Harris et al. 1986; Kings River Conservation District 1985-1997; Laymon 1995; USDA Forest Service 1995, 1997c and 1998). These sites along with their survey results are displayed in Tables 3.44 and 3.45 below. All the meadows listed below are in non-wilderness areas but no sites are in analysis units. Long Meadow is adjacent to the Tule Meadow Analysis Unit. It is the only known site that is adjacent to an analysis unit. This table shows the detection sites for the forest as listed by the Sierra Nevada Forest Plan Amendment FSEIS (Appendix D 2004).

Table 3.44. Willow flycatcher survey detection sites on national forest land, SNF. (M=Male; F=Female; U=Sex Unknown; Y=Young; 0=Surveyed/No Willow Flycatchers Found; ?=Possible Willow Flycatcher/Unknown Species of Empidonax Flycatcher Detected; Blank=No Survey).

	Lily Pad Meadow	Long Meadow*	Ross Meadow	Summit Mdw/ Deer	Summit Creek/ Pollard	Cow Mdw	Swanson Mdw	Poison/Grade Meadow	Mdw 41	Markwood Mdw	Total
1977					?						1?
1978		1M1F0U									1M1F0U
1979											
1980											
1981		1M1F0U								1M0F0U	2M1F0U
1982		1M1F0U								1M0F0U	2M1F0U
1983					0M0F1U						0M0F1U
1984	1M0F0U	4M3F6U5Y		3M0F0U	2M0F0U		?	3M1F1U2Y		0	12M4F7U7Y1?
1985		3M2F0U5Y		1M0F0U	0M0F2U			2M2F0U0Y			6M4F2U5Y
1986	0	3M3F0U3Y		0	1M0F0U		0	2M3F0U3Y		0	6M6F0U6Y
1987		3M3F1U4Y		0	2M0F2U			1M1F0U2Y			6M4F3U6Y
1988		2M0F0U			0			2M1F0U3Y			4M1F0U3Y
1989		0M0F2U			0			0			0M0F2U
1990		0						0			0
1991		0	?	0	0			0			1?
1992		0			0			0			0
1993		3M3F0U9Y		0	0			1M1F0U			4M4F0U9Y
1994		0		1M0F0U	0			0M1F0U			1M1F0U
1995	0	0	2U	?	0	1M1F0U3Y	0	0	?	0	1M1F2U3Y2?
1996		0		0				0			0
1997			?	0	0			0			1?
1998	0	0	0	0	0	0		?		0	1?
1999		0	0					3U mist net		1U mist net	4U mist net
2000		0	0								0
2001		2U (vocal)	0	0		0		0		0	2U
2002	0	0	0	0	0	0	0	0		?	1?

	Lily Pad Meadow	Long Meadow*	Ross Meadow	Summit Mdw/ Deer	Summit Creek/ Pollard	Cow Mdw	Swanson Mdw	Poison/Grade Meadow	Mdw 41	Markwood Mdw	Total
2003		0				0	0				1U
2004		1U									1U
2005	0	0	0	0	0	0	2?	0		1U	1U2?
2006	0	0	0	0	0	0	0	?		?	2?
Total	1M0F0U	21M17F12U26Y	2U2?	5M0F0U1?	5M0F5U1?	1M1F0U3Y	3?	11M10F4U10Y2?	1?	2M0F2U2?	45M28F25U39Y12?

*Long Meadow is adjacent to the Tule Meadow analysis unit.

Table 3.46. Willow flycatcher survey detection sites on private land within the SNF (M=Male; F=Female; U=Sex Unknown; Y=Young; 0=willow flycatchers found;?=Possible Willow Flycatcher - Unknown Species of Empidonax Flycatcher Found; # = Several Detected; Blank=No Survey).

	Dinkey Meadow	Lost Meadow	Shaver Dam	Stevenson Markwood Creek	Sulpher Meadow	Beasore Meadow	Total
1979		3M0F0U	1M0F0U				4M0F0U
1980	#M0F0U						#M0F0U
1981	#M0F0U						#M0F0U
1982	6M0F3U	2M0F0U	0			2M1F0U	10M1F3U
1983	3M4F5U3Y	2M0F0U					5M4F5U3Y
1984	3M2F0U	1M0F1U	0	?	0		4M2F1U
1985	0M0F4U	1M0F1U			0M0F1U		1M0F6U
1986	3M6F0U5Y	1M0F0U	0	0		4M0F0U	8M6F0U5Y
1987	2M2F0U3Y	2M0F0U	0				4M2F0U3Y
1988	0	0					0
1989	1M1F2U2Y	0					1M1F2U2Y
1990	0	0					0
1991	0	0					0
1992	1M0F0U						1M0F0U
1993	2M2F0U4Y						2M2F0U4Y
1994	0						0
1995	2M2F0U2Y	0	0	0		0	2M2F0U2Y
1996	0M0F3U						0M0F3U
1997						0	
1998							
Total	24M19F17U2Y	12M0F2U	1M0F0U	?	0M0F1U	6M1F0U	42M20F20U19Y

Seven willow flycatcher sites were surveyed fairly consistently from 1984 to 1996 by the Kings River Conservation District. They are Long Meadow, Summit Meadow, Summit Creek, Summit Meadow, and Poison Meadow on national forest land, and Dinkey and Lost Meadows on private land. Willow flycatchers were detected each year at one or more of these sites from 1984 through 1989. During that time the average total annual population (adults and fledglings) for the four sites on national forest land was 15 individuals; on private land the average total annual population was 7 individuals. Factoring in the additional private land sites, shown in Table 2, raises the average to 8 individuals per year. From 1984 to 1989 the average total annual population for all sites, Sierra NF and private land, was about 24 individuals.

An extensive survey on the Sierra National Forest was done in 1995. During this survey a total of nine willow flycatchers were found on national forest land, and six were found on private land. Even though willow flycatchers were detected at two new sites on

national forest land in 1995, the average annual total population from 1990 to 1996 was 4 individuals on national forest land and 2 individuals on private land.

In 1998 all of the known willow flycatcher sites and some additional sites on Sierra NF were surveyed with no confirmed willow flycatcher detections. However, willow flycatchers may have gone undetected because only one visit was made to each site, except for Long Meadow. For example, in 1998, an unidentified species of *empidonax* flycatcher was detected at Poison/Grade Meadow, which is a site where willow flycatchers have been found on several occasions in the past. The 1995 surveys consisted of two visits per site and covered more sites than the 1998 surveys; therefore, the 1995 survey results are considered to be a more realistic estimate of the current population. Using 1995 survey data, the estimated current willow flycatcher population is 6 to 9 individuals on the Sierra NF, and 4 to 6 individuals on private land. For all sites, Sierra NF and private land, there are estimated to be 10 to 15 individuals.

As part of the 2004 SNFPA ROD, meadows identified as "occupied" by willow flycatchers have been placed on a 4-year survey cycle. Current results from these surveys are listed in the tables above. The “occupied habitat” designation indicates a willow flycatcher was detected in a meadow during the breeding season at least once since 1982. The designation does not indicate that a pair of willow flycatchers successfully nested in the meadow, or that willow flycatchers currently occupy the habitat, only that a willow flycatcher song was heard during the designated survey period. Confirmation of a singing male during the key survey period indicates the possibility that the bird is a territorial breeding male, and therefore the possibility that a nesting pair of flycatchers could be present for that year.

Common to Analysis Units with Willow flycatcher (NED, CLO,CHQ, KAI, HNE, COO, DIL, HEL, NEL, DFC):
With regards to cowbirds and willow flycatchers as noted in Verner and Ritter (1983) cowbirds are rare or absent from many major habitat types and areas remote from human-based sources of supplemental food, however, there are no known species in the analysis area currently threatened by cowbird parasitism. There was no significant difference between the May counts and either set of counts made after cattle and horses were in the mountains, suggesting that cowbirds were at normal summer abundance at least 2 weeks before any livestock were present. The paper goes on to say that instead of gathering at pack stations, many cowbirds in the Sierra National Forest gathered in mid- to late morning in the vicinity of small herds of cattle that grazed regularly in some of the meadows.

The low rate of samples suggests that nest parasitism by cowbirds does not have a significant impact on potential hosts in the Sierra National Forest. The “Effects of pack station livestock on riparian songbird reproduction in the Eastern Sierra Nevada, California”, on the Inyo National Forest written by Culp and Heath (2005), stated “cowbird numbers increased at pack stations after pack animal arrival, 63-100% of host nests were initiated prior to pack animal arrival, and cowbirds laid eggs up to 4 weeks

prior. In general it appears that cowbird reproductive activity at the two study sites was not dependent on the presence of pack station livestock".

Another study conducted at Malheur National Wildlife Refuge in Oregon between 1988-1997, by Sedgwick and Iko (1999) shows that 1) robustness of willow flycatchers reproductive strategies in response to cowbird parasitism is evident; 2) cowbird parasitism appears to exact the greatest toll on first year birds; 3) similarities across parasitism and success classes for lifetime reproductive success in years subsequent to their first breeding year suggest that older willow flycatchers may learn improved anti-parasite strategies over time and 4) similar return rates, survival and lifetime reproductive success (subsequent to first year) of parasitized vs. unparasitized pairs suggest that female cowbirds may be selecting for superior host parents.

Pallid bat

The pallid bat is large, as California bats go, weighing as much as one ounce and having a wingspan of 14 or 15 inches. The females are larger than the males. Both sexes have broad wings, big ears and large eyes. The fur is light yellow on the back and creamy or almost white on the underparts (Hicks 1984). Mating takes place between late October and February. Pallid bats reproduce in nursery colonies of up to several hundred females, but generally fewer than 100. After a period of delayed fertilization, gestation occurs between April and June. They normally have 2 young per year between April and June. The young wean at about 7 weeks of age. Generally weaned in mid to late August. Maternity colonies diband between August and October (Sherwin 1998). Male bats may roost with the nursery colony or separately.

Pallid bats are found in a variety of habitats below 6,000' elevation throughout California. In the Sierra National Forest, they can be associated with oak woodlands, ponderosa pine, mixed conifer, rock crevices, and giant sequoia habitats. Tree roosting has been documented in large conifer snags (e.g. ponderosa pine), inside basal hollows of redwoods and giant sequoias, and bole activities in oaks (Sherwin 1998). The pallid bat tends to be a roosting habitat generalist that utilizes many different natural and manmade structures (FEIS V3Ch3 part 4.4 page 55). Pallid bats commonly roost under bridges at night, but can also use caves and mines. Day roosts are more varied and include rock outcrops, tree hollows, buildings, bridges, caves, and mines. Roost temperatures are important and must be below 40 degrees Celcius. Foraging habitat requirements appear to be more restrictive. The pallid bat forages close to the ground, preying on large, ground dwelling arthropods such as beetles, scorpions, and Jerusalem crickets. Large moths and grasshoppers are consumed to a lesser degree. Pallid bats appear to be more prevalent within edges, open stands, particularly hardwoods, and open areas without trees (FEIS V3Ch3 part 4.4 page 55).

In October 2001, Alan Gallegos, Assistant Province Geologist, Southern Sierra Province and Chad Berner, Forest Service GSA Intern wrote a geologic review of carbonate bedrock that has the potential for Cave Development on the Sierra National Forest (2001f). The mapping of carbonate bedrock and rock outcrop in the Sierra National Forest reveals that some areas could contain caves, potential bat habitat, and carbonate endemic flora and fauna. Several caves have been found to date and a cave inventory has been started. Identifying caves in rock outcrop to

identify bat habitat will require refining outcrop data through air photo analysis and stratifying available data by specific bat habitat criteria (elevation). The area that has marble identified has high potential for caves (pers. comm. Gallegos 2001).

At this time, there are three known night roosts on the Forest for the Pallid bat. Two are located on the High Sierra Ranger District: the million dollar mile and under the bridge over Highway 168 before the Rancheria Bridge; the third is on the Kings River Ranger District. There is the assumption that bats are within the project area but no surveys have been conducted to date.

Townsend's big-eared bat

Their most typical habitat is arid western desert scrub and pine forest regions. In terms of dominant vegetation type, this bat occurs in a variety of habitats, including desert scrub, sagebrush, chaparral, deciduous and coniferous forests. Their distribution is strongly associated with the availability of caves or cave-like roosting habitat such as old mines. In general, the most serious factor leading to population declines in bats is loss and/or disturbance of suitable roosting habitat, and Townsend's big-eared bats appear to be among the most dependent of all North American bats on abandoned or inactive mines. Concentrations also occur in areas with substantial surface exposures of cavity forming rock such as limestone, but such areas are rare in the West. The species is occasionally found in old, mostly abandoned buildings and other human made cave-like structures, but these areas are mostly used at night while the animals are foraging. The bats are inactive during the day, and stay mostly in caves or mine tunnels.

These bats require habitat for day roosts, night roosts, and hibernation roosts. The most significant roosts, which have the largest aggregations and are most critical to the survival of populations, are the winter hibernacula (both sexes), and the summer maternity roosts (entirely adult females and their young). Additionally, there are other summer roosts: Those used in the day time by males and non-reproductive females (usually containing no more than a few animals per roost), night roosts (generally at a different site than the day roost), used by both sexes as a place to rest and digest food during the night, and interim roosts (sites used in the spring before the young are born and in the fall before moving to hibernating sites.

The Townsend's big-eared bat requires roosting habitat that is inaccessible to humans, because individuals roost on walls or ceilings, often near entrances. They rarely seek shelter in crevices as many other bat species do. If undisturbed, individuals will frequently roost less than three meters off the ground, and have been found in air pockets under boulders on cave floors. Populations of this species are threatened by habitat loss, vandalism, and disturbance by cave explorers at maternity and hibernation roosts. Human disturbance can cause permanent abandonment of roost sites. Within a few years of publication of a guidebook to the caves of Colorado, human visitation to one particular cave increased so much that the colony of *C.townsendii* found there eventually disappeared (Hicks 1984).

The big-eared bat feeds on moths, caddisflies, and other insects, detecting them by echolocation, and capturing them in flight. They forage frequently over water, and also

pick insects from leaves. This bat is particularly maneuverable in flight, varying from swift darting movements to slow deliberate and hovering moves. This makes the species difficult to capture, which is one reason why so little is known about locations in Colorado and other states. Townsend's big-eared bats are late flyers. They emerge from the roost primarily after dark, an average of 45.5 minutes after sunset, and forage until the early morning hours.

The distribution of the species is patchy and associated with limestone caves, lava tubes, and man-made structures, such as mines and abandoned buildings. Given the requirement of a specific environment and this bat's sedentary behavior, it is likely that Townsend's big-eared bat is limited by roost site availability. Although natural deterioration of caves and mines is expected, the majority of roost loss is related to human activity in the form of disturbance, demolition, renewed mining, hazard abatement, or vandalism (SNFPA Part 4.4).

Osprey
Microhabitat for foraging varies greatly; along coasts in salt-water marshes, lagoons and ponds, estuaries, silted river mouths, coral reefs, and only rarely in deeper, off-shore water. Inland, this species forages along rivers, marshes, reservoirs, and natural ponds and lakes, where individuals feed in both shallow littoral zones as well as deeper water. Nesting densities indicate clear preference for shallow-water environments, as fish can be caught in deep water only when feeding or when driven near the surface. Osprey are visual hunters, therefore foraging is less successful in water with thick emergent and submerged vegetation. Reservoirs often provide ample expanses of shallow, clear water—ideal conditions for hunting (Swenson 1981, Vana-Miller 1987), although periods of low water can lead to reduced prey availability owing to prolific growth of aquatic vegetation (S. Postupalsky in Vana-Miller 1987).

California mule deer
Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments. Suitable habitat is composed of four distinctly different elements: fawning, foraging, cover, and winter range. Hiding and thermal cover is typically close to the ground and thick enough to camouflage the outline of the deer, without being so dense as to obscure the approach of potential predators. Thermal cover is similar and generally thought to be denser, with the additional property of sheltering deer from the elements. Winter range tends to be lower elevation habitats that meet the requirements for forage, hiding, and thermal cover described above. Mule deer migrate seasonally between higher elevation summer range and low elevation winter range.

3.3.2.2 Methodology

Prior to field visits to the trails, meadows and proposed campsites related to the analysis units, a Geographic Information System (GIS) analysis was conducted to identify vegetation types, density and size. The California Wildlife Habitat (CWHR)

Relationships data was evaluated to determine the types of habitat in the field so that baseline information could be formulated to determine what species may be affected by the action under analysis. Pack stations, campsites, meadows and trails were visited in the analysis units by an interdisciplinary team. Meadow evaluation is described under Section 3.2.1 and 3.3.4. The purpose of these visits was to assess potential habitat for various Federally Threatened and Endangered species (T&E), Forest Service Sensitive species (FSS) and Management Indicator Species (MIS). If species were observed it was recorded and field reports were written for each pack station as a basis to begin analysis.

Analysis Elements

There are three analysis elements that were used for analyzing the alternatives:
1) presence of species or suitable habitat;
2) disturbance to suitable habitat;
3) noise disturbance to the species

3.3.2.3 Overview – Common to All

Affected Environment

The analysis units are habitat to a number of different species that are listed as Forest Service sensitive species and one Threatened species. The species live at different elevations ranging in elevation from 3,500 feet to 10,000 feet and are listed below.

Table 3.47. Summary of terrestrial wildlife species by Analysis Unit.

Analysis Unit Name	Elev Range (ft) of AU	Terrestrial Wildlife Species and/or habitat
Chinquapin	6,600 to 8,900	Marten, wolverine, Sierra Nevada red fox, willow flycatcher
Clover	5,900 to 9,300	California spotted owl, Northern goshawk, marten, fisher and willow flycatcher
Coyote	8,300 to 10,000	Marten, willow flycatcher
Dinkey Front Country	5,500 to 6,600	California spotted owl, fisher, Northern goshawk, willow flycatcher
Dinkey Lakes	8,900 to 10,500	Marten, willow flycatcher
East Huntington	7,000 to 10,200	California

Analysis Unit Name	Elev Range (ft) of AU	Terrestrial Wildlife Species and/or habitat
		spotted owl, marten, wolverine, Northern goshawk, willow flycatcher
Edison	7,000 to 8,300	Bald eagle, California spotted owl, Northern goshawk
Florence	7,100 to 7,900	Bald eagle, marten, wolverine, Sierra Nevada red fox
Helms	8,200 to 10,100	Marten, Northern goshawk, willow flycatchers and California mule deer
Kaiser	7,000 to 10,200	Condor sighting (1967), California spotted owl, marten, Northern goshawk, Sierra Nevada red fox, California mule deer, Willow flycatcher
Nelder	4,100 to 9,100	California spotted owl, Peregrine falcon, Northern goshawk, great gray owl, willow flycatcher, California mule deer
Nelson	8,200 to 10,500	Northern goshawk, willow flycatcher
Tule Meadow	7,000 to 7,060	None
West Huntington	7,000 to 8,100	Bald eagle, marten and Northern goshawk

Analysis Unit Name	Elev Range (ft) of AU	Terrestrial Wildlife Species and/or habitat
Wishon	6,880 to 7,000	None

Table 3.48. Suitable acres for Management Indicator Species (MIS) by Analysis Unit.

Analysis Unit	Bald eagle	Spotted Owl	Fisher	Marten	Mule Deer	Willow flycatcher	Warblin Vireo	Wilson's Warbler	White-Crowned Sparrow	Western Tanager	Olive-Sides Flycatcher	Goshawk	Total Units
	BAEA	CSPO	SSF	PIMA	MULDR	WIFL	WAVI	WIWA	WCSP	WETA	OLFL	NOGO	
Chinquapin	0	1141	1146	1675	1606	11	123	635	0	1235	467	1141	**9168**
Clover	0	18581	18572	19785	17378	40	3226	10074	0	4026	4025	18580	**115755**
Coyote	0	0	0	3269	968	82	1222	2402	0	0	0	0	**7861**
Dinkey Front Country	0	1854	1854	1025	1876	18	574	1478	0	1876	1876	1854	**14413**
Dinkey Lakes	0	0	0	280	0	128	466	556	0	0	0	0	**1303**
E. Huntington	767	1367	1358	5382	4610	23	521	3295	0	742	613	1367	**19255**
Edison	1476	2097	2101	2242	1477	0	231	1099	0	1431	162	2097	**12938**
Florence	240	465	465	465	432	104	213	436	0	432	396	465	**3770**
Helms	51	0	0	3143	1681	239	553	1795	0	0	0	0	**7172**
Kaiser	2173	4383	4416	10681	10349	26	994	6234	0	5158	789	4381	**47385**
Nelder	0	20774	20773	14697	25658	121	5610	13264	0	12895	12534	20793	**147087**
Nelson	22	0	0	1224	922	16	195	628	0	0	0	0	**2968**
Tule Meadow	0	9	9	9	10	0	10	11	0	10	10	9	**87**
W. Huntington	1143	1482	1482	1482	1141	0	38	712	0	1141	1004	1482	**9963**
Wishon	0	4	4	4	2	0	0	0	0	2	2	4	**23**
Total	**5872**	**52157**	**52179**	**65363**	**68110**	**807**	**13977**	**42621**	**0**	**28949**	**21877**	**52173**	

Environmental Consequences

Each of the fifteen AUs is described for the affected environment and the associated environmental consequences of the three alternatives on listed terrestrial species and their associated habitats. Only those terrestrial species or their habitats that are known to occur or could occur within each of the fifteen AUs are described. Refer to the project's terrestrial species biological assessment and evaluation report (Sorini and Williams 2006) for more information on the effects of this project on all terrestrial species and their habitats. There is also a Management Indicator Species (MIS) Report (Sorini and Williams 2006) specifically for this project. The specific MIS report is tiered to the draft Forest MIS report which is written in broad terms to evaluate species at a Forest level (USDA Forest Service 2006).

Alternative 1

For Alternative 1 the reduction of pack station activities and their stations would reduce the amount of disturbance to terrestrial wildlife species; however, as an example, there would still be some disturbance from vegetation management projects, private stock, cattle grazing and recreationists. There is a complete list of past, present and reasonably foreseeable actions in the beginning of this chapter.

Alternative 2

Alternative 2 has a greater potential to affect species than Alternative 3 because the pack stock stations do not have designated campsites in the Dinkey Lakes and Kaiser Wildernesses.

There will be less of an effect to the species under Alternative 3 because the campsites are designated in the Dinkey Lakes and Kaiser Wildernesses and therefore may be less noise disturbance to the species. There may be less noise disturbance because the campsites would be in one specified location versus throughout the two wildernesses. The noise disturbance may cause the wildlife to leave an area for a short term but it would be expected they would return after the horses and clients leave.

Within the analysis units, in the non-wilderness, there would be the same effects under Alternative 2 and 3 to the species due to noise disturbance and disturbance to potential habitat. There is a destination zone in the Merced Canyon Wild and Scenic River, however, the campsite and use are nearly identical to past use; therefore, the effects would be the same.

Table 3.49. Determinations for the 11 listed terrestrial wildlife species within the fifteen analysis units for each alternative for this project are shown.

Species	Status	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Destination Management
Bald eagle	Federally Threatened; SNF Management	No effect	No effect	No effect

Species	Status	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Destination Management
	Indicator Species			
Peregrine falcon	Forest Service Sensitive; SNF Management Indicator Species	No effect	No effect	No effect
California spotted owl	Forest Service Sensitive; SNF Management Indicator Species	No effect	May affect, but is not likely to lead to federal listing or loss of viability	May affect, but is not likely to lead to federal listing or loss of viability
American marten; Pacific fisher	Forest Service Sensitive; SNF Management Indicator Species	No effect	May affect, but is not likely to lead to federal listing or loss of viability	May affect, but is not likely to lead to federal listing or loss of viability
Wolverine; Sierra Nevada red fox	Forest Service Sensitive	No effect	No effect	No effect
Northern goshawk	Forest Service Sensitive; SNF Management Indicator Species	No effect	May affect, but is not likely to lead to federal listing or loss of viability	May affect, but is not likely to lead to federal listing or loss of viability
Great gray owl	Forest Service Sensitive	No effect	May affect, but is not likely to lead to federal listing or loss of viability	May affect, but is not likely to lead to federal listing or loss of viability
Willow flycatcher	Forest Service Sensitive; SNF Management Indicator Species	No effect	May affect, but is not likely to lead to federal listing or loss of viability	May affect, but is not likely to lead to federal listing or loss of viability
Townsend's big-eared bat	Forest Service Sensitive	No effect	No effect	No effect

Alternative 1

Direct Effects Common to all Analysis Units

Potential disturbances to sensitive species resulting from pack station related activities would be reduced. Sensitive species would experience a decrease in stress and disturbances resulting from the proximity of horseback riders and other activities associated with the pack station.

Effects along remote and infrequently traveled trails would be less noticeable. The reduction of pack station related disturbances to sensitive species and habitat would apply to all species analyzed in this section. There is a detailed biological assessment and

evaluation in the project record. Existing dispersed, permitted and non-permitted recreational uses (hikers, campers, fishing, biking, OHV use, etc.) and other project activities would continue within the analysis area, so the potential for disturbances to sensitive species and their habitat would continue.

A beneficial effect may be expected due to the elimination of potential disturbances related to pack station activities. This includes the elimination of disturbances resulting from the presence of pack trains and riders, and reduced impacts to meadow vegetation and riparian areas due to the absence of grazing and pack stock related trampling.

Indirect Effects Common to all Analysis Units
There would be less trail maintenance (predominately cutting out trees) accomplished without the packers. In the Nelder AU, the use trails would not be authorized under this alternative and the trails would need to be rehabbed in order to be effectively closed to general public use effectively. The indirect effects to wildlife may be less noise disturbance with reduced trail maintenance because less people and stock would utilize the trails.

Direct and Indirect Effects Common to all Analysis Units
There would be no effects on roosting and hibernation habitats of Townsend's big-eared bat that may be present in the non-wilderness or wilderness portion of the analysis units because pack stock would not be utilizing areas where the bats may forage.

There would be no effects to the three avian guilds because the pack stations would not be in the areas that the birds utilize.

Cumulative Effects Common to all Analysis Units
Commercial pack stock operation impacts to wildlife species within this area particularly with respect to human disturbance effects to wildlife species is difficult to separate out from the cumulative effect of all these activities occurring simultaneously within the area. Continued effects would potentially affect terrestrial wildlife species from past and current activities (this list is derived from Table 3.2) such as current logging, grazing, recreation (off-highway vehicles, snowmobiling, fishing, camping, hiking, backpacking), however, no new incremental effects would occur from the no action alternative because no negative direct or indirect effects are expected. The actual affected acres by the pack station activities within this matrix of land uses is estimated as less than 1% of the cumulative effects analysis area for terrestrial wildlife.

Alternatives 2 and 3

Direct and Indirect Effects Common to all Analysis Units
There would no effects on roosting and hibernation habitats of Townsend's big-eared bat that may be present in the non-wilderness or wilderness portion of the analysis units. There may be changes in insect prey abundance in grazed meadows, however, scientific research is lacking in the field of impact assessment to determine if potential changes are having any substantive effect on use of these habitats by this species.

Common to all Analysis Units

Trails create small habitat fragmentation corridors that amount to a relatively insignificant habitat reduction for species and their prey. Insufficient research is available on human disturbance effects to fully understand how recreation and small scale recreation facilities such as pack station headquarters and/or cabins affect wildlife populations.

Meadow edge avian guild: See the discussion under Riparian Avian Species below for full discussion of this species guild. The level of pack stock grazing proposed under Alternatives 2 and 3 is not likely to degrade meadow habitats to the degree that habitat suitability would be diminished for meadow edge avian species. Campsites near meadows will be located in areas that do not degrade meadow habitat, such as away from moist soils and herbaceous ground cover.

Riparian Avian Species: Population trend data for each of these species is shown in Table 3.46 and is adapted from information in the Sierra National Forest MIS Report (USDA Forest Service 2006). At a statewide scale, each of these four species has a negative population trend. Within the Sierra Nevada, population trend data are less certain, though with the exception of Warbling Vireo (WAVI), all still appear to be declining. Population trends for these species at the North American scale of the entire Breeding Bird Survey (BBS) range from Definitely Decreasing, Wilson's Warbler (WIWA), to Definitely Increasing WAVI (Table 3.31). With population trend data suggesting these species to be declining in California, and the Sierra Nevada representing a significant portion of their range in the state, the habitat needs of these species should be a priority of land managers.

Table 3.50. Population trends for riparian avian species, as computed from BBS data for the 1966-2004 survey period.

	Population Trend Summary For Riparian Avian Species		
Species Name	**Sierra Nevada**	**California**	**Survey-Wide**
Warbling Vireo	Definitely Stable	Definitely Decreasing	Definitely Increasing
White-crowned Sparrow	Possibly Decreasing	Definitely Decreasing	Likely Decreasing
Wilson's Warbler	Likely Decreasing	Definitely Decreasing	Definitely Decreasing
Yellow Warbler	Possibly Decreasing	Possibly Decreasing	Definitely Stable

Under Alternatives 2 and 3, on use trails and stream crossings within riparian areas that are causing unacceptable environmental impacts may be rehabilitated and continued use would occur. However, on system trails the pack station use is not the only contributor to these conditions and their incremental effect is small, and without them, the impact would still occur. Therefore, under Alternatives 2 and 3 they represent an improvement over the current condition for riparian habitat, although the acreages involved are only a small portion of the riparian habitat within analysis units. The activities proposed under Alternatives 2 and 3 are not likely to result in a measurable effect to riparian avian populations or decreases in viability or habitat quality.

Mature Mixed Conifer Avian Guild: During the period ranging from 1993 to 2001, mixed conifer habitat in general increased from 232,000 to 240,000 acres (USDA Forest Service 2006). Mixed conifer for the Western Tanager and Olive-sided flycatcher,

suitable habitat currently on the SNF for these two species is approximately 79,000 acres for the WETA and 67,000 acres for the OSFL.

Population trend data for each of these species is shown in Table 3.47 and is adapted from information in the Sierra National Forest MIS Report (USDA Forest Service 2006). Within the Sierras and at a statewide scale, populations of the Western Tanager are likely stable while populations of the Olive-sided Flycatcher are definitely decreasing. Population trends for these species at the North American scale of the entire BBS are similar, except that the data reflects an even more stable population for Western Tanagers (Table 3.51).

Table 3.51. Population trends for mixed conifer avian species, as computed from BBS data for the 1966-2004 survey period.

	Population Trend Summary For Mixed-Conifer Avian Species		
Species Name	**Sierra Nevada**	**California**	**Survey-Wide**
Western Tanager	Likely Stable	Likely Stable	Definitely Stable
Olive-sided Flycatcher	Definitely Decreasing	Definitely Decreasing	Definitely Decreasing

Under Alternatives 2 and 3, the majority of current and proposed horse trails and campsites occur within stands or patches of mature mixed conifer habitat. These narrow trails do not result in measurable changes to the habitat condition or quality of the mature mixed conifer stand, especially above ground level. Ground-nesting birds are not likely to place a nest in a defined trail, even one that is lightly used, due to the lack of cover. The activities proposed under Alternatives 2 and 3 are not likely to result in a measurable impact to mature mixed conifer avian populations or decreases in viability or habitat quality.

Direct and Indirect Effects

The effects of commercial pack stock operations represent a very small percentage of use in the non-wilderness analysis area and cannot be easily separated out from the total human disturbance presence and habitat modification effects that may affect of suitable habitat. If all commercial pack stock operations ceased there would still be a continuous human disturbance presence from the other recreational users of the Forest during the nesting and young rearing period from June through August adjacent to the pack station facility areas or along some system trail areas.

Cumulative Effects Common to all Analysis Units

Management activities are ongoing and proposed such as timber harvesting, road maintenance, cattle grazing, off-highway vehicle use, and fishing (see Table 3.2 for complete list). All these activities contribute incrementally to direct and indirect effects on terrestrial species and avian guilds by causing noise disturbance and/or disturbing habitats. Each of the alternatives in addition to these other ongoing and planned activities slightly increases the effects on terrestrial species and has the same level of effect for Alternative 2 and 3. System trail, use trail, and Forest road use, as well as the use of campsites and destinations by commercial pack stock operators and clients can result in variable levels of displacement and avoidance responses by some species of wildlife of areas immediately adjacent to these human use areas. These types of impacts may occur

at critical times, important to the life cycle of the species such as breeding, nesting, fawning, young rearing and foraging (Gaines et al 2003). Some species of wildlife and individuals of a species can habituate to predictable patterns of human disturbance that can lessen the impacts on the species. The scientific understanding of how such impacts affect wildlife populations, their viability, and habitat use is poorly understood (Gaines et al. 2003, Knight and Gutziller 1995).

The actual affected acres by the pack station activities within this matrix of forest uses is estimated as less than 1% of this total landscape.

3.1.1.4 Analysis Unit Level Evaluation

NELDER (NED)

Affected Environment

There are all or portions of 11 Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) (MA001; MA002; MA010; MA003; MA016; MA064; MA078; MA081;MA083; MA084; MP070) for the California spotted owl in NED AU. There are three goshawk territories (SieGH41; SieGH44 and SieGH46). There were incidental sightings of great gray owl in the AU at Soquel Meadow during protocol surveys. There are five meadows that are emphasis habitat for this AU (Polk Salt Log, Watershed Meadow, Boggy Meadow 1, Soquel Meadow and Long Meadow II) for the willow flycatcher. Of these meadows, Soquel Meadow is the only one where pack stock grazing would occur. Portions of the White Chief and Grizzly mule deer population centers and several mule deer migration corridors lie within the AU.

Environmental Consequences

Alternative 1

Direct Effects

Potential disturbances or effects to sensitive species habitat would be eliminated. Sensitive species would experience a decrease in stress and disturbances resulting from the proximity of horse riders and other activities associated with the pack station. These effects would be greatest in the vicinity of the pack station headquarters east of Fish Camp, since this area currently experiences the greatest amount of horse riders, both in numbers and frequency of use.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease. These use trails would not be authorized under this alternative and the trails would need to be rehabilitated in order to be effectively closed to general public use.

Alternatives 2 and 3

Direct Effects

The potential effects to FS sensitive species and their habitat will be similar. These effects are outlined below for each species under consideration. Effects can be generalized into two types: disturbance to individuals by the presence of pack stock and humans; and effects to habitat by pack stock, such as grazing and trampling.

Northern goshawk: Under Alternatives 2 and 3, there is a potential disturbance to individual goshawks in proximity to strings of horses & riders. Frequency of disturbance is related to number of trips/day and the density of goshawks (likelihood of an encounter), while the intensity of disturbance is related to the size of the pack string, and habituation of the individual goshawk to this occurrence. The duration of this disturbance is short, since typically the pack string is passing through an area and not lingering or camping overnight, except in the established camp areas. Disturbed goshawks are likely to quickly return to the area once the pack string has gone by. On the Bass Lake Ranger District the discovery of a plucking post within 3' of a trail may be evidence that the level of disturbance associated with that trail is not sufficient to deter goshawk use. However, it is unlikely that goshawks would choose to nest in close proximity to a well-traveled trail.

California spotted owl: Direct effects would be the same as goshawks, except that the level of noise disturbance to spotted owls is potentially less than with the goshawk, because spotted owls are typically more tolerant of human presence than goshawks, and their nocturnal activity cycle is outside the usual time frame of pack stock operations. Along with associated trail rides in the non-wilderness trails in suitable spotted owl habitat may result in potential disturbance to any spotted owls using these habitats immediately adjacent to the facilities and trail corridors. Habitat will not be disturbed because the pack stock operations do not affect it. They are on trails and not affecting trees which owls may be nesting in or foraging from in the forest.

Peregrine falcon: Some areas of suitable habitat exist near trails, specifically Bare Island Lake; however, due to peregrine falcon use of cliff faces for nesting and foraging in the air it is unlikely that there would be interaction between pack strings and falcons; therefore there would not be an expected noise disturbance or disturbance to habitat.

Great gray owl: Under Alternatives 2 and 3, there is a potential of noise disturbance to individual great gray owls in proximity to strings of horses and riders. Campsites in or next to suitable meadows may deter use by great gray owls; however, the size of the disturbance area related to the group/camp size and activity level at the campsite may lead to the habituation of the individual owl to the type of activity.

Willow flycatcher: Since no willow flycatchers (WIFLs) have been located in or near the NED AU, potential for effects is very low. The potential exists that undiscovered WIFLs may occur in suitable habitat within the NED AU. Individual WIFLs are not likely to be disturbed by an occasional pack string of horses and riders near an occupied meadow. Pack stock have a small potential to bump against willow bushes while grazing

in meadows. This can be mitigated by restricting grazing in areas of suitable WIFL habitat where occupied sites are known to occur. There are none at this time. There are five meadows that are emphasis habitat for this AU (Polk Salt Log, Watershed Meadow, Boggy Meadow 1, Soquel Meadow and Long Meadow II). Soquel Meadow is the only one where pack stock grazing would occur. If either alternative was chosen, then a survey to protocol would need to be conducted prior to grazing occurring. Alternative 2 and 3 would implement 2004 SNFPA FEIS/ROD direction to implement late-season grazing if willow flycatchers area detected in meadows grazed by commercial pack stock.

Pallid bat: No direct effects are expected to occur for the Pallid bat.

Marten and fisher: There is a potential noise disturbance to individual martens and fishers in proximity to strings of horses and riders. Frequency of disturbance is related to number of trips/day and the density of marten and fishers (likelihood of an encounter), while the intensity of disturbance is related to the size of the pack string, and habituation of the individual marten or fisher to this occurrence. As with the goshawk, the duration of this disturbance is short, since typically the pack string is passing through an area and not lingering or camping overnight, except in the established camp areas. Disturbed martens and fishers are likely to quickly return to the area (or come out of hiding) once the pack string has gone by. Martens and fishers would probably not be likely to locate a den or resting site in close proximity to a well-traveled trail.

Wolverine: Since the last wolverine sighting in the NED AU was 27 years ago (other than the possible sighting in Yosemite National Park 13+ years ago), the potential for effects is very low. Wolverines naturally occur in very low densities, range over very large home ranges, and tend to avoid areas of human presence. The potential that any wolverine would encounter any pack stock and riders is extremely low. The effects analysis is based on potential disturbance within suitable habitat since the species can't be detected.

California mule deer: The deer (*Odocoileus hemionus californicusis*) in Madera and Mariposa Counties is part of the Oakhurst Herd Segment is located on the western slopes of the Sierra Nevada Mountains in Fresno County. In the LRMP, important habitat types for deer were described and specific areas were identified where management for these habitat types is emphasized. Each type has standards and guidelines in the LRMP for management and they are incorporated into action alternatives where appropriate.
The actions will not have measurable impacts to mule deer viability or habitat. Individual deer may be disturbed by horses and riders sufficiently to leave the immediate area. This level of disturbance (intensity and duration) is likely to be less than that caused by humans on foot. The level of grazing by horses and pack stock in meadows will not be sufficient to result in a measurable decrease of forage or browse for mule deer.

Indirect Effects

Northern goshawk: No effects are expected to occur to the habitat of goshawks or their prey species (primarily avians). This is because the level of uses proposed along trails

and within designated camp and grazing areas under Alternatives 2 and 3 is not sufficient to result in measurable decreases in goshawk habitat or prey populations.

California Spotted Owl: No effects are expected to the habitat of spotted owls or their prey species (primarily small mammals). This is because the level of uses proposed along trails and within designated camp and grazing areas under Alternatives 2 and 3 is not sufficient to result in measurable decreases in spotted owl habitat or prey populations. Spotted owl prey populations are typically nocturnal and therefore are most active during hours when there is little or no pack stock use occurring.

Peregrine falcon: No indirect effects to falcons would be expected as a result of Alternatives 2 or 3, due to peregrine falcon use of cliff faces for nesting and foraging in the air it is unlikely that there would be interaction between pack strings and falcons; therefore there would not be an expected noise disturbance or disturbance to habitat.

Great gray owl: Pack stock grazing has the potential to degrade the habitat of the prey species (voles) for great gray owls because there is some level of disturbance with the soils being more compacted and herbaceous cover removed to some extent. The potential for these effects is low, due to the low level of grazing proposed. As long as the grazing standards are met and not exceeded as discussed in Section 3.3.4, there should not be an issue regarding lack of habitat.

Willow Flycatcher: No indirect effects are expected to occur. Pack stock grazed meadows tend to retain substantial areas of robust willow communities since pack stock forage on herbaceous species and not willow.

Pallid bat: No direct effects are expected to occur for the Pallid bat.

Marten and Fisher: No indirect effects are expected to the habitat of martens or their prey (rodents). No indirect effects are expected to the habitat of fishers or their prey. This is because the level of uses proposed along trails and within designated camp and grazing areas under Alternatives 2 and 3 is not sufficient to result in measurable decreases in marten or fisher habitat or prey populations.

Wolverine: No indirect effects are expected to the habitat of wolverine or their prey (mainly mammals and carrion). This is because the level of uses proposed along trails and within designated camp and grazing areas under Alternatives 2 and 3 is not sufficient to result in measurable decreases in wolverine habitat or prey populations.

CLOVER (CLO)

Affected Environment

There are eight California spotted owl PACs or Home Range Core Areas HRCAs within the CLO AU (MA013; MA027; MA029; MA030; MA040; MA059 and portions of MA065 and MA066). There are two goshawk territories (SieGH32 – Globe Rock and SieGH36 – Granite Creek) within the AU. There are marten and fisher sightings. There

are five meadows which are identified as emphasis habitat for the WIFL (Clover Meadow - 507132B, McCreary Meadow, South – 507-114A, Jackass Meadow – 507124 A/B, Brophy Meadow – 506M369, and Klette Meadow – 506M374), none of which are proposed for pack stock grazing.

Visual surveys to locate territorial goshawk or their nests were conducted on the Sierra National Forest between 2002 and 2004 while conducting field visits to pack stations, outlying facilities, campsites and grazing areas. No new nest sites were found.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed for common to all analysis units.

Indirect Effects

Same as listed for common to all analysis units.

Alternative 2

Direct Effects

Northern goshawk: There would be minimal direct effects to the goshawk because the territories have been utilized by goshawk for at least 5 years and the pack station has been utilizing the trail at least 40 years. The direct effects of commercial pack stock operations represent a small percentage of use in the non-wilderness portion and cannot be easily separated out from the total human disturbance presence and habitat modification effects that may affect goshawk use of suitable habitats for nesting and foraging.

California spotted owl: There would be minimal direct effect to the spotted owl because the territories have been established since the early 90s. The birds have reproduced successfully and the pack station has been in the area for at least 20 years. Owls may subsequently avoid some areas for periods when the activities occur.

Marten and fisher: There are incidental sightings in the AU. The animals may leave the area for a short time due to noise disturbance but return after awhile. It seems their den areas are more secluded and the pack station activities are not within the area where den sites may occur.

Willow flycatcher: No direct effects are expected to occur because no pack sotck grazing is proposed where emphasis habitat is identified.

Indirect Effects

Northern goshawk: There would be minimal indirect effects to the prey base because the species are not affected by the horse and riders on the trails. There are other activities in the area (backpackers and private pack stock that also utilize the trails).

California spotted owl: : Pack station activities would have minimal indirect effects on the spotted owl prey base because these animals are primarily nocturnal, and are active during hours when few (if any) pack station activities are taking place.

Marten and fisher: No indirect effects are expected to the habitat of marten or fisher or their prey (rodents and small mammals). This is because the level of uses proposed along trails and grazing areas under Alternatives 2 is not sufficient to result in measurable decreases in marten or fisher habitat or prey populations.

Willow flycatcher: No indirect effects are expected to occur because no pack stock grazing is proposed in the emphasis sites identified.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2 for all species mentioned above. The direct effects of commercial pack stock operations represent a small percentage of use in the non-wilderness portion and cannot be easily separated out from the total human disturbance presence and habitat modification effects that may affect species use of suitable habitats for nesting, foraging or denning depending on the species.

Indirect Effects

Indirect effects are the same as Alternative 2 for all species mentioned above. This is because the level of uses proposed along trails and within designated camp and grazing areas under Alternatives 3 is not sufficient to result in measurable decreases in species habitat or prey populations.

EDISON (EDI)

Affected Environment

There are numerous sightings of bald eagles and a nesting eagle pair within the EDI AU. The eagles at Lake Thomas A. Edison were seen in 2006 and confirmed nesting in 2005. Within the EDI AU there is a portion of one California spotted owl PAC (FR075) and a few goshawk sightings.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease which in turn may be less noise disturbance to the species however there is still human activity by others such as hikers and private stock use.

Alternative 2

Direct Effects

Bald eagle: The nesting pair of eagles has been located for at least five years and the trail has been utilized at least 20 years. The nest itself is > ¼ mile from the most utilized trail. Due to the birds being reproductively successful it is evident that the current level of trail use is not sufficient to deter nesting, therefore, Alternative 2 is not expected to have direct effects to the bald eagles.

Northern goshawk: There are incidental sightings of goshawk in the area; however, no known nests have been located at this time. The habitat utilized is similar to spotted owls. There may be short term noise disturbance but if birds are nesting in the area they would return quickly if dispersed because the horses and riders are passing by the area and not camping overnight.

California spotted owl: Similar to the bald eagle the spotted owls have been located for at least five years and the trail has been utilized at least 20 years. There may be noise disturbance from horses and riders passing by but it would be minimal because the horses are not staying in the area.

Indirect Effects

Bald eagle: There would be minimal indirect effects to the eagles. Their prey base is in the lake which is not being utilized by the pack station. Their habitat is relatively undisturbed because the nest site is off the main trail.

Northern goshawk: There would be minimal indirect effects to the goshawk because the habitat is not being manipulated and the prey base (birds) may leave the area due to noise disturbance but would return after a short period.

California spotted owl: There would be minimal indirect effects to the owl because their activity is mostly nocturnal and horses and riders are not going through the area at night.

Alternative 3

Direct Effects

Direct effects are same as Alternative 2 because horses will still be moving through the area, however, they will not be any closer to the birds.

Indirect Effects

Indirect effects are same as Alternative 2 because the habitat and/or prey base for the species is not being disturbed**.**

CHINQUAPIN (CHQ)

Affected Environment

There is one incidental marten sighting within the AU. There are no other wildlife sightings within this AU. The AU is at the upper elevational range for fisher. It is habitat

for marten, wolverine, and Sierra Nevada red fox. There is one meadow which is emphasis habitat for the WIFL (513M20). The meadow has not been requested for grazing at this time.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Furbearers: There are incidental marten sightings in the AU. There will be minimal direct effects. The animals may leave the area for a short time due to noise disturbance but would return. As for wolverine and Sierra Nevada red fox, there will be minimal direct effects to those two species because the horses and riders do not ride in their habitat of rocky terrain.

Willow flycatcher: No direct effects are expected because no grazing is proposed at the emphasis meadow.

Indirect Effects

No indirect effects are expected to occur because the prey base and habitat would not be disturbed for any species or their habitat found in this AU.

Alternative 3

Direct Effects

Direct effects are similar to Alternative 2 because animals may leave the area for a short time period and would return after the pack horses and riders have moved through the area.

Indirect Effects

Indirect effects are similar to Alternative 2 because it is not expected to disturb the prey base or habitat for any species or their habitat found in this AU.

FLORENCE (FLO)

Affected Environment

There are two bald eagle sightings within the AU. There is a high probability that eagles nest in the area but no nest has been found to date (Smith, pers. comm. 2006). There is a 1941 sighting in the database for a Sierra Nevada red fox that was trapped in the winter at

Florence Lake (Schempf 1977). The AU is habitat for the marten, Wolverine and Sierra Nevada red fox. There are no other sightings for the FLO AU.
The AU was visited in 2003. There were no incidental sightings of wildlife. The habitat for the species listed above does not seem to be hindered by the pack station use.

Environmental Consequences

Alternative 1

Direct Effects
Same as listed above for common to all analysis units.

Indirect Effects
One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects
Bald eagle: There are incidental sightings of eagles in the area but there will be minimal effects to the species because the birds may move within the area due to noise disturbance but would return after a short time. The fly over sightings in the area may be the birds going to an unknown nest site or different area to hunt/forage on Florence Lake.

Marten, Wolverine and Sierra Nevada red fox: There may be minimal direct effects to marten, Wolverine and Sierra Nevada red fox if the species are crossing the trail while horses and riders pass through the area because if the animals are in the vicinity they may leave due to noise disturbance and return at a later time.

Indirect Effects
Bald eagle: No indirect effects are expected to occur for the bald eagle because the habitat and prey base are not being disturbed.

Marten, Wolverine and Sierra Nevada red fox: No indirect effects are expected to occur because the prey base and habitat would not be disturbed.

Alternative 3

Direct Effects
Bald eagle: Direct effects are the same as Alternative 2 because the birds are moving through the area and there is a massive area by which the eagles can hunt/forage.

Marten, Wolverine and Sierra Nevada red fox: Direct effects are similar to Alternative 2 because the mammals are moving through the area and there is a large area to rest and forage. If they are in the area, they may leave for awhile due to noise disturbance but could return once the horses and riders have gone through the area.

Indirect Effects for all species
Indirect effects are the same as Alternative 2 because the habitat or prey are not being disturbed.

KAISER (KAI)

Affected Environment

There is a condor sighting from 1967 within this AU (USFS 2005). There are all or portions of four PACs (FR010; FR014; FR016; FR026) for the California spotted owl within the KAI AU. There are incidental marten and goshawk sightings and one 1989 Sierra Nevada red fox sighting in the KAI AU. Deer population center #11, Kaiser Wilderness is within the AU. Kaiser Peak Meadow is emphasis habitat for the WIFL, it is not proposed for grazing.

A site visit was conducted in 2004 to the pack station and to review the day ride trail loops adjacent and within the Kaiser Wilderness. A goshawk was seen flying through the tree canopy. It was documented in the field report for that year.

Environmental Consequences

Alternative 1

Direct Effects
Same as listed above for common to all analysis units.

Indirect Effects
One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects
Northern goshawk: There are incidental sightings of goshawks in the area. The birds may leave the area for a short term due to noise disturbance but would return.

California spotted owl: There are spotted owls in the area but there will be minimal direct effects to the owls because there may be short term noise disturbance but the birds would return to the area. Owls are primarily nocturnal and the packers would not be moving through the area at that time. When the owls are resting they may have a slight noise disturbance due to horses moving through the area and humans interacting with one another.

California mule deer: The actions proposed under Alternative 2 of this analysis will not have measurable impacts to mule deer viability or habitat. Individual deer may be disturbed by horses and riders sufficiently to leave the immediate area. This level of disturbance (intensity and duration) is likely to be less than that caused by humans on foot. The level of grazing by horses and pack stock in meadows will not be sufficient to result in a measurable decrease of forage or browse for mule deer.

Willow flycatcher: Kaiser Peak Meadow is emphasis habitat for the willow flycatcher however, grazing is not proposed under this alternative for the meadow; therefore, no direct effects are expected to occur.

Indirect Effects
Northern goshawk: There may be noise disturbance to the prey base which is mostly birds for the goshawk. Similar to the goshawk, the birds may leave the area but would return after the pack stock has gone by. If they are near the ground they may fly further up in the canopy of the trees and return once the horses have gone by.

California spotted owl: No indirect effects are expected to occur because the prey base is primarily nocturnal and the packers are not moving through the area at that time.

California mule deer: The horses may graze some of the areas where deer are grazing however, the areas seem to be large enough that the deer may leave the area and graze elsewhere or return after the horses and riders have left.

Willow flycatcher: Kaiser Peak Meadow is emphasis habitat for the willow flycatcher however, grazing is not proposed under this alternative for the meadow; therefore, no indirect effects are expected to occur.

Alternative 3
Direct Effects
Direct effects are same as Alternative 2.

Indirect Effects
Indirect effects are same as Alternative 2**.**

EAST HUNTINGTON (HNE)

Affected Environment
There is one HRCA and a portion of PAC FR076 within the HNE AU. There are incidental marten, wolverine and goshawk sightings within the AU. There are two meadows (Meadow 71 and 72) which are identified as emphasis habitat for the WIFL., neither of which are proposed for pack stock use.

Environmental Consequences

Alternative 1
Direct Effects
Same as listed above for common to all analysis units.

Indirect Effects
One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Northern Goshawk: There are incidental sightings of goshawks. The area has not been surveyed to protocol; however, the direct effects would be minimal because the pack stock is moving through this area not stopping to camp.

California spotted owl: There is a PAC in the AU. There is a sighting of one female 15 years ago. There is a trail through the PAC. There may be a direct effect if there is now a nesting pair of owls in the area or even a resident bird. The direct effect would be noise disturbance if they are nesting and in close proximity to the trail.

Marten and wolverine: Some of the marten sightings are incidental while others were found with camera stations following a protocol. The marten may be disturbed by the pack stock moving through the area; however, similar to goshawks they would return to the area**.** Also, marten may avoid areas around trails; however, the species can range over large areas to find suitable foraging habitat and rest sites. The wolverine sightings are incidental also and similar direct effects would be expected as listed for the marten. The wolverine may even have less direct effects because they are more secluded in living than marten. It is unknown how the trail system may impact these species since there is no known population of wolverine to monitor, and there is no research to support such an analysis for the Sierra.

Willow flycatcher: No direct effects are expected because no grazing is proposed at the emphasis sites.

Indirect Effects

Northern Goshawk: There may be noise disturbance to the prey base, which is mostly birds, for the goshawk. Similar to the goshawk they may leave the area but would return after the pack stock have gone by. If they are near the ground they may fly further up in the canopy of the trees and return once the horses and riders have gone by.

California spotted owl: No indirect effects are expected to occur because the prey base is primarily nocturnal and the packers are not moving through the area at that time.

Marten and wolverine: Trails create small habitat fragmentation corridors that also provide access pathways where human disturbance encounters may occur, along with insignificant habitat reductions for the species and its prey.

Willow flycatcher: No indirect effects are expected because no grazing is proposed at the emphasis sites.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2 because there is no destination zones designated in the AU because it is in the non-wilderness portion of the analysis area.

Indirect Effects

Indirect effects are the same as Alternative 2 because there is no destination zones designated in the AU because it is in the non-wilderness portion of the analysis area.

WEST HUNTINGTON (HNW)

Affected Environment

There are bald eagle sightings and a nest adjacent to the AU. There are incidental marten and goshawk sightings within it.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Bald eagle: There is potential for noise disturbance to bald eagles from day rides along Huntington Lake trail. At the same time, there are other activities in the area due to Huntington Lake such as sailboats, day use in a number of the campgrounds and snowmobiling in the winter.

Northern goshawk: There are incidental sightings of goshawks. The area has not been surveyed to protocol; however, the direct effects would be minimal because the pack stock is moving through this area not stopping to camp.

Marten: Some of the marten sightings are incidental while others were found with camera stations following a protocol. The marten may be disturbed by the pack stock moving through the area; however, similar to goshawks they would return to the area**.** Also, marten may avoid areas around trails; however, the species can range over large areas to find suitable foraging habitat and rest sites.

Indirect Effects

Bald eagle: There would not be a direct effect to the prey base for the eagles because the pack stock do not utilize the lake. The eagle usually is foraging while perched in a dominant tree then flies down to capture fish.

Northern goshawk: There are incidental sightings of goshawks. The area has not been surveyed to protocol; however, the direct effects to prey would be minimal because the pack stock is moving through this area not stopping to camp.

Marten: Trails create small habitat fragmentation corridors that also provide access pathways where human disturbance encounters may occur, along with insignificant habitat reductions for the species and its prey.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2 because this analysis unit is in the non-wilderness and does not have destination zones.

Indirect Effects

Indirect effects are the same as Alternative 2 because this analysis unit is in the non-wilderness and does not have destination zones.

COYOTE (COO)

Affected Environment

There are incidental sightings of marten in the COO AU. There are two meadows (516M312 and Lakecamp Meadow) identified as emphasis habitat for the WIFL. Neither meadow is being proposed for pack stock use. The Dinkey Lakes Trail Plan includes this analysis unit.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Marten: There are incidental marten sightings. The marten may be disturbed by the pack stock moving through the area; however, they would return to the area**.** Also, marten may avoid areas around trails; however, the species can range over large areas to find suitable foraging habitat and rest sites.

Willow flycatcher: There are two meadows identified as emphasis habitat for the willow flycatcher. Neither meadow is recommended for grazing, therefore, no direct effects are expected to occur.

Indirect Effects
Marten: Trails create small habitat fragmentation corridors that also provide access pathways where human disturbance encounters may occur, along with insignificant habitat reductions for the species and its prey.

Willow flycatcher: There are two meadows identified as emphasis habitat for the willow flycatcher. Neither meadow is recommended for grazing, therefore, no indirect effects are expected to occur.

Alternative 3
Direct Effects
Marten: Direct effects may be less under this alternative because the pack stock is managed within a particular identified area.

Willow flycatcher: No direct effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing. If the meadows were requested for grazing at a later time, then surveys would need to be conducted as part of the request and analysis.

Indirect Effects
Marten: Indirect effects may be less under this alternative because the pack stock is managed within a particular identified area. The habitat and prey base for the marten may not be disturbed because a specific area is identified for stock camps in Chapter 2, Section 2.2.

Willow flycatcher: No indirect effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing.

DINKEY LAKES (DIL)

Affected Environment
There are incidental sightings of marten in the DIL AU. There are four meadows that are identified as emphasis habitat for the WIFL (516M137, Dinkey Lake - 516M130, Mystery Lake – 516M126, and 516M121). The Dinkey Lakes Trail Plan includes this analysis unit.

Environmental Consequences

Alternative 1
Direct Effects
Same as listed above for common to all analysis units.

Indirect Effects
One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Marten: There are incidental marten sightings. The marten may be disturbed by the pack stock moving through the area; however, they would return to the area**.** Also, marten may avoid areas around trails; however, the species can range over large areas to find suitable foraging habitat and rest sites.

Willow flycatcher: There are four meadows that are identified as emphasis habitat within this AU. None have been requested for grazing, therefore, no direct effects are expected to occur.

Indirect Effects

Marten: Trails create small habitat fragmentation corridors that also provide access pathways where human disturbance encounters may occur, along with insignificant habitat reductions for the species and its prey.

Willow flycatcher: There are four meadows that are identified as emphasis habitat within this AU. None have been requested for grazing, therefore, no indirect effects are expected to occur.

Alternative 3

Direct Effects

Marten: Direct effects may be less under this alternative because the pack stock is managed within a particular identified area. The marten may not be disturbed because the areas that are identified as stock camps in Chapter 2, Section 2.2 are low quality habitat.

Willow flycatcher: No direct effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing. If the meadows were requested for grazing at a later time, then surveys would need to be conducted as part of the request and analysis.

Indirect Effects

Marten: Indirect effects may be less under this alternative because the pack stock is managed within a particular identified area. The habitat and prey base for the marten may not be disturbed because a specific area is identified for stock camps in Chapter 2, Section 2.2 is low quality habitat and less likely to be used than other areas within the Dinkey Lakes wilderness.

Willow flycatcher: No indirect effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing.

HELMS (HEL)

Affected Environment

There is an incidental sighting of marten and one goshawk territory SieGH2 (Dogtooth Peak) within the HEL AU. There are two meadows that are identified as emphasis habitat for the WIFL (516M177 and 521M360). Neither meadow is proposed for pack stock use. Deer population center #26, Helms Meadow is within this AU. The Dinkey Lakes Trail Plan includes this analysis unit.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Northern goshawk: There are trails through the west portion of the AU. The rest of the unit does not show trails according to the GIS layers. The territory is in the general vicinity of the trails. The territory is defined by habitat not a current nesting bird. If a bird is nesting there may be noise disturbance to the bird from horses and riders.

Marten: There may be noise disturbance to marten if they are in the area. They may leave the area for a short time and then return later because the horse and riders are moving through the area not camping.

Willow flycatcher: there are two meadows that are identified as emphasis habitat for the willow flycatcher. No meadows have been requested for grazing in this analysis unit; therefore, no direct effects are expected to occur.

California Mule Deer: The actions proposed under Alternative 2 of this analysis will not have measurable impacts to mule deer viability or habitat. Individual deer may be disturbed by horses and riders sufficiently to leave the immediate area. This level of disturbance (intensity and duration) is likely to be less than that caused by humans on foot. The level of grazing by horses and pack stock in meadows will not be sufficient to result in a measurable decrease of forage or browse for mule deer.

Indirect Effects

Northern goshawk: There will be minimal indirect effects to the goshawk habitat or prey base from horses and riders because they are moving through the area and not stopping for long periods of time. There may be some noise disturbance due to horses and riders however it will be of short duration.

Marten: There will be minimal indirect effects to marten habitat or their prey base because it is of short duration that the horses and riders are moving through the area.

Willow flycatcher: Indirect effects are not expected to occur because grazing was not requested in the meadows listed above that are emphasis habitat.

California mule deer: The level of grazing by horses and pack stock in meadows will not be sufficient to result in a measurable decrease of forage or browse for mule deer.

Alternative 3

Direct Effects

Northern goshawk: Goshawks may utilize the area; however, if they are, it would be short term noise disturbance to the species because there are no destinations identified in this analysis unit. The horses and riders would be moving through the area and spending the night in one location.

Marten: Direct effects may be less under this alternative because the pack stock is managed within a particular identified area. The marten may not be disturbed because the areas that are identified as stock camps in Chapter 2, Section 2.2 are low quality habitat and not within this analysis unit.

Willow flycatcher: No direct effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing. If the meadows were requested for grazing at a later time, then surveys would need to be conducted as part of the request and analysis.

California mule deer: As the horses and riders move through the area there may be deer that leave the area for a short time but would return once the horses have moved through the analysis unit. It would be short term noise disturbance because there are no destination zones identified for this analysis unit.

Indirect Effects

Northern goshawk: No indirect effects are expected to occur to goshawk habitat and their prey base because there are no stock camps proposed in this analysis unit.

Marten: Indirect effects may be less under this alternative because the pack stock is managed within a particular identified area. The habitat and prey base for the marten may not be disturbed because a specific area is identified for stock camps in Chapter 2, Section 2.2. Some of the stock camps are considered to be low quality habitat and less likely to be used then other areas within the Dinkey Lakes Wilderness.

Willow flycatcher: No indirect effects would be expected because the meadows that are identified as emphasis habitat are not authorized for grazing.

California mule deer: The level of grazing by horses and pack stock in meadows will not be sufficient to result in a measurable decrease of forage or browse for mule deer.

NELSON (NEL)

Affected Environment

There is one goshawk territory SieGH3 (Dinkey Lakes) within the NEL AU. There are two meadows defined as emphasis habitat for the WIFL (521M303 and 521M308). Neither meadow is proposed for pack stock use. The Dinkey Lakes Trail Plan includes this analysis unit.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed above for common to all analysis units.

Indirect Effects

One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects

Northern goshawk: There are trails through the AU. The territory is in the general vicinity of the trails. The territory is defined by habitat not a current nesting bird. If a bird is nesting there may be noise disturbance to the bird from horses and riders.

Willow flycatcher: There are two meadows defined as emphasis habitat for the willow flycatcher; however, none are proposed for grazing; therefore, no direct effects are expected to occur.

Indirect Effects

Northern goshawk: There would be minimal indirect effects to goshawk habitat or prey base because the horses and riders are not stopping in an area for a long period of time. The prey base may fly higher into the tree canopy but return to the ground once riders have moved through the area.

Willow flycatcher: There are two meadows defined as emphasis habitat for the willow flycatcher; however, none are proposed for grazing; therefore, no indirect effects are expected to occur.

Alternative 3

Direct Effects

Northern goshawk: Goshawks may utilize the area; however, if they are, there would be short term noise disturbance to the species because the pack stock would be moving toward one of destination zones identified in this analysis unit. The horses and riders would be moving through the area and spending the night in one location.

Willow flycatcher: There are two meadows defined as emphasis habitat for the willow flycatcher; however, none are proposed for grazing; therefore, no direct effects are expected to occur

Indirect Effects
Indirect effects are the same as Alternative 2**.**

DINKEY FRONT COUNTRY (DFC)

Affected Environment

There is one California Spotted Owl Protected Activity Center (PAC) (FR039) and three Home Range Core Areas (HRCAs) (FR027; FR039; FR162) within the AU. There are fisher sightings within the AU. There is one goshawk PAC (SieGH6 – Mary-Y-Mac) within the AU. There are two meadows identified as emphasis habitat for the WIFL (Glen Meadow and Forked Meadow).

Environmental Consequences

Alternative 1

Direct Effects
Same as listed above for common to all analysis units.

Indirect Effects
One potential indirect effect is a reduction in the level of trail maintenance performed on the trails currently used by the pack station. Some waterbar maintenance, trail maintenance on use trails would cease.

Alternative 2

Direct Effects
Northern Goshawk: There are nesting goshawks within the AU; however, the pack station activities are not within the vicinity of the nest. There would be minimal direct effects, if any, from the pack stock due to the distance between activities and nesting birds.

California spotted owl: There are nesting owls within the AU; however, there would be minimal effects to the birds because the owls have been in the vicinity for at least 10 years and the pack station activities have been ongoing for at least 20 years. The birds have reproduced successfully.

Fisher: Fishers are in the area. Den sites have not been identified because they are difficult to find even with radio telemetry. There would be direct effects to the animals because they may leave the area due to noise disturbance but would return because the day rides are short term and are approximately one to two hours not stopping at any one location.

Willow flycatcher: There are two meadows that are identified as willow flycatcher habitat. One of the meadows is requested for grazing and will have surveys conducted to

protocol, prior to being used. See the monitoring plan in the Record of Decision for timeframe and details. If willow flycatchers are found, the pasture would have to have an alternate start date of late August. The last three years it was surveyed, no willow flycatchers were found.

Indirect Effects

Northern Goshawk: There may be noise disturbance to the prey base, which is mostly birds, for the goshawk. Similar to the goshawk they may leave the area but would return after the pack stock have gone by. If they are near the ground they may fly further up in the canopy of the trees and return once the horses have gone by.

California spotted owl: No indirect effects are expected to occur because the prey base is primarily nocturnal and the packers are not moving through the area at that time.

Fisher: Similar to habitat for marten, trails create small habitat fragmentation corridors that also provide access pathways where human disturbance encounters may occur, along with insignificant habitat reductions for the species and its prey.

Willow flycatchers: There may be an indirect effect if the willow component within Glen Meadow is damaged and willow flycatchers are occupying the area.

Alternative 3

Direct Effects

Direct effects are the same as Alternative 2 because there are no destination zones within the analysis unit because it is non wilderness.

Indirect Effects

Indirect effects are the same as Alternative 2 because there are no destination zones within the analysis unit because it is non wilderness.

TULE MEADOW (TUL)

Affected Environment

There are no incidental wildlife sightings in the area at this time.

Environmental Consequences

Alternative 1

Direct Effects

No direct effects are expected to occur because the pack station is not habitat for any species. An incidental sighting may occur; however, the area is not habitat.

Indirect Effects

No indirect effects are expected to occur because no species are expected and the area is not habitat for any of the species.

Alternatives 2 and 3

Direct Effects

No direct effects are expected to occur because there are no sightings in the area. The area is habitat for some species but there are minimal sized trees for birds to nest in that are currently listed as Forest Service sensitive species. It is adjacent to an area that is occupied willow flycatcher habitat, Long Meadow.

Indirect Effects

No indirect effects are expected to occur because the area has minimal suitable habitat.

WISHON (WIS)

Affected Environment

There are no incidental wildlife sightings in the analysis unit at this time.

Environmental Consequences

Alternative 1

Direct Effects

Same as listed for TUL AU.

Indirect Effects

Indirect Effects:

Same as listed for TUL AU.

Alternatives 2 and 3

Direct Effects

No direct effects are expected to occur because there are no sightings in the area. The area is habitat for some species but there are minimal sized trees for birds to nest in that are currently listed as Forest Service sensitive species.

Indirect Effects:

No indirect effects are expected to occur because there is minimal suitable habitat within the analysis unit at this time.

ANSEL ADAMS/JOHN MUIR (AA/JM)

Affected Environment

A comprehensive discussion of the wildlife resource for the Ansel Adam/John Muir AU can be found in the 2005 Pack Stock Management EIS on page III-134. This Final EIS incorporates that information by reference.

Environmental Consequences

Threatened and Endangered Species*:* Implementation would not affect the bald eagle and Paiute cutthroat trout or their habitat found within the AA/JM AU. Implementation of

Alternatives 2 and 3 may affect but would not adversely affect the Sierra Nevada bighorn sheep.

Forest Service Region 5 Sensitive Species: Implementation of Alternatives 2 and 3 may affect individuals of the following species but would not contribute to a trend toward federal listing of any of these species, or lead to a loss of their viability in the AA/JM AU: Yosemite toad, mountain yellow-legged frog, willow flycatcher, great gray owl, American marten, Pacific fisher, California wolverine, Sierra Nevada red fox, California spotted owl, Townsends big-eared bat, and the pallid bat.

Management Indictor Species or Species Group*:* Implementation of any Alternative would not result in the downward trend of any other MIS (i.e. not on the federal threatened, endangered or proposed species list or Forest Service Region 5 sensitive species list) found within the AA/JM AU.

No other federally listed threatened, endangered, proposed, or Forest Service Region 5 sensitive species or their habitat would be affected.

Alternatives 2 manages for an increased level of protection for Yosemite toad meadow breeding habitats since grazing would be managed to avoid Yosemite toad occupied breeding habitats. Fifty two meadows approved for commercial packer stock grazing overlap with Yosemite toad breeding areas. One hundred ninety seven occupied Yosemite toad breeding meadows outside of grazing zones would be fully protected since grazing would be prohibited. Suitable/unsuitable determinations would be implemented immediately.

The direction allows for some level of control of potential dispersed impacts to MIS mule deer, yellow warbler, and meadow and meadow edge bird species and their habitats since it designates overnight stock holding camps, implements destination quotas that would limit destination impacts such as access and social trails, grazing impacts. All meadows outside of grazing zones are closed to commercial pack stock grazing. One hundred forty three meadows analyzed are likely to have some level of commercial pack stock grazing use where MIS habitat impacts are most likely to occur. A subset of 110 meadows would be closed to grazing as a result of unsuitable for grazing determinations. Thirty four meadows with hydrologic functioning problems that are impacting MIS wildlife habitat conditions would continue to be open for grazing where grazing has the potential to exacerbate the problems, or slow restoration rates.

Thirteen meadows identified as suitable unoccupied willow flycatcher habitat would be approved for grazing. Habitat structural characteristics could be impacted if meadows are grazed to maximum allowable use levels.

Mountain yellow-legged frog stream habitat could be potentially impacted at one meadow approved for commercial pack stock grazing.

There would be some potential for a reduced level of human disturbance to MIS wildlife species and habitats on 73 miles of system trail not suitable for commercial stock, and 80 miles on 82 use trails where commercial pack stock would be prohibited. There may be some localized minor level of riparian habitat improvement on these trails, if impacted sections narrow in width such as where trails course through meadows, and at stream and spring crossing areas.

Other user groups would likely continue to use campsites, trails, and destinations and possibly hinder rehabilitation of impacted areas of habitat, as well as maintain some level of human disturbance impacts to wildlife species in these areas.

A comprehensive discussion of the environmental consequences to the wildlife resource for the AA/JM AU can be found in the 2005 Pack Stock Management EIS on pages IV-452, 429, 431, 441, 450, 457, 461, 464, 467, 481, 487, 495, 498, 499, 501, 504, 505, and 509. This Final EIS incorporates that information by reference.

3.3.3 Vegetation and Botanical Resources

3.3.3.1 Background

This section provides an overview of the vegetation found within the project area, and then describes the affected environment and environmental consequences for three analysis elements: rare plants; fen habitats; and invasive non-native plants. The vegetation of the Ansel Adams/John Muir (AA/JM) wildernesses was described and analyzed in Chapter 3 of the 2005 Trail and Commercial Pack Stock EIS (pp. III-161 to III-199), and that information is incorporated into this section by reference.

General description of the vegetation: The fifteen analysis units outside of AA/JM wildernesses lie on the west slope of the central Sierra Nevada, and range in elevation from about 4,000 to about 10,500 feet. The project area falls within the Sierra Nevada Ecological Section (M261E) in the USDA Forest Service National Hierarchical Framework of Ecological Units (Miles and Goudey, 1997). Vegetation varies from ponderosa pine and mixed conifer forest with montane chaparral at lower elevations, to red fir/lodgepole pine forests, to subalpine forests and treeless alpine vegetation at the highest elevations. Massive areas of rock outcrops occur throughout all of these vegetation types, as well as shrublands dominated by various species of oak, manzanita, and *Ceanothus*.

Riparian vegetation is found along streams and in meadows, springs, and seeps. Riparian vegetation along streams varies considerably within the project area, ranging from clearly defined bands of riparian forest dominated by white alder (*Alnus* rhombifolia), willow (*Salix* spp)., and Oregon ash (*Fraxinus latifolia*) to simply a strip of herbaceous riparian plants with upland forest trees growing next to the stream. Please refer to Tables 3.37 and 3.38 in the aquatic species section for quantification of streams and meadows within each analysis unit, and to the watershed section for a description of geomorphology, soils, and hydrology. Meadows are defined as openings in forests which generally have high water tables and are dominated by herbaceous vegetation that is adapted to wet conditions. Meadows are typically heterogeneous, containing patches of different plant assemblages in response to variations in moisture, drainage, elevation, etc. Overall, meadows can be classified as dry, moist, or wet; and montane, supalpine, or alpine (Ratliff, 1982). Some meadows contain areas of peat soils called fens. Fens are areas of perennial saturation where peat soils form because accumulation of organic matter exceeds decomposition (Cooper and Wolf, 2005). Fens are of significance because of their contribution to hydrologic function in meadows and because they provide habitat for several rare plant species.

Native vegetation in the central Sierra is remarkably diverse, reflecting the variety of growing conditions resulting from differences in moisture, temperature, soils, sunlight, aspect, and disturbance regimes such as fire, floods, and human activities (Botti, 2001). Sierran native vegetation is also relatively intact, with few non-native species at the higher elevations. Non-native plants make up a smaller proportion of all species in each major vegetation zone as elevation increases. For example, Botti (2001) wrote that 23

percent of plant species were non-native in the lower elevation chaparral/oak woodland zone of Yosemite National Park, 13 percent of species in the mixed conifer zone were non-native, 5 percent of species in the montane zone were non-native, and only 0.5 percent were non-native in the subalpine zone. The alpine zone had no non-native species. This pattern is true for adjacent lands in the Sierra National Forest as well. Extensive surveys for this project from 2003 through 2006 revealed no non-native species in the subalpine and alpine zones. The focus of this analysis will be on rare plants, fens, and invasive non-native weeds, as these elements of the vegetation determined to be most likely to respond to the different management scenarios presented in the three alternatives.

Rare Plants: Rare plants are defined as species that are either Forest Service Sensitive or on a watch list maintained by the Forest Service. Sensitive species are those species that have been specifically designated by the Regional Forester as needing special management in order to prevent them from losing long-term viability or becoming endangered or threatened. Watch list species are generally restricted in distribution or locally uncommon, representing an important component of biodiversity, and are managed through the NEPA process under the biodiversity requirements of the National Forest Management Act. Watch list species typically have more individuals, more occurrences, fewer threats, and/or a wider overall distribution than most sensitive species.

The Region 5 Sensitive Plant List was revised in 2006, and the new list took effect on October 1, 2006, after the field work was completed for this project. Methodology for revising the list included evaluating plant species with Global Rarity rankings between 1 and 3, as well as State-listed species and newly described species, and coordinating among National Forests as to whether Forest Service Sensitive status would be warranted. For each species added to the Sensitive Plant List, an evaluation form was completed; these are on file at the Bass Lake Ranger District office. The Sierra NF Sensitive Plant List increased by 13 species, while one species was removed (please see the BA/BE for more information). Because the list revision process began in 2003, most of the new sensitive species were searched for during field surveys, but some were brought up later in the revision process, and in this case the effects analysis for this project is based on suitable habitat present and the likelihood of that species being present in affected areas. Table 3.53 lists the rare plants with potential to occur in the project area.

Fens:

Fens, also called peatlands, are perennially saturated areas, usually within meadows, dominated by mosses and herbaceous wetland vegetation. Fens are important because of their function in meadow water storage, and their role in maintaining water quality and hydrologic integrity in meadows. In addition, several sensitive plant species are found primarily in fen habitats. Fens are defined by having at least 40 cm of organic soil that has formed in place and where peat-forming vegetation (generally certain species of sedges and mosses) occurs and is entirely rooted within the peat body (Cooper and Wolf, 2005). In the Sierra Nevada, the type of peatland is termed a fen rather than a bog, because the primary source of water is groundwater, although precipitation contributes water as well (Cooper and Wolf, 2005). Inventories of Sierra Nevada fens began in 2003,

and are ongoing. The extent to which livestock grazing and trampling affect fens has been investigated in a preliminary study by Cooper et. al. (2005), and will continue to be studied in an attempt to determine the amount of such use fen ecosystems can sustain.

Noxious weeds and invasive non-native plants: Invasive non-native plants (weeds) are species which, if allowed to spread, cause ecological and economic damage. In this background discussion, a discussion of what is meant by invasive weeds and why they are a concern is followed by a summary of management direction and a description of the cooperative weed management that is ongoing and relevant to the pack station permits.

Invasive weeds may be officially listed as "noxious" at the federal or state level. The California Invasive Plant Council (Cal-IPC, 2006) assigns ratings of high, moderate, or limited ecological impact based on ecosystem impacts, potential for invasiveness, and ecological distribution.

Ecosystem health is threatened by the spread of invasive non-native weeds in a variety of ways. Dense infestations can reduce native biodiversity, compete with threatened, endangered and sensitive (TES) plant species, reduce wildlife habitat quality and quantity, modify vegetative structure and species composition, change fire and nutrient cycles, hybridize with native species, and degrade soil structure (Bossard et al., 2000).

Trails often act as conduits for movement of vegetation, including weeds (Benninger-Truax et al., 1992), and trail and road users, including pack stock, hikers, OHVs, and maintenance personnel or vehicles, can spread weed seeds and other propagative parts.

In the Sierra Nevada Forest Plan Amendment (USDA 2001, 2004) standards and guidelines were adopted to manage invasive weeds using an integrated weed management approach with the goals of preventing the introduction of new invaders, conducting early treatment of new infestations, and containing and controlling established infestations. These standards and guidelines include assuring weed prevention measures are included when reissuing or amending pack stock operator permits, completing noxious weed inventories of the national forests; and controlling, eradicating, and monitoring known weed infestations. In addition, there is direction to encourage use of certified weed free hay and straw and to phase in a requirement to use certified weed free hay and straw as these products become available.

The effort to develop a certification process for weed-free hay and straw is being conducted at the regional/state level, and a draft Memorandum of Understanding is nearly complete (Clines, 2005). One of the first actions would be to conduct a NEPA analysis for "closure orders", phasing in a requirement that only weed-free feed products be used on National Forest System lands in California. In compliance with the intent of the MOU to bring about the "closures" simultaneously across California, certified weed free forage would probably not be required at the pack stations until the program is in place state-wide. The reason for this is that certified weed free hay and straw are currently difficult to obtain, and can be cost-prohibitive, and weed-free products are expected to be much

more readily available once a formal requirement for their use is in place for all Forest Service, Bureau of Land Management, and National Park Service lands in California. In other words, once hay producers and vendors are confident that an adequate market exists, they will have incentive to get their fields certified, and market their certified weed-free products widely.

A coordinated program for inventorying, controlling and preventing the spread of noxious weeds and invasive non-native plants has been ongoing in the Sierra NF since 1998. The Sierra NF is a founding member of the Sierra-San Joaquin Noxious Weed Alliance (a Weed Management Area (WMA) for Mariposa, Madera, and Fresno counties). The WMA brings together landowners and managers (private, city, county, state, federal) for the purpose of controlling invasive weed species in a cooperative manner. Several pack station permittees are also Sierra NF cattle grazing permittees and are active partners in the weed management efforts of the WMA. As part of the WMA framework, pack stations are being checked for noxious weeds by Fresno and Mariposa County Agricultural Biologists, in addition to the surveys done for this project, because of concern for weeds arriving via contaminated hay. Weeds on the California Noxious Weed list with ratings of "A" or "B" are of highest priority for state and county weed managers (CDFA, 2006). New infestations of State A and B rated weeds are controlled promptly by county or California State Department of Food and Agriculture biologists or by Forest Service employees in cooperation with counties.

Weedy species are most likely to invade areas of disturbed soil, but some are also able to invade intact ecosystems under the right circumstances (Gurvich et al., 2005). Areas that have been disturbed by humans or domestic animals are more susceptible to invasion by weeds (Bossard et al., 2000). Landsberg et al. (2001) cite several studies that showed horse travel on trails caused more impacts than other recreational users (hikers, motorcycles), but that the amount of impact depended on the environment, with the most impact occurring in moist or steep places. Weeds establish most readily at the edge of trails (Campbell and Gibson, 2001), and weed seeds in manure deposited in disturbed damp sites would be most likely to germinate (Landsberg et al., 2001). The pack stations are areas where the ground is mostly bare and compacted due to human, vehicle, and pack stock traffic and weeds tend to occur at the edge of the bare compacted area, just as on trails. Trampling can disturb soil of pastures or meadows where grazing occurs, but because pastures confine the pack stock when grazing, the soil disturbance is more concentrated than in meadows with open grazing. Campsites and the associated stock holding areas usually have areas of bare ground, either compacted or with surface soil disturbance.

Weeds can be spread via commercial pack stock by the animals themselves (hair, hooves, dung), as well as by wranglers and clients, feed and straw, and vehicles and other equipment. Weed seeds have been shown to be present in horse dung and have been documented to germinate from it (Campbell and Gibson, 2001). The species and number of weed seeds found in horse dung depend on the weeds present in pastures or in dried stock feeds. A not-yet-completed study of manure and weeds by the National Park Service and Dominican University of California was reported in the LA Times (2005), with the implication that because no state or federally-listed noxious weeds were present

in the horse manure, horses and mules do not spread noxious weeds. However, the samples were from a small number of San Francisco Bay Area pastures, and they did find many non-native species that are considered wildland weeds. Several examples of noxious weeds documented in contaminated hay or straw are offered by Clines (2005). Feed pellets are processed in such a way that any weed seeds are killed, but other forms of feed used in the wilderness (cubes, hay) may still have live weed seeds. All of this supports the need to move towards requiring certified weed free hay in the future, however, it is not yet widely available enough to require for all permittees.

The stock used at the pack stations over-winters in off-Forest pastures at lower elevations in the Sierra Nevada, the San Joaquin Valley, or elsewhere; where weeds are usually more common. The stock travel between these over-wintering sites and the pack stations by stock drives or trucks on paved, gravel, or unimproved roads, many with populations of non-natives along the roadside. The possibility exists that weeds may be moved into the national forest during these activities.

3.3.3.2 Methodology

Field assessments for rare plants, fens, and invasive non-native weeds: From 2003 through 2006, botanical field surveys were conducted at the pack stations and facilities, along most day ride trails and stock drive routes, and within meadows associated with pack stations. In addition, meadows, campsites and trails requested for use by the permittees were evaluated in the Kaiser and Dinkey Lakes wildernesses and Merced Wild and Scenic River. The surveys were generally conducted during interdisciplinary team visits to project areas, and the botanists participated in filling out the trail assessment forms, meadow and grazing forms, and some campsite inventory forms (all can be found in the project record). Specific aspects of methodology related to the three analysis elements follows.

Analysis Elements

Rare plants: Surveys were conducted in accordance with direction in the Forest Service Botanical Program Handbook (FSH 2609.25, Chapter 10 - Sensitive Plant Program Management). Surveys were floristic in nature (to the extent time allowed, all plant species observed were identified and recorded), but the focus was on searching for rare plants, invasive non-native weeds, and fen habitats in areas used by pack station and resort permittees. Surveys were conducted by or under the direction of professional, journey-level, Forest Service botanists. Detailed records of the botanical surveys along with maps showing areas surveyed and plants lists for each site can be found in the project record for this EIS. Also, further details about Forest Service sensitive plants may be found in the Biological Evaluation for Sensitive Plants (Clines, 2006a), and the Noxious Weed Risk Assessment (Clines, 2006b), located in the project file for this EIS on the High Sierra Ranger District, and is available upon request as required by 40 CFR 1502.21. Findings of the field surveys for rare plants, fens and invasive weeds are tabulated below in Table 3.52.

Fens: The methodology for fen surveys is based on a protocol devised in Region 5 in 2005, with the assistance of Dr. David Cooper of Colorado State University. The full protocol (available in the project file) involves detailed mapping of the extent of each

patch (or "stand") within a given meadow that qualifies as a peatland by having at least 40 cm of peat. Data are taken on depth of peat, soil saturation, dominant plant species, slope, aspect, elevation, and types of disturbance, if present. A soil pit is dug for each stand in order to describe the soil profile. A 2 meter long steel probe is lowered vertically into the soil profile in order to get a preliminary idea of the depth of peat, if present. The surveyor can feel the texture of the soil change from soft and spongy (organic peat soil) to more gritty or sandy (mineral soil that is not peat). This probing technique can be used to rapidly map out the boundaries of the fen by determining the extent of peat soils. The stands are then mapped onto aerial photographs and digitized in GIS, maintained in GIS files at the Bass Lake Ranger District. In 2005 and 2006, the Sierra NF began a fen inventory using the full protocol.

Field surveys for this project generally did not use the full protocol, as it is time-consuming and the need was simply to determine fen presence/absence, and to obtain a general idea of whether pack stock impacts were occurring. In most cases, the steel probe was used. Glen Meadow fen has been studied by Cooper et al. (2005) during a study of the impacts of stock use on fens in the Sierra Nevada, and carbon flux measurements were made to determine whether the fen was functional, or losing peat and becoming degraded. For Dutchman Lake fen, Quartz Meadow Complex fen, and Soquel Meadow fen the probe technique was used to confirm that these areas are peatlands. Miner Camp Meadow and Nellie Lake Meadow were deemed fens based on topography, plant species present, and the appearance of peat buildup, but they were not probed.

Noxious weeds and invasive non-native plants: All non-native plants encountered during field assessments were documented, with a special focus on detecting noxious weeds listed by the State of California (CDFA, 2006) and invasive non-native plants listed the California Invasive Plant Council (Cal-IPC, 2006). Also, see Noxious Weed Risk Assessment (Clines, 2006b).

3.3.3.3 Overview – Common to All

Affected Environment

Table 3.52 shows the results of the field assessments as well as previously known information for rare plants, fens, and invasive non-native plants for all 15 analysis units. Following this summary table is a more detailed description of the affected environment for each analysis element (rare plants, fens, and weeds), which sets the stage for the effects analysis.

Table 3.52 Summary of Findings from Botanical Field Surveys by Analysis Unit.

Analysis Unit Name	Elev Range (ft)	Rare Plants	Fens	Noxious Weeds and Invasive Non-native Plants
Chinquapin	6,600 to 8,900	Mono Hot Springs evening primrose	None found near areas used by pack station	Some bull thistle noted

Analysis Unit Name	Elev Range (ft)	Rare Plants	Fens	Noxious Weeds and Invasive Non-native Plants
Clover	5,900 to 9,300	Bolander's clover, Kettle-Dome buckwheat	None found near areas used by pack station	Some bull thistle noted along trails
Coyote	8,300 to 10,000	Short-leafed hulsea in AU, but not near pack stock activities	None found near areas used by pack station	Scattered bull thistle
Dinkey Front Country	5,500 to 6,600	*Meesia triquetra* (moss) in fen	Northen finger of Glen Meadow is a fen	Cheatgrass and bull thistle near old sawmill, lens-podded hoary cress near pack station
Dinkey Lakes	8,900 to 10,500	None found	At least 3 meadows have fens	None found
East Huntington	7,000 to 10,200	Known populations of subalpine fireweed and short-leafed hulsea in AU	None found near pack station areas	Scattered bull thistle
Edison	7,000 to 8,300	Mono Hot Springs evening primrose known to occur in AU	None found	Scattered bull thistle
Florence	7,100 to 7,900	Mono Hot Springs evening primrose in AU	None found	Cheatgrass present in general area
Helms	8,200 to 10,100	None found	None found	None found
Kaiser	7,000 to 10,200	Short leafed hulsea near trail 25E41, subalpine fireweed in AU	Several documented in 2006, no pack stock impacts observed.	Bull thistle in general area
Nelder	4,100 to 9,100	*Meesia triquetra,* veined water lichen, mountain lady's slipper, Rawson's flaming trumpet, and short-leafed hulsea present in AU.	Fens present in 3 meadows	Bull thistle, Spanish broom, and common mullein present in AU.
Nelson	8,200 to 10,500	None found.	None found.	None found.
Tule Meadow	7,000 to 7,060	Bolander's clover present nearby, but not in AU	None found	None found.
West Huntington	7,000 to 8,100	Known populations of subalpine fireweed.	None found	Bull thistle, common mullein, foxglove, and everlasting pea present.
Wishon	6,880 to 7,000	None Found	None found	None found

Rare Plants:

There are 26 species of rare plants and 2 species of watch list plants known or with potential to occur in the 15 analysis units; although only ten species were found within areas used by pack station permittees. There are no federally listed threatened or endangered plant species with potential to occur in the analysis area, however one of the species, slender moonwort, is a candidate species (US Fish and Wildlife Service, 2005) in a "warranted but precluded from listing" status.

No severe impacts were observed to rare plant populations during the field assessments. Most species found during the surveys are restricted to riparian habitats of various types. Because effects differ depending on habitat type, rare plants will be analyzed by general habitat type (rock outcrop, upland, or riparian) within the analysis units, in addition to disclosures of effects on specific rare plant populations that were documented to occur in areas affected by pack station activities. The species and their habitat types are listed in Table 3.53. Each of these habitat types can generally be described by physical characteristics and vegetation, but they are patchy on the ground, blending into one another, and four of the species considered occur in more than one habitat type. The habitat types are described below:

Rock outcrop habitats are unweathered or barely weathered bedrock, with plant habitat limited to rock crevices and pockets of gravelly soil between rocks. In some cases the outcrops are in openings in forest or shrub vegetation that do not appear rocky, but are characterized by very shallow, barely weathered rock (SNFPA EIS, USDA, 2001). Outcrops are common throughout the project area. There are 10 species of rare plants of rock outcrop habitats (2 also occur in upland and 2 in riparian) considered in this analysis.

Upland habitats are defined partly by what they are not; they are non-riparian, non-rocky habitats. Generally they are coniferous forests with oaks present in patches of varying density. All of these vegetation types also have inclusions of rocky or riparian habitat, so there is not a one-to-one correspondence between vegetation type and rare plant habitat type. There are 6 species of rare plants of upland habitats (2 also occur in rock outcrops and one also in riparian) considered in this analysis.

Riparian habitats are associated with streams, lakes, or other "special aquatic features" as defined in the SNFPA EIS, (USDA, 2004), including meadows, fens, wetlands, and seasonally wet ponds or lakes. Vegetation types present include wet and dry meadows, willow, aspen, and some conifer forest (especially lodgepole pine). There are 18 species of rare plants of riparian habitats (2 also occur in upland, and one in rocky habitats) considered in this analysis.

The sensitive plant species are discussed in detail in the Biological Evaluation (BE), which can be found in the project record. Table 3.53 summarizes the species and some key habitat and occurrence information.

Table 3.53 Rare plants occurring in the project area or with potential habitat there.

NAME & FAMILY	FED/ STAT E	USFS SENSITIVE (S) OR WATCH LIST (WL)	ELEV. RANGE (feet)	HABITAT TYPE	OCCURRENCE IN SUP PROJECT AREA
Allium yosemitense YOSEMITE ONION Liliaceae	-/Rare	Sensitive	1500-6900	Rocky	Not found during field surveys, but occurs within 6 miles of NED AU (in Yosemite National Park).
Botrychium ascendens UPSWEPT MOONWORT Ophioglossaceae	-/-	Sensitive	5000-9000	Riparian	Not yet known to occur in the Sierra NF, potential habitat exists.

NAME & FAMILY	FED/ STATE	USFS SENSITIVE (S) OR WATCH LIST (WL)	ELEV. RANGE (feet)	HABITAT TYPE	OCCURRENCE IN SUP PROJECT AREA
Botrychium crenulatum SCALLOPED MOONWORT Ophioglossaceae	-/-	Sensitive	4875-8125	Riparian	Not yet known to occur in the Sierra NF, potential habitat exists.
Botrychium lineare SLENDER MOONWORT Ophioglossaceae	Fed. Candidate/-	Sensitive	8000-9000	Riparian, Rocky	One historical site known from the Sierra NF, in John Muir Wilderness outside SUP project area, potential habitat exists.
Botrychium lunaria COMMON MOONWORT Ophioglossaceae	-/-	Sensitive	8000-9000	Riparian	Not yet known to occur in the Sierra NF, potential habitat exists.
Botrychium minganese MINGAN MOONWORT Ophioglossaceae	-/-	Sensitive	4900-7000	Riparian	Not yet known to occur in the Sierra NF, potential habitat exists in many AUs.
Botrychium montanum MOUNTAIN MOONWORT Ophioglossaceae	-/-	Sensitive	4900-7000	Riparian	Not yet known to occur in the Sierra NF, potential habitat exists in many AUs.
Bruchia bolanderi BOLANDER'S CANDLE MOSS	-/-	Sensitive	5000-7500	Riparian	Occurs near Tule Meadow AU.
Camissonia sierrae ssp. *alticola* MONO HOT SPRINGS EVENING-PRIMROSE Onagraceae	-/-	Sensitive	4500-8500	Rocky	Occurs in CHQ, EDI, FLO AUs.
Collomia rawsoniana RAWSON'S FLAMING TRUMPET Polemoniaceae	-/-	Sensitive	2000-7000	Riparian	One population in NED AU along Nelder Creek, not near areas used by pack station.
Cypripedium montanum MOUNTAIN LADY'S-SLIPPER Orchidaceae	-/-	Sensitive	4,000-7200	Riparian, Upland	10 populations in NED, not directly in areas used by pack station.
Dicentra nevadensis TULARE COUNTY BLEEDING HEART Papaveraceae	-/-	Sensitive	7500-10000	Rocky	Only known occurrence on Sierra NF is in John Muir Widlerness near Spanish Mountain, not found in 15 other AUs.
Epilobium howellii SUBALPINE FIREWEED Onagraceae	-/-	Sensitive	5000-8800	Riparian	Occurs in KAI, HNE, HNW, NEL, HEL.
Eriogonum prattenianum var. *avium* KETTLE DOME BUCKWHEAT Onagraceae	-/-	Watch List	4500-9000	Rocky	Occurs in CLO AU.
Fissidens aphelotaxifolious BROOK POCKET-MOSS Moss	-/-	Sensitive	0-6300	Riparian	Known from only one site in the Sierra NF, outside the SUP project area, suitable habitat present.
Helodium blandowii BLANDOW'S BOG-MOSS Moss	-/-	Sensitive	6500-9000	Riparian (fen)	Not yet known to occur in the Sierra NF, potential habitat exists in many AUs.
Hydrothyria venosa VEINED WATER LICHEN	-/-	Sensitive	4,000-8,000	Riparian	Known to occur in NED,
Hulsea brevifolia SHORT-LEAVED HULSEA Asteraceae	-/-	Sensitive	5000-9000	Upland	Known to occur in NED, CLO,
Ivesia unguiculata YOSEMITE IVESIA Rosaceae		Watch List	5000 – 9000	Riparian	Known to occur in several AUs, not experiencing detrimental impacts.
Leptosiphon serrulatus MADERA LEPTOSIPHON Polemoniaceae	-/-	Sensitive	1000-4100	Upland	Not found in AUs, but a historic occurrence documented at Fish Camp, near NED AU.
Lewisia disepala YOSEMITE LEWISIA Portulacaceae	-/-	Sensitive	4000-7500	Rocky	Not found in AUs, but potential habitat is present.

NAME & FAMILY	FED/ STATE	USFS SENSITIVE (S) OR WATCH LIST (WL)	ELEV. RANGE (feet)	HABITAT TYPE	OCCURRENCE IN SUP PROJECT AREA
Lewisia kelloggii ssp. *kelloggii* KELLOG'S LEWISIA Portulacaceae	-/-	Sensitive	6000-11000	Rocky	Known from Shuteye Peak and Chiquito Ridge, outside AUs, potential habitat present.
Lupinus gracilentus SLENDER LUPINE Fabaceae	-/-	Sensitive	8000-11,500	Upland	Known to occur in Yosemite National Park, not yet found in SNF.
Lupinus lepidus var. culbertsonii HOCKETT MEADOW LUPINE Fabaceae	-/-	Sensitive	8000-10,000	Upland, Rocky, riparian	Potential to occur in NED, CLO
Meesia triquetra THREE-RANKED HUMP MOSS	-/-	Sensitive	6000-8000	Riparian (fen)	Occurs in NED, CLO, DFC, KAI.
Meesia uliginosa ONE-NERVED HUMP MOSS	-/-	Sensitive	7500-9000	Riparian (fen)	Only known SNF population is near Spanish Mountain, outside AUs, potential habitat present.
Trifolium bolanderi (TRBO) BOLANDER'S CLOVER Fabaceae	-/-	Sensitive	6500-7500	Riparian	Occurs within CLO
Viola pinetorum ssp. *grisea* (VIPIG) GREY-LEAVED VIOLET Violaceae	-/-	Sensitive	4875-11050	Rocky, upland	Only known SNF occurrence is near Mount Hooper, approx. 2 miles from FLO AU.

Fen habitats:

Four of the 15 analysis units have meadows with fens that occur in or near areas used by pack station permittees (see Table 3.52 and Table 2.21). Over all analysis units, of the 24 meadows requested for grazing use, six were found to have fens. Of these six, three were deemed to be unsuitable for grazing and would not have pack stock use (Quartz Meadow Complex, Miner Camp Meadow, and Nellie Lake Meadow). The remaining three (Soquel Meadow, Dutchman Meadow, and Glen Meadow) have fen areas with potential for pack stock trampling or with current trampling occurring.

To put the proportion of fens potentially affected by this project in perspective, it is helpful to consider the following: The Forest has been conducting fen inventories since 2003, and to date has documented nearly 100 meadows containing fen habitat out of over 200 meadows surveyed specifically for fens. Of the 100 meadows containing fens (totaling 300 acres), about 35 acres within these meadows are actually fens. This illustrates the nature of peatland occurrence within meadows: they tend to be spatially arranged in patches within the meadow rather than occupying the entire aerial extent of the meadow.

Noxious Weeds and Invasive non-native plants:

Overall, the project area is relatively free of invasive weeds, and none of the infestations discovered during field surveys have yet spread beyond control. There are no weeds on Federal Noxious Weed Lists known in the analysis area. To date, only one state-listed noxious weed has been found near Sierra NF pack stations: lens podded hoary cress (*Cardaria chalepensis*), a B-rated weed, was found in the DFC AU during surveys for this project. This section contains basic information on the biology and impacts of individual weed species found within the analysis area, and their extent in the project area

in relation to the Sierra NF at large. Because non-native species differ vastly in their degree of invasiveness and competitiveness, depending on their biology and habitat, each species warrants different levels of concern (USDA Forest Service 2001). In other words, not all weed species are equally damaging, or demand equally urgent action.

Bull thistle (*Cirsium vulgare*), although not as highly invasive as other noxious thistles, bull thistle competes with and displaces native species and decreases forage values in meadows and uplands at elevations up to 7,000 feet (Randall, 2000). Although bull thistle was noted in 10 of the 15 AUs, it does not seem more prevalent in areas used by pack stations than elsewhere in the Forest, based on field observations for a variety of projects in the Sierra NF over the past 10 years (e.g. Cedar Valley Project, Sonny Meadows Project, Recreation Residence permit reissuance project, OHV surveys, etc. – Noxious Weed Risk Assessments for these projects are available at the Bass Lake Ranger District office). Cal-IPC rates bull thistle as having moderate ecological impact, but notes that this species can be very problematic regionally, and especially in riparian areas (Cal-IPC, 2006).

Cheatgrass (*Bromus tectorum*) is found throughout California and the West but is not yet abundant at higher elevations in the Sierra NF. Cheatgrass is the most widespread invasive plant in the U.S., and is rated by the California Invasive Plant Council as having a high ecological impact in California. In certain ecosystems, especially deserts and other arid areas, cheatgrass competes with native and desirable species for soil moisture and can permanently degrade native vegetation by shortening the fire return interval (Young, 2000). However, the potential for cheatgrass to cause ecological problems varies considerably according to local conditions such as climate and disturbance regime, and Sierra National Forest botanists have not gauged this as one of the Sierra National Forest's top threats at this point.

Common mullein (*Verbascum thapsus*) is considered a Cal-IPC weed of limited impact, and generally is not considered one of the more damaging wildland weeds in the Sierra NF. However, common mullein is a biennial plant with high seed production, often over 100,000 seeds per plant. Although most seeds at or near the soil surface germinate rapidly, buried seeds can remain viable for 35 to 100 years (Pitcairn, 2000). After soil disturbance, especially fire, high densities of mullein plants can prevent natural revegetation with native species (Pitcairn, 2000). This weed was found in both NED and HNW analysis units.

Everlasting pea (*Lathyrus latifolius)* is not yet listed by Cal-IPC. It is a perennial ornamental herb that easily escapes cultivation and forms masses of dense vine-like foliage in wildland areas. This species has escaped cultivation and spread to the exclusion of all other plants in several areas around Bass Lake and Oakhurst (Madera County) in and near the Sierra National Forest; and in and near the town of Big Creek (Fresno County) near the KAI AU. This weed was documented during the field assessments to occur in HNW AU.

Foxglove (*Digitalis purpurea*) is a biennial ornamental plant that has escaped cultivation in many wildland areas. In addition to competing with native plants for moisture and nutrients, foxglove is extremely toxic (it contains the heart stimulant digitalis, a cardiac glygoside) and is lethal to animals consuming even small amounts of plant material (Harris, 2000). Cal-IPC (2006) rates this species as having limited ecological impact. In the Sierra National Forest, some streamsides have large enough quantities of foxglove that botany personnel have undertaken manual removal to protect native riparian vegetation. Another reason to remove it from wild areas is that in the event of wildfire, the smoke is toxic and injurious to people (Harris, 2000)

Himalaya blackberry (*Rubus discolor).*
Himalaya blackberry is native to Western Europe, and occurs throughout California up to at least 6,000 feet elevation (Hoshovsky, 2000). In the Sierra National Forest, this species is primarily found in wetlands and along streams, where it can form dense, impenetrable thickets that over time, exclude most other vegetation. Plants are avoided by grazing livestock because of their robust, sharp prickles, and can impede access to water by wildlife (Hoshovsky, 2000). Cal-IPC (2006) rates this vine-like shrub as having a High ecological impact across the State of California. Seeds can be spread by wildlife and water.

Lens-podded hoary cress (C*ardaria chalepensis)*. The only Sierra NF location of this serious pest is in front of the corrals at the CPO Dinkey Creek Site, in the DFC AU. This species is a B-rated noxious weed (State of California rating) that is exceptionally difficult to control, as it has an extensive underground stem system that produces new plants from stem and root fragments. Cal-IPC rates it as having a moderate ecological impact statewide, but clearly this plant can have a high ecological impact at a local scale, especially in wetland and riparian areas (Chipping and Bossard, 2000). Each stem can produce up to 5,000 small seeds, and the root system spreads vertically and laterally, rapidly occupying the soil rooting zone (Chipping and Bossard, 2000). Plants are poisonous to livestock, and negatively affect wildlife by replacing native plants. Herbicides, monthly tilling for several years, or sustained flooding are the only known ways to effectively control this weed (CDFA, 2006; Cal-IPC, 2006).

Spanish broom (*Spartium junceum*) occurs on private property near Fish Camp (NED AU), and may have spread to the national forest near the Yosemite Trails Pack Station facilities. This flammable invasive shrub is rated as having a high ecological impact by Cal-IPC (Cal-IPC, 2006). Spanish broom spreads quickly into disturbed areas, forming dense tangles of fire-prone vegetation. The foliage is poor forage for wildlife (Nilsen, 2000).

Other non-native species present in the analysis area that are not known to be very invasive or disruptive to native plant communities include knotweed (*Polygonum arenastrum*), goat's beard (*Tragopogon dubius*), and purple sandspurry (*Spergularia rubra*). Please see plant lists in the project record for a complete list of native and non-native species observed.

Ansel Adams/John Muir Wildernesses
The Pack Stock Management FEIS (2005) described the affected environment and environmental consequences for the portions of the Ansel Adams and John Muir Wildernesses that are within the project area considered in this EIS. That analysis is incorporated into this document by reference. A description of the affected environment for vegetation can be found on pages III-67-199 of the Final EIS. Very few weeds were found in these Wildernesses themselves, none of them on the Federal or State Noxious Weed lists.

Environmental Consequences

General Discussion: Effects to botanical resources are closely correlated with effects displayed in the watershed, trails, and grazing resources sections. Background information found in those sections and in the 2005 Pack Stock Management FEIS will not be repeated in this section. Important to note is that the two action alternatives contain measures intended to reduce or eliminate direct and indirect effects for botanical resources and the soils and watershed functions that they require. Because the field assessments were conducted by an interdisciplinary team, the team identified resource protection measures during the field visits or in follow-up meetings and these measures are now incorporated into both action alternatives. When necessary, the team recommended that certain areas not be used because of resource concerns (e.g. see Table 2.22). **Especially important for the conclusions in the effects section are:**

- The requirement for a noxious weed management plan for each permit, which would place a priority on preventing new infestations and on early detection of any weeds that do appear.
- The requirements for pack station permittees to control existing populations of invasive weeds as specified in Chapter 2.
- Requirements to protect and avoid fragile wet areas and fens in meadows authorized for grazing in order to protect fen function and rare plant habitat.
- Monitoring of rare plants as specified in the monitoring plan and in Chapter 2.

Alternative 1

Direct and Indirect Effects

Rare plants of ***riparian and meadow habitats*** would not be subject to trampling of soil and vegetation by commercial pack stock. Physical removal of vegetation through herbivory by pack stock would no longer occur. There would be essentially no change in conditions for meadows that have not previously received commercial pack stock use under this alternative. This alternative could reverse adverse impacts from grazing to rare plants in areas that were previously grazed by commercial stock. Areas that have been grazed by commercial stock prior to this analysis may have improved conditions. Bare ground may decrease and then species composition would move more rapidly towards high-seral (desirable) conditions, depending on the intensity and frequency of past grazing and lingering historical impacts. Rare vascular plants of riparian areas such as subalpine fireweed, Yosemite ivesia, and Bolander's clover would be less likely to be grazed and would be more likely to produce seeds and seedlings each year. Rare mosses would experience the fewest effects from trampling under this alternative. Rare plants **of**

upland habitats would be experience less trampling than under alternatives 2 and 3, as pack stock would not be traveling the trails leading to populations (short-leafed hulsea in particular), and stock camps and the associated ground disturbance would not be occurring. Rare plants of ***rocky habitats*** would be least likely under this alternative to experience inadvertent impacts from stock parties stopping to rest or traveling through these habitats, although few impacts are occurring presently to this habitat type from commercial pack stock.

Fens would likely have increased vegetative cover and more accumulation of organic matter that sustains peat formation, less exposure to aerobic conditions from stock trampling, and increased rates of organic matter accumulation. However, four of the six fens are currently experiencing cattle grazing and trampling, which would continue.

Invasive non-native weeds would have less likelihood of being introduced under this alternative, as there would be fewer vectors. Transport vehicles for commercial pack stock operations would not be traveling from the lower elevations where weeds are more prevalent to the high country, and the chance of inadvertently introducing weeds via hay would be reduced. In addition, the likelihood of pack stock accidentally spreading seeds via their hooves, fur, manure, or gear would be least under this alternative. However, there would be a lost opportunity for education of permittees, their staff, and their clients about the invasive weed issue, and there would be fewer people that might spot the first few plants of a new weed infestation in time to control it, especially in remote areas where Forest Service personnel rarely travel.

Cumulative Effects

Activities associated with commercial pack station operations would not occur, however other activities are occurring in the project area and will continue. Table 3.2 shows the activities that would continue to occur under Alternative 1.

Rare plants of all habitat types would continue to receive some trampling and removal by grazing of commercial livestock and private pack stock. Recreational activities such as OHV, dirt bike riding, mountain biking, hiking, camping, hunting, and fishing would continue to impact rare plants occasionally, not to the extent that a loss of viability or a trend toward federal listing would occur (based on field assessments of rare plant populations for this and other projects). Vegetation management activities such as fuels reduction, thinning, and commercial timber harvest would continue but projects are designed to protect rare plants and avoid damage to habitat. The ongoing effects of hydroelectric power production in the San Joaquin River drainage are more or less permanent, but will be lessened in scope by the implementation of new license conditions which provide for additional environmental protection.

Fens would be subject to ongoing existing and future activities similarly to rare plants. If activities such as recreation, commercial livestock grazing, or illegal OHV use are damaging fen habitats, the SNF may fence or otherwise protect these areas as necessary.

Invasive non-native weeds. Most of the ongoing and future activities listed in Table 3.2 have potential to spread weeds into the SNF, however, as all Forest Service-initiated projects must have a noxious weed risk assessment, prevention measures and weed management will be built into project design. For other types of activities over which the Forest Service has little or no control, such as general recreation, and vehicles driving on roads within the Forest, there will always be a certain risk of introduction of new weeds or of moving existing weeds from one location to another. These activities most likely account for the bulk of new weed introductions in the Forest, and will continue to occur, and to be addressed through public education and outreach and an ongoing early detection and rapid control approach.

An environmental consequences discussion of commercial pack stock use in the AA/JM Wildernesses for Vegetation (weeds) can be found on pages IV-510-676 of the 2005 Pack Stock Management EIS. There would be risks of weed introduction and spread due to commercial pack stock use, packing in feed, hiker use, and trail maintenance activity. The use of charcoal for fires above the elevational fire closure reduced the risk of weed introduction. Any trail sanding in the AA/JM will be done with weed free material, minimizing the risk of weed introduction. Although the risk of weed survival if introduced is relatively low, particularly at higher elevations, the negative effects of weeds could be long-term, ranging from low to high in severity, and local to widespread in extent.

Because stock is restricted to approved trails and campsites by this decision, any weed seeds transported into the wilderness are most likely to fall in the trail tread or stock holding areas where traffic and activity make establishment unlikely. Establishment of weed populations at the edges of the most heavily traveled trails and at stock holding camps is the most probable, but it is also likely to be noted during monitoring.

Alternative 2

Direct and Indirect Effects

Rare Plants: Under Alternative 2, rare plants within the project area could be damaged or killed if they are trampled by pack stock, if multiple trailing cuts through an occurrence, if they are eaten by pack stock, or if pack stock hoof punching alters the hydrology of meadows where the plants are growing. Specific mitigation measures and monitoring required in both action alternatives will provide protection for rare plants, along with specific habitat protection actions that would be incorporated into the Annual Operating Plan as needed over the term of the permit.

Rare plant species of ***riparian or wetland habitats*** would experience more direct and indirect effects under alternative 2 than under alternative 1, due to the greater chance of effects to soils and hydrology (see watershed section). Species of ***upland and rock outcrop habitats*** would also receive more impacts under Alternative 2 than under the no action alternative, because the trails and campsites in upland areas would have the added use of commercial pack stock on top of private stock and hiker use.

Fens: Under Alternative 2, fen habitats within Dutchman Meadow, Glen Meadow, and Soquel Meadow could be damaged if they are trampled by pack stock to the extent that

bare ground is increased and peat is exposed to the atmosphere, allowing organic soils to desiccate and decompose (Cooper et. al., 2005). In addition, in some fens (e.g. Glen Meadow), heavy livestock grazing in the past apparently has resulted in the replacement of peat-forming plant and moss species by short-lived tap-rooted perennial plants (Cooper et al., 2005). Avoidance of fens has been built into the action alternatives, but except for Glen Meadow fen, which would be fenced, some degree of uncertainty exists as to how well "avoiding" the fens in Dutchman Meadow and Soquel Meadow can be accomplished. These effects will also occur, but to a lesser extent, under Alternative 1, as cattle would still use four of the meadows containing fens.

Invasive Non-native Plants: Under Alternative 2, each permittee would work with the Forest Service to create and implement a Noxious Weed Management Plan. The plan would be expected to be effective in reducing inadvertent weed introductions via pack stock permittees' operations; however, all possible introductions would not be stopped. The risk is greater than under Alternative 1 that new weed infestations would be introduced into the Forest via pack stock permittees operations. Balancing this increased risk is the potential for finding new, small weed infestations if packers, their staff, and their clients are educated to recognize and report new infestations in remote areas seldom visited by Forest Service botanists.

Cumulative Effects

The commercial pack station activities proposed under Alternative 2 would occur in addition to the other activities occurring in the project area listed in Table 3.2, and as described under Alternative 1.

Rare plants of all habitat types would experience trampling and removal by grazing by commercial livestock and private pack stock in addition to the activities proposed in this EIS. Recreational activities such as OHV, dirt bike riding, mountain biking, hiking, camping, hunting, and fishing would continue to impact rare plants occasionally, not to the extent that a loss of viability or a trend toward federal listing would occur (based on field assessments of rare plant populations for this and other projects). Vegetation management activities such as fuels reduction, thinning, and commercial timber harvest would continue but projects are designed to protect rare plants and avoid damage to habitat. The ongoing effects of hydroelectric power production in the San Joaquin River drainage are more or less permanent, but will be lessened in scope by the implementation of new license conditions which provide for additional environmental protection, including rare plant protection and noxious weed management.

Fens would be subject to ongoing existing and future activities similarly to rare plants. If activities such as recreation, commercial livestock grazing or illegal OHV use are damaging fen habitats, the SNF may fence or otherwise protect these areas as necessary.

Invasive non-native weeds. Most of the ongoing and future activities listed in Table 3.2 have potential to spread weeds into the SNF, however, as all Forest Service-initiated projects must have a noxious weed risk assessment, prevention measures and weed management will be built into project design for all such projects, just as has been done for this project. For other types of activities over which the Forest Service has little or no

control, such as general recreation, and vehicles driving on roads within the Forest, there will always be a certain risk of introduction of new weeds or of moving existing weeds from one location to another. These activities most likely account for the bulk of new weed introductions in the Forest, and will continue to occur, and to be addressed through public education and outreach and a continued program of early detection and prompt control.

In summary, the proposed activities would not contribute to any negative cumulative effects to sensitive plants or fens, nor is there likely to be a substantial increase in weed introductions to the extent that any type of cumulative threshold of weed spread would be reached. This is because the activities cover a relatively small acreage of the forest, and protection of rare plants and fens, along with requirements for weed prevention and control, would be integrated into the permits.

An environmental consequences discussion of commercial pack stock use in the AA/JM Wildernesses for Vegetation (weeds) can be found on pages IV-510-676 of the 2005 Pack Stock Management EIS. There would be risks of weed introduction and spread due to commercial pack stock use, packing in feed, hiker use, and trail maintenance activity. The use of charcoal for fires above the elevational fire closure reduced the risk of weed introduction. Any trail sanding in the AA/JM will be done with weed free material, minimizing the risk of weed introduction. Although the risk of weed survival if introduced is relatively low, particularly at higher elevations, the negative effects of weeds could be long-term, ranging from low to high in severity, and local to widespread in extent.

Because stock is restricted to approved trails and campsites in the AA/JM Wildernesses by the 2005 Pack Stock Management EIS decision, any weed seeds transported into the wilderness are most likely to fall in the trail tread or stock holding areas where traffic and activity make establishment unlikely. Establishment of weed populations at the edges of the most heavily traveled trails and at stock holding camps is the most probable, but it is also likely to be noted during monitoring.

Alternative 3

Direct and Indirect Effects

This alternative would confine commercial stock use in the Kaiser and Dinkey Lakes Wilderness Areas and the Merced Wild and Scenic River to designated camp sites in selected destination zones, which would benefit native vegetation and rare plants because designated sites would be required to meet BMPs, and sensitive areas would not be permitted for use. Impacts at designated areas would be monitored and management would be adjusted to ensure compliance with standards and guidelines for soils, water quality, and rare plants.

The direct impacts to vegetation, rare plants, and fens would be similar to the effects of the proposed action across the analysis area, but rather than occurring at any campsite selected by the packer, they would be limited to designated stock camps in the wilderness areas. There would be a reduced risk of long-term impacts to soils and vegetation in areas where destination quotas would be established, because these areas would be monitored

for compliance with standards and guidelines. Direct effects to sensitive plants and fens in the wildernesses (Miner Camp Meadow and Nellie Lake Meadow) would be less likely to continue year after year under Alternative 3 than under Alternative 2.

Rare Plants: Under Alternative 3, rare plants within the project area could be damaged or killed if they are trampled by pack stock, if multiple trailing cuts through an occurrence, if they are grazed by pack stock, or if pack stock hoof punching alters the hydrology of meadows where sensitive plants are growing. The risk of weeds spreading via pack stock operations is slightly lower than under Alternative 2 because the areas where stock are allowed to camp in the wilderness and MWSR are fewer, and would be easier to check for new weed infestations than if use is scattered across the landscape. Direct and indirect effects to rare plants of all habitat types in the wilderness areas (no rare plants were found in the Merced Wild and Scenic River zone) would be less likely than under Alternative 2 because destination management would allow better control of on-site impacts. Designation of stock camps would ensure their compliance with BMPs. For rare plants across the rest of the project area (outside the wilderness and MWSR), the differences between Alternative 2 and 3 are not significant, because whether or not the number and location of stock is managed through trailhead or destination quotas in the wilderness and Merced Wild and Scenic River areas is immaterial. Specific mitigation measures and monitoring required in both action alternatives will provide the real protection for rare plants, along with specific habitat protection actions that can be incorporated into the Annual Operating Plan as needed over the term of the permit.

Rare plant species of ***riparian or wetland habitats*** will experience more direct and indirect effects under Alternative 3 than under Alternative 1, due to the greater chance of effects to soils and hydrology. Species of ***upland and rock outcrop habitats*** will also receive more impacts under Alternative 3 than under the no action alternative, because the trails and campsites in upland areas will have the added use of commercial pack stock on top of private stock and hiker use.

Fens: Under Alternative 3, fen habitats within the project area could be damaged if they are trampled by pack stock to the extent that bare ground is increased and peat is exposed to the atmosphere, allowing organic soils to desiccate and decompose (Cooper et. al., 2005). In addition, heavy livestock grazing in the past apparently has resulted in the replacement of peat-forming plant and moss species by short-lived tap-rooted perennial plants in some meadows (Cooper et al., 2005). The extent to which this may occur under the grazing regimes allowed in Alternative 3 is unknown, but monitoring would occur and changes in grazing may be required in the future. These effects will also occur, but to a lesser extent, under Alternative 1, as livestock and private pack stock would still use the meadows containing fens.

Invasive Non-native Plants: Under Alternative 3, as in Alternative 2, each permittee would work with the Forest Service to create and implement a Noxious Weed Management Plan. The plan would be expected to be effective in reducing the likelihood of inadvertent weed introductions via pack stock permittees' operations; however, all possible introductions would not be stopped. The risk is greater than under Alternative 1 that new weed infestations would be introduced into the Forest via pack stock permittees'

operations. Balancing this increased risk is the potential for finding new, small weed infestations if packers, their staff, and their clients are educated to recognize and report new infestations in remote areas seldom visited by Forest Service botanists.

Cumulative Effects
Same as for Alternative 2.

3.3.3.4 Analysis Unit Level Evaluation

NELDER (NED)

Affected Environment

Rare plants: *Meesia triquetra,* a moss species, was found in Soquel Meadow, in a small fen. No other meadows in the NED AU were found to have this moss, although several were fens. See discussion of fens, below.

Veined water lichen grows in Nelder Grove along Nelder Creek in an area not used by pack stock permittees. Despite searching at most creek crossings while surveying trails proposed for use for this permit, no additional veined water lichen populations were found.

Mountain lady's slipper orchid (*Cypripedium montanum*) is known from at about 15 locations in Nelder Grove. Several population occur near trails used by YTPS (Trails 22E05, 22E06, 22E07, and 22E08), but plants are out of sight of the trail and no impacts from the various types of recreation have been documented during annual monitoring. Rawons's flaming trumpet (*Collomia rawsoniana)* grows along California Creek and Nelder Creek in and adjacent to the NED AU. However, no plants were found in areas used by the pack station.

A small new population of short-leaved hulsea (*Hulsea brevifolia*) was found along the trail leading to Pike Camp, on both sides of the trail.

Fens: Meadows proposed for use by the pack stock permittee were assessed to determine whether or not they contained fen (peatland) habitats. Soquel Meadow, Dutchman Meadow, and the Quartz Meadow complex contained areas of fen habitat. Goat Meadow, Tin Can Meadow, Buffin Meadow, Biledo Meadow, Lower Iron Creek Meadow, Bare Island Meadow, and Grizzly Creek Meadow did not have areas qualifying as fens (defined by depth of peat, plant species composition, and hydrology (Cooper and Wolf, 2005).

Noxious Weeds and non-native plants: No State-rated Noxious Weeds were found within the NED AU. Non-native invasive plants noted were: Spanish broom (*Spartium junceum*) along the Jackson Road near the "Mile High" site proposed for a new headquarters complex. Bull thistle was found at six locations, mostly in small occurrences that would be easy to manually remove. The exception was at the corral north of the winter loop (Trail NED18), where there was a large dense bull thistle infestation spanning private and public lands. Common mullein (*Verbascum thapsus*),

was similarly found in only a few small populations, except for the one at the entrance to the current YTPS headquarters. These plants were removed by the permittee at the request of the Forest Service in 2005. A small patch of Himalayan blackberry was found along Trail NED 09, along the trail between Buffin Meadow and Tin Can Meadow.

Environmental Consequences

Alternative 1

Direct Effects

Rare plants: There would be no direct effects from trampling and grazing to rare plants or their habitat from commercial pack and riding stock.

Fens: Cattle grazing and trampling would still occur in Soquel Meadow, but no commercial pack stock impacts would be added.

Noxious weeds and invasive non-native plants would continue to be introduced as a result of general recreation and other vectors

Indirect Effects

Indirect effects to rare plants and fens such as soil erosion, sedimentation, and reduction in hydrologic function of meadows would not occur as a result of commercial pack stock. One potential negative effect would be that fewer new noxious weed locations would be observed and reported by the permittees and their staff; as this permittee is pro-active with regard to invasive weeds in the National Forest, and has been voluntarily using weed-free feed and participating in weed control efforts.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock. In particular the Cedar Valley Project, various roadside hazard tree projects, and the Fish Camp and Sugar Pine fuels reduction project would occur with this AU.

Alternative 2

Direct Effects

Direct effects to rare plants of meadows and fens (*Meesia triquetra*) are occurring to some extent: these include killing or damaging individual clumps of *Meesia* when stock concentrate in the fen portion of Soquel Meadow, and their hooves punch holes in the peat. The permit requirements (see Chapter 2) commercial stock to avoid fens in Soquel and Dutchman meadows should minimize direct impacts to fens. Unless fenced, the fens in Soquel and Dutchman Lake Meadow may have incidental impacts if stock drift into them. No other sensitive plant species are expected to experience direct effects from this alternative, and no other fens would be affected, as grazing would be prohibited in the Quartz Meadow Complex, where the other fen occurs in NED AU.

Indirect Effects

Indirect effects to sensitive plants in meadow or fen habitats could be alteration of meadow hydrology, along with hoof punching causing damage to fens and ultimately contributing to loss of the fen (Cooper and Chimner, 2005). The *Meesia triquetra* in Soquel Meadow fen would be protected from pack stock impacts under this alternative, thus these effects would be ameliorated if observed. Indirect effects would not be expected if stock are managed to avoid the fen, and if only incidental trampling occurs each year.

Cumulative Effects

In addition to this alternative other management activities are ongoing and proposed as described in the overview section and as shown in Table 3.2. All these activities contribute incrementally to direct and indirect effects on sensitive plant species by compacting soils and trampling of aquatic and riparian plant species and their habitats. Because protection for rare plants and fens and prevention and management of noxious weeds is required for all Forest Service projects, and because direct and indirect effects described for this AU would be ameliorated by permit requirements, no irreversible cumulative effects would occur under Alternative 2.

Alternative 3

Direct Effects

Three use trails would be approved under this alternative (NED22, NED23, and NED28). NED28 has not been surveyed in its entirety for botanical resources, and does traverse meadow habitat. If necessary, any findings from the survey of this trail, planned for 2007, will be incorporated into the annual operating plan for the pack station (e.g. rare plants or fens to avoid, invasive weeds that might need control). No rare plants were found along NED22 or NED23, thus there would be no effects. NED25, the trail to Pike Camp, where short-leafed hulsea was found, would not be approved under Alternative 3. Otherwise, the effects are the same as for Alternative 2.

Indirect Effects

Indirect effects are same as those for Alternative 2.

Cumulative Effects

Cumulative effects are same as those for Alternative 2.

CLOVER (CLO)

Affected Environment

Rare plants: Soldier Meadow has an occurrence of Bolander's clover (*Trifolium bolanderi*) at the southeast end of the meadow. No evidence of impacts was observed although the meadow is being grazed by commercial livestock. Kettle Dome buckwheat (*Eriogonum prattenianum* var. *avium*) occurs in several extensive populations in the CLO AU, for example in the rocky outcrops along the Walton Trail (24E20). The buckwheat seems to be growing well in these areas, and trails and roads through the populations do not seem to be affecting the buckwheat's viability, and very little of its habitat. No evidence of impacts due to pack stock permittees' activities has been observed.

Fens: No fens occur within areas used by the pack station.

Noxious weeds and invasive non-native plants: One common mullein stalk was found at the MPS headquarters on the road from the main area to the water tank. No other listed weeds are on the site, and no sensitive plants were found at the pack station. Bull thistle occurrences were found on trails 26E01, 25E30, 24E26, and 24E40, but there is no evidence that they were more dense along these trails used by the pack station than in nearby areas disturbed by logging and cattle grazing. Sierra National Forest personnel have been manually removing bull thistle in this area, and this would continue under any alternative.

Environmental Consequences

Alternative 1

Direct Effects

Bolander's clover would not be grazing or trampled by commercial pack stock in Soldier Meadow. Noxious weeds and invasive non-native plants would continue to be introduced as a result of general recreation and other uses of the national forest.

Indirect Effects

There would be no indirect effects on botanical resources.

Cumulative Effects

Cattle grazing would still occur in Soldier Meadow. Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued. In this AU in particular, the Grave, Yard, Fuller, and Squaw precommercial thinning projects will occur but are designed to protect rare plants and fens and to prevent the spread of weeds.

Alternative 2

Direct Effects

Bolander's clover plants may be eaten by commercial pack stock, and some plants may be trampled, but as monitoring is built into the project proposal, any changes needed in

management are expected to occur before irreversible impacts could take place. No effects are expected for other rare plant species as none were found in areas used by the permittee.

Indirect Effects
Indirect effects to rare plants in Soldier Meadow would potentially be alteration of meadow hydrology or the introduction of noxious weeds, resulting in diminished water for Bolander's clover. The monitoring requirement would ensure that corrective action could be taken if monitoring revealed that habitat for Bolander's clover is being degraded.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3
Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

EDISON (EDI)

Affected Environment
Rare Plants: No sensitive plants were found during field surveys of areas used by pack stations in the EDI analysis unit, although there are known populations of Mono Hot Springs evening primrose within the AU.

Fens: A portion of trail 27E21 goes through Mono Meadow. Risk of this trail impacting sensitive species seems low, but a botany survey was not conducted in Mono Meadow where the trail goes through. This area does not appear to be a fen. The presence of the trail through Mono Meadow is resulting in trail incision and multiple trailing. No fens have been documented in the EDI analysis unit.

Noxious Weeds and Invasive non-native plants: The HSPS pack station headquarters at Lake Edison is a large facility with several buildings and corrals. Cultivars of columbine have been planted in the middle of the station. The permittees also have brought in potted plants of roses, petunias, and geraniums. None of these is likely to become invasive and spread beyond the facility.

Bull thistle is present in a meadow near trail 27E24. The bull thistle does not appear to be influenced by the trail at this time. Bull thistle was also observed in 2001 near the ferry landing south of the trail leading to the north side of Edison Lake. This infestation did not appear to be associated with the pack station's activities.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects to rare plants or their habitat from commercial pack stock. Noxious weeds and invasive non-native plants would continue to be introduced at the same rate to the present situation.

Indirect Effects

There would be no new indirect effects on botanical resources.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects

No rare plants, fens, or weeds are known to occur in the areas being used, thus no direct effects would occur.

Indirect Effects

No indirect effects would occur to sensitive plants. Noxious weed introductions may be more likely than under Alternative 1 but the noxious weed management plan would minimize the possibility.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects

Direct effects are the same as those for Alternative 2.

Indirect Effects

Indirect effects are the same those for Alternative 2.

Cumulative Effects
Cumulative effects are the same as those for Alternative 2.

CHINQUAPIN (CHQ)

Affected Environment

Rare Plants: Populations of Mono Hot Springs evening primrose occur within the analysis unit, however none were found to occur directly within areas used by the pack station.

Fens: No fens were found in this analysis unit in areas used by pack station.

Noxious Weeds: There is bull thistle in the meadow near trail 27E24, but it is not clearly related to pack stock use in the area. A more likely vector for spread of bull thistle is cattle grazing because of the degree to which cattle move around in the AU.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects due to commercial pack stock on sensitive plants or their habitat. Noxious weeds and invasive non-native plants would continue to be introduced at about the same rate as in the present situation.

Indirect Effects
There would be no new indirect effects on botanical resources.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 2

Direct Effects
A small number of Mono Hot Springs evening primrose plants is crushed by stock and foot traffic each year when people or stock step off the trail for any reason. The proportion of plants affected is miniscule compared to the overall number of plants present.

Indirect Effects
Some increase in sedimentation and erosion may occur, potentially removing the sandy/gravelly soil needed by Mono Hot Springs evening primrose from areas of occupied habitat, or resulting in deposit of sand or gravel onto plants or habitat. This is more likely if trail maintenance is not done regularly. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3
Direct Effects
Direct effects are the same as those for Alternative 2.

Indirect Effects
Indirect effects are the same as those for Alternative 2.

Cumulative Effects
Cumulative effects are the same as those for Alternative 2.

FLORENCE (FLO)

Affected Environment

Rare Plants: Known populations of Mono Hot Springs evening primrose (*Camissonia sierrae* ssp. *alticola*) occur along trails and roads at many locations around Florence Lake, mostly just outside the analysis unit boundary.

Fens: No fens occur in the FLO analysis unit.

Noxious Weeds and Invasive non-native plants: Cheatgrass and common mullein are present in front of the HSPS Florence Lake spike station. It may or may not be there as a result of the commercial operation.

Environmental Consequences

Alternative 1
Direct Effects
Direct effects such as trampling and killing of Mono Hot Springs evening primrose plants by commercial pack stock would not occur. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
Indirect effects such as loss of gravelly soil required by Mono Hot Springs evening primrose would not occur as frequently, although other users of the trails would still potentially bring about some soil disturbance. Either way, the amount of disturbance affects a tiny percentage of the available occupied and unoccupied habitat for the Mono Hot Springs evening primrose.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
A small number of Mono Hot Springs evening primrose plants is crushed by stock and foot traffic each year when people or stock step off the trail for any reason. There would be more stock traffic under this alternative than under Alternative 1; but the proportion of the populations affected is miniscule compared to the overall number of plants present (many hundreds of thousands in a good rain year). The common mullein in front of the Florence Lake spike station would be removed, directly halting any competition for water and nutrients that may be occurring. Alternatives 2 and 3 require manual removal of the common mullein infestation at the Florence Lake Spike Station annually until eradicated.

Indirect Effects
Some increase in sedimentation and erosion may occur, potentially removing the sandy/gravelly soil need by Mono Hot Springs evening primrose from areas of occupied habitat, or resulting in deposit of sand or gravel onto plants or habitat. This is more likely if trail maintenance is not done regularly. Noxious weed introductions may be slightly more likely than under Alternative 1. The appropriate measures for addressing the cheatgrass and any other noxious weeds found at the site would be included in the Weed Plan required under Alternative 2. The removal of the mullein would benefit native plants growing at the Florence Lake Spike Station site as competition for light and nutrients would cease, and seed banks of native plants would be likely to flourish.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects
Direct effects are the same as those for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects the same as for Alternative 2.

KAISER (KAI)

Affected Environment

Rare Plants: Trail 25E41 passes through an occurrence of the Forest Service sensitive plant species, *Hulsea brevifolia* (short-leaved hulsea). The occurrence seems to be in good condition, with no visible off-trail impacts. Known populations of subalpine fireweed (*Epilobium howellii*) occur in the analysis unit, but were not found in areas used by the pack stations.

Fens: Nellie Lake meadow in the Kaiser wilderness has small areas that may be fen habitat. These habitats are not currently being affected by D&F activities.

Noxious Weeds and Invasive non-native plants: There is scattered bull thistle within this analysis unit, not necessarily related to the pack station.

Environmental Consequences

Alternative 1

Direct Effects
Commercial pack stock would not be able to inadvertently step off of Trail 25E41 and kill or crush short-leafed hulsea plants, although this may occur to some extent from private stock or hikers. No direct effects to fen habitat from trampling by commercial stock would occur at the fen at Nellie Lake. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
There would be no indirect effects on botanical resources caused by commercial pack stock.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
Occasional trampling of a few short-leafed hulsea plants may occur; as is currently likely from private stock or foot traffic. Otherwise no direct effects are expected for sensitive plants from commercial stock. Fen habitat at Nellie Lake would not be impacted by

commercial pack stock, as grazing would not be permitted at this location. Protection from commercial pack stock use would continue to protect the fen habitat, although some incidental trampling by private stock may occur.

Indirect Effects
Slight increases in dust and erosion may occur within the short-leafed hulsea population, but the effects are not expected to cause a decline in population numbers or vigor. This is based on observations by the Forest Botanist of dozens of populations across the Sierra NF that thrive next to roads where summer dust is prevalent. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects:
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3
Direct Effects
Direct effects are the same as those for Alternative 2.

Indirect Effects
Indirect effects are the same as those for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

EAST HUNTINGTON (HNE)

Affected Environment

Rare Plants: No sensitive plants were found near areas used by the pack stations. Known populations of subalpine fireweed (*Epilobium howellii*) occur in meadows within the analysis unit, but not near the pack station's areas of use.

Fens: No fens were found during field surveys for this project.

Noxious Weeds and Invasive non-native plants: There is scattered bull thistle within this analysis unit, no more prevalent in areas used by pack stock than elsewhere.

Environmental Consequences

Alternative 1
Direct Effects
There would be no direct effects to sensitive plants or their habitat due to commercial pack stock.

Indirect Effects
There would be no indirect effects on botanical resources due to commercial pack stock. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
An occasional subalpine fireweed plant may be grazed or crushed. However, this species is no taller than 6 inches and generally is not out in the open meadows where most grazing and trampling would occur. The number of known populations has increased from less than 10 in 2004 to nearly 100 in 2006, and many consist of 1000s of plants, growing in semi-disturbed habitats. Thus new information about this species indicates that it is tolerant of, and possibly even requires, disturbance.

Indirect Effects
Any indirect effects to meadow habitats such as erosion or sedimentation would potentially affect undiscovered populations of subalpine fireweed. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

WEST HUNTINGTON (HNW)

Affected Environment

Rare Plants: No sensitive plants were found during surveys for this project. Known populations of subalpine fireweed (*Epilobium howellii*) occur in meadows within the analysis unit.

Fens: Some parallel trails to Trail 26E64 (part of 2-hour loop) are impacting the upper part of a meadow. No fens were noted during field surveys for this project.

Noxious Weeds and Invasive non-native plants: The headquarters for D&F pack station at Huntington Lake contains a large area of exposed, compacted soil. A creek runs near the office building. The area has several weedy, invasive plant species including woolly mullein (*Verbascum thapsis*), everlasting pea (*Lathyrus latifolius*), and foxglove (*Digitalis purpurea*). Most of the foxglove is cultivated in the garden in front of the office building; some of the foxglove is growing wild near the creek, as well. There is scattered bull thistle within this analysis unit.

Environmental Consequences

Alternative 1

Direct Effects

There would be no new direct effects to sensitive plants or their habitat. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects

There would be no new indirect effects on botanical resources.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects

No direct effects are expected for sensitive plants as none were found to occur in affected areas.

Indirect Effects

Any indirect effects to meadow habitats would potentially affect undiscovered populations of subalpine fireweed by altering meadow hydrologic function. Noxious weed introductions may be slightly more likely than under Alternative 1. Native vegetation would recover in areas where mullein, foxglove, and everlasting pea would be eliminated over time (the permit holder is required to remove weeds at the headquarters station at Huntington Lake under this alternative). The reduction of multiple trailing near

Trail 26E64 would benefit native vegetation as the unused pathways revegetate with native plants.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3
Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

COYOTE (COO)

Affected Environment
Rare plants: No sensitive plants were found during field surveys for this project, although known populations of short-leafed hulsea occur in the unit.

Fens: No fens were identified during surveys, however Rock Meadow and Pike Cabin Camp have not yet been surveyed.

Noxious weeds and invasive non-native plants: Scattered bull thistle occurs in this unit.

Environmental Consequences

Alternative 1
Direct Effects
There would be no direct effects from commercial pack stock to sensitive plants or their habitat. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
There would be no indirect effects on botanical resources from commercial pack stock.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects

No direct effects are expected for sensitive plants.

Indirect Effects

No indirect effects would occur for sensitive plants. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Three trails that are currently not classified for maintenance would be classified by the Dinkey Lakes Trail Management Plan. Their classification would range from TC1 to TC3 under this alternative. Although trails are assumed to be stable and not creating notable erosion and sedimentation impacts, adding Trail Classes would make it more likely that periodic maintenance would occur and would maintain stability and prevent erosion increases, which would benefit the overall health and stability of native vegetation.

Alternative 3

Direct Effects

Direct effects are the same as for Alternative 2.

Indirect Effects

Indirect effects are the same as for Alternative 2.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur. However, in contrast to Alternative 1, the Dinkey Lakes Trail Management Plan would remove some trails from the system and would lower the Trail Class of some other trails compared to Alternative 2. The trails that would be removed are naturalizing and do not receive much use, so discontinuing maintenance would allow them to completely naturalize and revegetate with native plants.

DINKEY LAKES (DIL)

Affected Environment

Rare plants: No sensitive plants were found during field surveys for this project.

Fens: Several areas identified as fens occur in this analysis unit. Miner Camp Meadow in the Dinkey Lakes Wilderness is likely a fen in the wet, middle part of the meadow. The meadow adjacent to Swede Lake contains a steep fen (Cooper and Wolf, 2005). Neither of these fen habitats is currently being affected by CPO activities. User trail DIL02, the Swede Lake Spur, is near the fen but not in it, and was determined not to be affecting rare plants or fens during the 2003 botanical survey.

Noxious weeds and invasive non-native plants: No noxious weeds were found during field surveys for this project.

Environmental Consequences

Alternative 1

Direct Effects

There would be no new direct effects to sensitive plants or their habitat. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects

There would be no new indirect effects on botanical resources.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects

No direct effects are expected for sensitive plants, fens, or noxious weeds as none were found to occur.

Indirect Effects

No indirect effects would occur for sensitive plants. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects

Direct effects are the same as for Alternative 2 as no rare plants, fens or weeds were found in areas used by the packer.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

HELMS (HEL)

Affected Environment

Rare plants: No sensitive plants were found during field surveys for this project.

Fens: No fens were observed.

Noxious weeds and invasive non-native plants: No weeds were found during surveys for this project.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects to sensitive plants or their habitat as none were found in the areas surveyed. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
There would be no new indirect effects on botanical resources.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
No direct effects are expected for sensitive plants, fens, or weeds because none were found to occur.

Indirect Effects
No indirect effects would occur for sensitive plants. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect

rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects
Direct effects are similar to those for Alternative 2.

Indirect Effects
Indirect effects are similar to those for Alternative 2.

Cumulative Effects
Cumulative effects are similar to those for Alternative 2.

NELSON (NEL)

Affected Environment

Rare plants: No sensitive plants were found during field surveys for this project.
Fens: No fens were observed in this analysis unit.

Noxious weeds and invasive non-native plants: No noxious weeds were found during field surveys for this project.

Environmental Consequences

Alternative 1

Direct Effects
There would be no direct effects to sensitive plants or their habitat as none were found in this AU. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
There would be no indirect effects on botanical resources as none were present.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
No direct effects are expected for sensitive plants.

Indirect Effects
No indirect effects would occur for sensitive plants. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3
Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

DINKEY FRONT COUNTRY (DFC)

Affected Environment
Rare plants: Two populations of *Meesia triquetra* were found in this analysis unit. One is in the northern portion of Glen Meadow, in a fen. Trampling by hooves of pack stock and cattle may be directly causing mortality within the *Meesia triquetra* population in the Glen Meadow fen.

Fens: The northern finger of Glen Meadow is a fen, which has more bare ground than desirable for maintenance of the fen (Cooper, Chimner, and Wolf, 2005).

Noxious weeds and invasive non-native plants: The Glen Meadow (Sawmill) Trail has bull thistle (*Cirsium vulgare*), cheatgrass (*Bromus tectorum*), and woolly mullein (*Verbascum thapsus*) along sections. The bull thistle is especially prevalent on a flat, disturbed area by the trail. The infestation is likely a result of former sawmill activities. Lens-podded hoary cress is growing near the CPO Dinkey Creek Site, and until recently appeared to be contained to a fraction of an acre of undisturbed ground unaffected by pack station operations. The Forest Service has plans to eradicate the infestation with herbicide once NEPA is completed for the Kings River Project. A recent hazard tree timber sale occurred in within the boundaries of the hoary cress population. Subsequently, the equipment used for the timber sale was transported to CPO spike stations at Courtright and Wishon, possibly moving contaminated soil to new locations.

Environmental Consequences

Alternative 1
Direct Effects
There would be no additional direct effects to sensitive plants or their habitat. The current impacts of cattle grazing and trampling on the *Meesia* population and its fen habitat would continue and would be monitored by the botanist and the rangeland

manager to determine whether changes in cattle grazing are needed. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
Indirect effects to fen habitat, such as the exposure of peat to air and subsequent loss of fen function, would potentially occur from cattle impacts, but would not be exacerbated by commercial stock use.

Cumulative Effects
The direct and indirect effects described above would be addressed by working with the livestock permittee to avoid the fen, most likely by fencing it to exclude all stock, and the indirect effects would thus not accumulate to the point of losing the fen. Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
Because a fence to protect the fen is required, the fen would probably recover over time from impacts of the combined hoof action of pack stock and permitted cattle.

Indirect Effects
The *Meesia triquetra* population and the Glen Meadow fen would be fenced to avoid the continued loss of peat accumulation. Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur. Cumulative effects to the *Meesia triquetra* population and its fen habitat would be averted by fencing of the Glen Meadow fen.

Alternative 3

Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

TULE MEADOW (TUL)

Affected Environment

Rare plants: No rare plants were found during surveys for this project.

Meadows and fens: No fens were found during field surveys for this project.

Noxious Weeds and Invasive non-native plants: There is scattered bull thistle within this analysis unit. Lens-podded hoary cress may have been transported to this site from the CPO Dinkey Creek Site in 2006 on logging equipment.

Environmental Consequences

Alternative 1

Direct Effects

There would be no direct effects to sensitive plants or their habitat as none were found. Noxious weeds and invasive non-native plants not be introduced by pack station operations.

Indirect Effects

There would be no new indirect effects on botanical resources as none were found.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects

No direct effects are expected.

Indirect Effects

Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects

Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects

Direct effects are the same as for Alternative 2.

Indirect Effects

Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

WISHON (WIS)

Affected Environment

Rare Plants: No sensitive plants were found during surveys for this project.

Fens: No fens were noted during field surveys for this project.

Noxious Weeds and Invasive non-native plants: There is scattered bull thistle within this analysis unit. Lens-podded hoary cress may have been transported to this site from the CPO Dinkey Creek Site in 2006 on logging equipment.

Environmental Consequences

Alternative 1

Direct Effects
There would be no new direct effects to sensitive plants or their habitat. Noxious weeds and invasive non-native plants would continue to be introduced at a similar rate to the present situation.

Indirect Effects
There would be no new indirect effects on botanical resources.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview section above, but no additional incremental effects would occur from commercial pack stock as there would be no permit issued.

Alternative 2

Direct Effects
No direct effects are expected.

Indirect Effects
Noxious weed introductions may be slightly more likely than under Alternative 1.

Cumulative Effects
Continued effects on botanical resources would still occur from other activities ongoing and planned in the analysis unit as shown in Table 3.2 and described in the overview. The pack station activities proposed under Alternative 2 have been mitigated to protect rare plants and to minimize the potential for weed spread, thus no cumulative impacts from Alternative 2 would occur.

Alternative 3

Direct Effects
Direct effects are the same as for Alternative 2.

Indirect Effects
Indirect effects are the same as for Alternative 2.

Cumulative Effects
Cumulative effects are the same as for Alternative 2.

ANSEL ADAMS/JOHN MUIR (AA/JM)

Affected Environment

A comprehensive discussion of the botanical resource for the Ansel Adam/John Muir AU can be found in the 2005 Pack Stock Management EIS on page III-161. This DEIS incorporates that information by reference.

Environmental Consequences

Sensitive and Watch List Plants: Individual sensitive or watch list plants may be affected by commercial and private pack stock activities, hiker use, and trail management activities; however, the effects of these activities would be minor, local, and short-term. There are some long-term moderate to severe impacts to riparian habitat regionally from historic grazing that would experience some recovery.

The trail classes, and associated use and maintenance impacts to sensitive plants, would be slight. Any trail impacts would be local, minor, and short-term. The possibility of impacts from avoidance of trail obstacles could occur but also would be local, minor, and short-term depending on the extent of and how long the reroute was in use.

One hundred and sixteen meadows with potential habitat for sensitive riparian species would be open for use under this alternative. Meadows with severe problems would be rested and those for which range readiness is probably never reached over most of the meadow would be closed, so the riparian potential habitat with the highest risks for degradation would not be available for use until recovered. Sixteen meadows with potential habitat for sensitive riparian plants would remain in degraded conditions. The overall effect would be a long-term beneficial reduction in impacts to potential habitat for sensitive riparian species.

Fens: In this alternative, fens would be more protected from inadvertent commercial pack stock use than in Alternative 1 because no grazing would be permitted in fens. Thirteen meadows with fens or fen characteristics would remain in degraded condition. There would be overall long-term beneficial effects to fens under this alternative.

Weeds: There would be some risk of weed introduction from pack stock use, hiker use, and trail maintenance. If weeds were introduced, the effects would be long-term, moderate to severe, and although beginning locally, could easily become widespread.

A comprehensive discussion of the environmental consequences to the botanical resource for the Ansel Adam/John Muir AU can be found in the 2005 Pack Stock Management EIS on pages IV-511, 534, 542, 551, 583, 587, 603, 605, 626, 629, 643, 654, 656, 673, and 674. This DEIS incorporates that information by reference.

3.3.4 Grazing Resources

3.3.4.1 Background

The entire analysis area in this discussion has a history of domestic livestock grazing that commenced in the late 1800's, well before the creation of the Forest Reserves or the modern Forest Service (USDA Forest Service 2005). Large numbers of sheep, used primarily to feed miners and for wool production, peaked in the 1870s but disease, drought and the onset of Forest Service management led to major reductions by the 1930s. Operations shifted to cattle and even though use was still high there was an awareness of degraded and deteriorating conditions.

During World War II permitted use went up, but never as high as the pre-1920s use had been. Across the Sierra Nevada montane areas and foothill rangeland were reverting to thicker stands of timber and brush due to decades of fire suppression. This decreased productivity and the lack of manpower after the war made for further reductions in the amount of permitted use. In the 1940s many allotments, now a part of wilderness adjacent to the project area were closed to commercial cattle use to accommodate recreational and commercial pack stock use and to provide adequate summer range forage for wildlife. Other allotments became vacant due in part to the intensive management these remote allotments required which led to uneconomical operations, in some cases. Since the 1970s, management has focused on resource protection, with an emphasis on protecting riparian areas and meadow habitat occupied by sensitive terrestrial and aquatic species. Higher elevation range in the Ansel Adams and John Muir Wildernesses became less feasible to manage and reductions in livestock numbers continued into the mid-1990s (Menke et. al. 1996; SNF 2210 Range Analysis files).

Historical pack stock use in support of sheep and cattle grazing, mining operations, hydropower development, logging operations, and for recreation purposes likely greatly exceeded the numbers and geographic extent of today's use. Documentation suggests that extensive poorly managed or unmanaged livestock use between the mid 1800s and the early 1900s contributed to reduced forage production and altered the health of rangeland throughout the Sierra Nevada (Menke et. al. 1996).

Meadows are important for providing wildlife habitat, livestock and pack stock forage, water holding capacity, and for filtering sediments and protecting water quality. Past poorly or unmanaged livestock use has influenced the current condition of some of the meadows assessed within the project area as changes in vegetative species composition and lowered water tables are still evident today. Recreation impacts to meadows can occur from improperly placed trails and campsites, but this was rarely observed (trail impacts noted in 2 of 20 meadows observed) in the project area.

3.3.4.2 Methodology

A suitability analysis was needed to determine areas that are appropriate for grazing use in the planning area. Direction for determining grazing suitability comes from the Region 5 Rangeland Analysis and Planning Guide (USDA, FS, R5, March, 1997, pages

3-9 to 3-13), and the Final EIS and Management Direction for the Ansel Adams, John Muir, and Dinkey Lakes Wilderness Areas, (EIS Packstock Management Guide, Appendix G, page G-16).

For this analysis, each meadow was visited by an interdisciplinary team (IDT). The IDT determined which areas within the meadows were suitable for grazing based on criteria such as forage production, stream condition, soil and vegetative condition, trail impacts to meadows, accessibility of water for livestock, range readiness, presence of fens and other critical areas, presence of TES plants and wildlife and/or their potential habitat, slope, and current use and overall resource condition. Production for each vegetation type was estimated based on average vegetation community production as reported in Ratliff (1985) and the 2005 Pack Stock Management EIS. Meadow condition was qualitatively evaluated based on IDT field assessments using a meadow rating criteria inventory protocol developed by the Inyo National Forest IDT. Recent quantitative data on the condition and trend of these meadows had not been collected at the time of this analysis and meadow and riparian ecological condition was evaluated using the meadow rating criteria and Proper Functioning Condition (PFC) evaluations. The meadows that were considered suitable for grazing in this analysis are mid to late seral status (Table 3.52), based on the meadow rating criteria used to evaluate the meadows and were assigned allowable forage use standards for grazing as described in the 2005 Pack Stock Management EIS and the 2001 Wilderness Plan. In addition, the IDT assessed the riparian conditions of all meadows using the interagency PFC protocol (USDI-BLM, 1993) and visual estimates of riparian function. The riparian system is rated as functional, functional at risk or non-functional based on a qualitative assessment of vegetation and physical stream parameters. The conditions in meadows assessed for commercial pack stock grazing use are summarized in Table 2.21 and Table 3.52. The analysis elements (criteria) used to evaluate effects of the proposed action and alternatives on the meadow resource are based on grazing activity that can result in impacts to vegetation and soils. These analysis elements are indicated by evidence of or potential for these impacts to affect meadow condition.

Analysis Elements

1) Disturbance and/or removal of vegetation from grazing activity;
2) Disturbance and/or displacement of soil, leading to sod fragmentation and/or compaction of soil from grazing activity; and
3) Changes to species composition (evidence of or potential for a shift away from potential natural community)
4) Hydrologic function alteration (evidence of or potential for a shift away from proper functioning condition).

3.3.4.3 Overview – Common to All

Affected Environment

Management Direction

Grazing suitability determinations are summarized in Table 2.21 and Table 2.22. Implementation of existing management direction, including the Sierra Nevada Forest

Plan Amendment (SNFPA) meadow grazing utilization standards and 2001 Wilderness Plan and Packstock Management Guide, as incorporated here, would improve or sustain desired conditions for meadows considered suitable to withstand use by pack stock. Minimum impact stock management would be necessary to sustain grazing in meadows, particularly where only portions of meadows are considered suitable for grazing. In addition, the Packstock Management Guide from the 2001 Wilderness Plan provides specific direction for stock use and handling in the wilderness. It is noted here that successful implementation of this direction, along with minimum impact stock management techniques would require coordination between the Special Uses Permit Administrator and Rangeland Management Specialist.

Direction on wilderness pack stock grazing is provided in the FEIS for the Ansel Adams, John Muir and Dinkey Lakes Wildernesses in Appendix G under Packstock Management Guide (USDA Forest Service, 2001) and this direction would be incorporated by reference for pack stock activities in the Kaiser and non-wilderness portions of the Sierra National Forest, that were not initially covered under this Guide. The Guide provides direction to assess the hydrologic function of meadow habitats and other special aquatic features during range analysis. Based on this analysis, grazing strategies are to be developed for packer use areas and are to be described in annual operating instructions that will protect critical areas, which are habitats or features of particular concern because of their sensitivity to impacts or the habitat they provide for sensitive species. Examples include fens, spring heads, and breeding pools for Yosemite Toads. The Guide directs that a successful pack stock grazing program include the following objectives: 1) move toward or maintain wilderness resources such as vegetation, soils, wildlife and watersheds in desired condition; 2) protect watersheds and water quality; 3) packer use needs to be compatible with other wilderness uses and values (i.e. permitted commercial livestock grazing); 4) utilize grazing practices that promote sustainable forage production for stock and wildlife; 5) utilize range management principles such as range readiness to adapt to seasonal fluctuations and timing of use; and 6) integrate efficient and clearly understood range management objectives into commercial outfitter and guide operating plans in order to effectively attain compliance.

The Packstock Management Guide (Appendix G - AA, JM DL Wilderness Plan) indicates goals and objectives that all rangelands are properly functioning and in satisfactory condition. Properly functioning riparian and meadows are defined as having adequate vegetation, landform or large woody debris present to dissipate energies associated with wind and water, filter sediments and aid floodplain development, improve floodwater retention and ground water recharge, develop diverse pond and channel characteristics and support greater biodiversity. The Wilderness Plan defines satisfactory rangeland condition as being in a high seral ecological state with greater than or equal to 50% similarity to Potential Natural Community with stable soils, continuous vegetative cover and rooting throughout the profile.
Wilderness Plan direction for forage utilization calls for monitoring key benchmarks annually. In this document, monitoring is proposed in key and selected critical areas. Key areas are established to be representative sites for the monitoring and assessment of a larger area and they are established in areas where use levels are expected to be average

and in ecological types expected to respond early to use (USDA FS Pacific Southwest Region 1997).

Since the grazing proposed under both action alternatives in this assessment is specific to meadows and pastures and not a less defined area, the key area concept does not readily apply to this project proposal. Therefore the rationale for determining the location and frequency of grazing monitoring would be based on the records of most recent past use, as found in Table 3.54. The three meadows and two pastures where use was reported in 2 out of 3 years from 2003-2005 would initially be selected as key benchmarks, as these areas are considered the baseline indicator of the proposed level and predominant locations of use in the planning area. Monitoring would be adapted to authorized areas as use levels change in the planning area, however, not more than five meadows authorized for grazing would be monitored annually.

Annual Monitoring

Two methods for determining annual utilization are outlined in the Packstock Management Guide for measuring utilization levels in meadows grazed by pack stock: the Key Species Method and Grazing Response Method. The Key Species Method is a rapid, reasonably accurate estimate of forage removed based on broad use classes. The Grazing Response Index is used to determine grazing pressure on a particular area that addresses how intensely plants in a selected area have been grazed and how many times these plants were grazed. This method is used to plan grazing patterns for subsequent years in order to maintain plant vigor and rangeland health based on the following concepts of plant health as determined by 1) frequency of defoliation, 2) intensity of use, and 3) regrowth opportunity. Annual range readiness inspections should be conducted for all meadows suitable for grazing prior to livestock use. The *R5 Rangeland Analysis and Planning Guide* (USDA Forest Service 1997) outlines the specifics for determining range readiness. Special use permits for commercial outfitters are to include conditions requiring them to cease using meadows when grazing standards are reached, and involvement in the monitoring of grazing conditions. Meadows will be closed to all pack stock grazing for the following season if over utilization of vegetation occurs.

Long Term Monitoring

The method used for determining grazing suitability for this analysis was based on a point-in-time assessment based an interdisciplinary knowledge of meadow function. The Wilderness Plan management direction, incorporated here to this proposal by reference, states that more detailed monitoring for ecological status and hydrologic function will be conducted at key benchmarks using the USFS Pacific Southwest Regional Rooted Frequency protocol for quantitative measurement of plant species composition and trend (Weixelman and Bakker 2005), the USFS Pacific Southwest Regional Toe Point Protocol for more rapid assessment of plant species composition (USDA FS Pacific Southwest Region 1969 - FSH 2209.21), the Proper Functioning Condition Protocol for Lotic and Lentic riparian areas (USDI BLM et al. 1995 and 1999), the USFS Regional Fen Checklist (in draft form), and the USFS Pacific Southwest Regional streambank alteration measurements. Adequate monitoring data also includes photo-points in critical areas and written critical area evaluations.

Grazing Standards and Guidelines

The 2001 Wilderness Plan and Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004) provide the following direction for allowable utilization standards under season long grazing and apply to wilderness and non-wilderness pack stock use:

- For meadows in early seral status: limit livestock utilization of grass and grass-like plants to 30 percent (or minimum 6-inch stubble height) (SNFPA ROD Appendix A-58)
- For meadows in late seral status: limit livestock utilization of grass and grass-like plants to a maximum of 40 percent (or minimum 4-inch stubble height (SNFPA ROD Appendix A-58)
- Degraded meadows (such as those in early seral status with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest from grazing until they have recovered and moved to mid- or late seral status (SNFPA ROD Appendix A-59).
- Browsing on hardwood and riparian shrub annual leader growth or seedlings and advanced regeneration will be limited to no more than 20 percent of the annual growth(SNFPA ROD Appendix A-59)
- In stream reaches occupied by fish, any activity that results in trampling and chiseling of stream banks should not exceed 20% of any given stream reach. Controls such as re-routing trails, relocating dispersed campsites, and/or fencing of areas will be used to manage activities and improve riparian conditions in identified areas not meeting this standard. (S/G #76 – USDA Forest Service 1991)
- Keep disturbance to streambank, natural lake and pond shorelines, caused by resource activities, from exceeding 20 percent…10 percent in essential habitat for Lahontan and Paiute cutthroat trout and Little Kern Golden Trout (SNFPA ROD Appendix A-55)
- When existing routes through riparian areas and meadows are not compatible with riparian dependent resources, consider re-routing. (S/G #79 – USDA Forest Service 1991)
- Allow picketing or tethering of stock in meadows and overnight tie-ups no closer than 100 feet of lakes and streams. (S/G #80 – USDA Forest Service 1991)
- Exclude livestock from standing water and saturated soils in wet meadows and associated streams and springs occupied by Yosemite toads or identified as "essential habitat" in the conservation assessment for the Yosemite toad during the breeding and rearing season (through metamorphosis). Wet meadow habitat for Yosemite toads is defined as relatively open meadows with low to moderate amounts of woody vegetation that have standing water on June 1 or for more than 2 weeks following snow melt. Specific breeding and rearing season dates will be determined locally. If physical exclusion of livestock is impractical, then exclude grazing from the entire meadow. This standard does not apply to pack and saddle stock. (S/G #53 – USDA Forest Service 2004)

Currently, commercial pack stock operators are required to fill out "*Stock Use Reporting Cards*" that include forage area used, numbers of stock, and estimated duration of grazing time (USDA Forest Service 2005). This data from recent years is displayed in Table 3.54.

Table 3.54: Summary of recent reported commercial pack stock use by Special Use Permit Analysis Unit

SUP Analysis Unit	Pack Station(s)	# Pack Stations Reported Grazing Use	Total Reported Use* 2003-2005 (in stock nights)		
			2003	2004	2005
Clover	MPS	0	No use	No use	No use
Chinquapin	no commercial pack stock use occurs	n/a			
Coyote	no commercial pack stock use occurs	n/a			
Dinkey Lakes	CPO	0	No use	No use	No use
Dinkey Front Country • Mill Meadow	CPO	1	No use	20	16
• Glen Meadow	CPO	1	No use	No use	60
Edison	no commercial pack stock use occurs	n/a			
Florence	no commercial pack stock use occurs	n/a			
Helms		0	No use	No use	No use
Huntington East	no commercial pack stock use occurs	n/a			
Huntington West	D&F	0	No use	No use	No use
Kaiser	D&F	0	No use	No use	No use

SUP Analysis Unit	Pack Station(s)	# Pack Stations Reported Grazing Use	Total Reported Use* 2003-2005 (in stock nights)		
			2003	2004	2005
Nelder • Iron Creek Meadow	YTPS	1	30	55	64
• Bare Island/Iron Lakes	YTPS	1	No use	12	56
• Biledo Meadow	YTPS	1	42	69	No use
• Tin Can Meadow	YTPS	1	No use	48	No use
• Soquel Meadow	YTPS	1	25	5	No use
• Quartz Meadow	YTPS	1	14	No use	No use
Nelson	CPO and D&F	0	none	none	none
Tule Meadow	CPO	no grazing in analysis unit	-	-	-
Wishon	CPO	no grazing in analysis unit	-	-	-
TOTALS			**111**	**209**	**196**

**Total reported use reflects use reported annually by Pack Station Operators*

The proposed grazing analyzed here would occur in meadows and fenced pastures outside and within wilderness associated with the base facilities and stock supported back country trips. Portions of the project area include grazing by cattle, private pack stock on recreational trips, and by commercial pack stock in association with pack stations. Refer to Tables 2.21, 2.22, 3.54, 3.55 and 3.56 for details regarding each meadow in the proposed action. Meadows that do not show reported use in Table 3.54 are considered not currently grazed for the purposes of this analysis.

Table 3.55: Summary of past and proposed management under Alternative 2 and Alternative 3 of meadows and pastures. Reference to grazing in column headings is to commercial pack stock grazing.

AU	Meadows and Pastures			
	Not grazed in past Not authorized in EIS Alt 1, 2, 3 = no grazing, no change	**Not grazed in past Authorized in EIS Alt 1 = no change Alt 2&3 = change to grazing**	**Grazed in past Authorized in EIS Alt 1 = change to no grazing Alt 2&3 = no change**	**Grazed in past Not authorized in EIS Alt 1, 2, 3 = change to no grazing**
NED	Grouse Meadow* Pike Cabin Camp Mdw	Buffin Meadow* Dutchman Lake Mdw Grizzly Creek Mdw* Upper Goat Meadow*	Bare Island Meadow* Biledo Meadow* Tin Can Meadow* Upper Iron Creek Mdw* Soquel Meadow*	Lower Iron Creek Mdw Quartz Meadow Complex*
CLO	-	-	Soldier Meadow*	-
KAI	Nellie Lake Meadow*	NE Nellie Lake Mdw*	-	-
COO	-	-	-	Perkins Camp*† Rock Meadow*†
DIL	Miner Camp Meadow South Lake Meadow SE 1st Dinkey Lake Mdw	-	-	-
NEL	Little Lake Meadow	-	-	-
DFC	-	-	Mill Meadow* Glen Meadow*	-

** = Grazed by cattle; † = Not yet assessed by IDT, would not be authorized in Alternative 2 or Alternative 3; underlined = Contains a fen.*

Environmental Consequences

Effects are the changes to the existing condition as the result of 1) actions taken by an agency, 2) actions taken by others, and/or 3) naturally occurring events. This analysis discloses effects to meadows under the proposed action and alternatives. A list of actions associated with the project area in Table 3.2 was used to analyze the nature and timing of these effects or potential effects. Connected actions, such as the commercial pack stock operations in the Ansel Adams and John Muir Wildernesses which are directed by the 2005 Pack Stock Management EIS and mitigation and design criteria are also considered. Analysis Units (AUs) are the spatial bound used in this analysis. Past and present projects that overlap within the AU are considered in this analysis if they are still contributing an effect to the meadow systems. Future projects are analyzed based on their potential effect within the AU or at the meadow scale.

Packstock grazing and travel through meadows can reduce vegetative cover and compact and dislodge soil which can lead to a decrease in rooting depth and infiltration rate for the site. The reduced infiltration rate increases the erosion potential. Increased soil density can limit rooting depths and the vegetative recovery process is slowed even if the area is not disturbed further. The degree and rate of recovery from a disturbance is affected by elevation, slope and hydrology. As elevation increases, meadow recovery decreases and

as slope increases meadow fragility and potential for erosion increases. The hydrology of a meadow dictates the species composition and soil properties.

Alternative 1

Direct and Indirect Effects

Under this Alternative, permits would no longer be issued. The meadows proposed for pack stock use would not be grazed by commercial pack stock (Table 3.54). The trampling of soil and vegetation and physical removal of vegetation through grazing by commercial pack stock would not occur. No change in conditions for meadows that were not previously grazed by commercial pack stock is expected.

This alternative would eliminate disturbance to soils and vegetation from commercial pack stock use. Six of the 20 meadows assessed would have no change, as they were not previously grazed by commercial pack stock (Table 3.55). The meadows that have been grazed (12 meadows) in the recent past by commercial pack stock (Table 2.21), were grazed for short periods of time, known as short duration-high frequency grazing, or episodic grazing that is not sustained over a long period of time. The absence of grazing would readily allow for seed germination, seedling establishment and nutrient transfer into the soil to occur more readily under this alternative. Areas that have been grazed by commercial stock prior to this analysis may have improved conditions under this alternative. Bare ground may decrease and beneficial changes in species composition may occur, depending on the intensity and frequency of past grazing and lingering historical impacts. Vegetation from each season's growth, known as litter, would accumulate throughout these meadows, where it may have previously been harvested by grazing stock, resulting in improved cover to protect soils. Two meadows with fen habitat would have no impact from commercial pack stock grazing (Table 2.21).

Cumulative Effects

The removal of pack stations and associated use of the meadows would allow for some recovery of the meadows that are currently grazed, depending on the level of lingering effects from historic unmanaged cattle and sheep grazing. Eight meadows that have been grazed in the past would not be grazed. Twelve meadows would remain ungrazed by commercial pack stock under this alternative. Seventeen meadows that are also part of active cattle allotments would continue to be grazed intermittently by cattle or recreational stock users or not grazed at all.

The meadows described in detail in this analysis would not receive pack stock grazing under this alternative. Cattle grazing is authorized in several of the meadows analyzed and would continue, however, this alternative would reduce the combined effect or potential effect (as some of the meadows have not received use by commercial pack stock) of cattle grazing and pack stock grazing in the same location. Recreational activities and wildland use fires (naturally occurring fires that are allowed to burn in wilderness) would continue to be managed within the project area.

Alternative 2

Direct and Indirect Effects

Grazing animals can affect a meadow by changing the plant species that grow there, changing the meadow's productivity, and by increasing the amount of bare ground affecting the meadow's overall condition (Blaney et al 2001). Meadows within and outside wilderness analyzed here are generally considered to have had either historic, and/or recent past use or current use by livestock in this analysis. The meadows analyzed here are located within boundaries of vacant or actively grazed cattle allotments. Four of the 20 meadows analyzed (24 meadows total in analysis area) are fenced pastures proposed for use exclusively by commercial pack stock operators (Table 2.22).

Meadow soils, vegetation and hydrology may be affected by grazing animals through trampling of vegetation and soils from hoof punching, trailing, dust bathing, and removal of vegetation. Hoof impacts that persist can lead to sod fragmentation that dries soil making it less conducive to vegetative rooting and growth. The most sensitive areas in a meadow seem to be wet areas and effects to these areas may last longer than in xeric sites. Trampling, trailing and rolling by stock may lead to soil compaction, erosion, creation of bare ground and changes in plant composition. Wet areas and other sensitive habitat, such as fens, are examples of areas where management practices should be used to avoid impacts. Grazing can affect productivity levels and species composition. A study on effects of recreational pack stock grazing on alpine meadows in Yosemite National Park indicated reduced productivity and basal vegetation and soil cover in grazed treatments. As the duration (hours) of grazing increased, bare soil increased and vegetative cover decreased (Cole et al 2004).

Under the proposed action, commercial pack stock will be managed to meet desired conditions by controlling when and how long the meadows are utilized. Pack stock will be managed to reduce resource impacts to meadow vegetation, soils, streambanks and hydrologic function. The grazing use will be managed using range readiness criteria, stock night determinations, allowable use levels, stream disturbance monitoring and long term condition and trend monitoring. Monitoring of vegetative utilization and streambank disturbance will occur at selected key areas as described in the 2001 Wilderness Plan. These standards and guidelines would become part of the special use permit and are included in the annual operating instructions for each pack station. Forest-wide grazing start dates, as required in the 2001 Wilderness Plan, are issued annually to commercial pack station operators through Forest Orders and annual operating plans, and include on dates for grazing based on indicators of soil moisture (snow water content) and expected growth to withstand grazing pressure. On-dates for grazing in meadows occupied by the Yosemite toad are determined by the Forest aquatic specialists based on predictions of snow melt and toad development timeframes. This information is provided to line officers and permit administrators for incorporation into the annual operating plans.

Cumulative Effects

Light to moderate grazing by deer, bighorn sheep and small mammals is believed to have occurred in the Sierra Nevada prior to the arrival of Spanish and Mexican colonists

(Ratliff 1985) and large elk herds were present on the west side of the range (Menke et. al. 1996). The Gold Rush created a booming industry for livestock producers in California. Ranchers grazed their cattle and sheep in the fertile Central Valley and Sierra foothills and when the drought years of the 1860s and 1870s left limited forage in the valley and foothills, ranchers ran their stock to the higher alpine meadows of the Sierra Nevada to keep them from starving (Blaney et al 2001).

Historical pack stock use in support of sheep and cattle grazing, mining operations, logging operations, and for recreation purposes likely greatly exceeded the numbers and geographic extent of today's use (USDA Forest Service 2005). Recreational saddle and pack stock have used this area for decades as well. The residual effects of historic and often abusive grazing have left an impact on the meadow habitat by altering species composition, compacting meadow soils and incising streams through repeated hoof shearing and chiseling and combined overuse of streamside vegetation that holds the soil in place during high flows. Impacts are evident by lowered water tables that persist within the analysis area. Beginning in the 1930s and 1940s, scientists became concerned with the effects of livestock use on the fragile meadow ecosystem and studies of the vegetation and soils in the Sierra Nevada determined that grazing was one of many factors that could contribute to degraded meadow conditions. Another factor is lodgepole pine encroachment into meadows due to residual effects from historic overuse and possibly current grazing effects and fire suppression. Lodgepole pine invasion in meadows is influenced by grazing since it directly affects the vegetation and soils, often creating a suitable niche for lodgepole pine germination. However, lodgepole pine encroachment may also be the result of plant succession, as it occurs in both grazed and ungrazed meadows. The effect of this advancement of lodgepole into meadows reduces the area of open meadow, alters light and moisture availability in the soil for herbaceous plants alters species composition that trends towards undesirable species in terms of meadow productivity and forage value (Ratcliff 1985).

Areas considered suitable for grazing met certain evaluation criteria addressed by the interdisciplinary team. Although some meadows may have exhibited evidence of past impacts, these impacts are not so pervasive to prohibit further grazing use and removal of grazing would not necessarily ameliorate the past impacts that may be visible today. Meadows will be grazed under current standards to meet or move toward desired conditions under Alternatives 2 and 3.

Current levels of commercial pack stock use are generally less than the stock nights proposed under Alternatives 2 and 3 and areas that have been grazed appear to be meeting resource goals and objectives. Cattle numbers are not expected to increase within the project area. Based on past analyses of range allotments within the project area, it is likely that cattle grazing will continue to be authorized in the future, so the potential for overlapping use will continue and the grazing utilization thresholds may be reached sooner in these meadows as the season progresses.

Recreational stock use does not appear to directly overlap with the meadows suitable for grazing that are located outside the wilderness. Forest visitors use the Dinkey Front

country, Dinkey Lakes, Kaiser and Nelder Analysis Unit and possibly other units for day riding. Recreational overnight stock use may overlap at Nellie Lake, which has several large stock camps adjacent to the lake.

It is difficult to determine if recreational stock use will increase from current levels in these wilderness and non-wilderness areas, however, the price of fuel, feed and operational costs associated with owning pack stock combined with the specialized expertise required to use pack stock in a backcountry setting, may all combine to deter potential increases in recreational pack stock use.

Probable foreseeable future actions within the project area include vegetation, recreation and infrastructure management actions (Table 3.2). Of the foreseeable future actions, cattle grazing, stock supported and non-stock supported recreational use, off highway vehicle use (OHV) fuels and fire management, including the wildland fire use program, as administered in wilderness areas have the potential to impact the meadows in the project area. The cumulative effects of overlapping use by cattle and pack stock exist in multiple areas that were assessed during this analysis including non-wilderness meadows such as Soquel, Upper Iron Creek, Buffin, Biledo, Soldier, and Grizzly meadows. The meadow NE of Nellie Lake is within the Kaiser Allotment. This area also receives some recreational pack stock use. However, the standards and guidelines for grazing would be applied to both commercial cattle and pack stock grazing to minimize impacts. Monitoring would detect impacts if they occur and prevent conditions from deteriorating away from desired conditions.

Operations in the Ansel Adams and John Muir Wildernesses are directed by the 2005 Pack Stock Management EIS.

Alternative 3

The effects of Alternative 3 are the same as under Alternative 2 with the exception of a potential for reduced effects in the Kaiser Analysis Unit, as discussed below.

Direct, indirect and cumulative effects under this alternative may be less than Alternative 2, as limits on the number of stock (stock at one time limits) in this area and the number of trips allowed provide a temporal control and subsequent use may be more restricted than what is described under Alternative 2. Although critical areas would be protected from grazing impacts this destination management alternative also provides an improved opportunity to manage resource issues since the use is more strictly controlled and resource impacts, if they occur, can be traced to a particular pack station more readily. Monitoring would detect impacts if they occur and prevent conditions from deteriorating away from desired conditions.

Operations in the Ansel Adams and John Muir Wildernesses are directed by the 2005 Pack Stock Management EIS.

3.3.4.4 Analysis Unit Level Evaluation

This section focuses on effects associated with the meadows in the analysis units.

NELDER (NED)

Affected Environment

Yosemite Trails Pack Station uses this analysis area to provide day rides and overnight pack stock supported trips. This analysis addresses over night pack stock grazing in the northern portion of this analysis unit in order to support overnight trips. The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56 for meadows assessed for commercial pack stock grazing use in the Nelder Analysis Unit.

Bare Island Lake Meadow is adjacent to the trail that accesses the lake and associated camps. No evidence of hydrologic function alteration, sod fragmentation or soil compaction was observed in this meadow (Table 3.56). Changes in species composition from potential natural community were not evident. Although this meadow is also within the Iron Creek Allotment, the meadow and surrounding area receive little use by cattle. The low to moderate forage production in the meadow could support pack stock use for approximately 10 stock nights per season.

Biledo Meadow is part of the Iron Creek Allotment and receives occasional use by cattle. The meadow has a very active spring headwaters and spring channel that flows year round through the meadow and because of this the majority of the meadow is generally too wet to support much concentrated pack stock use. An old road adjacent to the meadow is also causing some resource issues, such as localized erosion although overall the meadow has slight hydrologic function alteration, and is rated at PFC (Table 3.56). Approximately 50 stock nights are allocated for this meadow (Table 2.21). Reported use in 2004 (Table 3.54) exceeds the stock nights authorized for this meadow.

Buffin Meadow is part of the Iron Creek Allotment and receives use by cattle as they are being trailed to the allotment holding field to the northeast. A trail that crosses the meadow is causing localized erosion. This trail is not used by commercial pack stock, but is used recreationally. The meadow has low to moderate forage production and the southern portion of the meadow is too wet to support stock use. No sod fragmentation, but evidence of slight hydrologic function alteration and moderate compaction were observed in the meadow. Isolated changes in species composition from PFC were also observed (Table 3.52). Patches of bull thistle (*Cirsium vulgare*), which is a noxious weed, are present in the meadow. Approximately 119 stock nights are authorized for this meadow (Table 2.21).

Dutchman Lake Meadow would support late season grazing (after August 15) if stock are managed to avoid wet areas and the potential fen habitat in the meadow. The meadow has no evidence of hydrologic function alteration in the area surrounding the lake, however, the upper portion of the meadow is dry with a faint trail that is now somewhat re-vegetated. Sod fragmentation was not observed and very little compaction evident.

No evidence of recent grazing was observed in meadow. The meadow vegetation included many plant species, such as *Carex* spp. which is typical of a meadow in late ecological status.

Grizzly Creek Meadow is a mostly dry, somewhat sloping meadow that is also grazed by cattle. This meadow has low to moderate forage production and is mostly range ready throughout the season with the exception of the lower portion of the meadow, which stays wet most of the season (Table 2.21). Stock would need to be managed to avoid this wet area. No evidence of hydrologic function alteration was observed. There is moderate severity of sod fragmentation (from cattle use) and slight compaction, mostly from the trail that bisects the meadow. There were few changes in plant species composition from the potential plant community (Table 3.56).

Grouse Meadow was not assessed for commercial pack stock grazing suitability. Lower Iron Creek Meadow is a dry, sparsely vegetated hillside grassland area with low forage production. Although no grazing or resource impacts were observed (Table 3.56), this meadow does not produce enough forage for even minimal pack stock grazing.

Pike Cabin Camp Meadow is located to the northeast of Dutchman Lake. This meadow has a willow component and moderate forage production, however, this meadow was not assessed by the IDT and therefore grazing is prohibited.

The Quartz Meadow Complex is grazed by cattle permitted on the Mugler Allotment. There is evidence of hydrologic function alteration with some downcutting in the spring channel associated with this meadow (Table 3.56) with moderate sod fragmentation from hoof punching. There is potential for conflicting use by pack stock and cattle in this area combined with the fact that meadow is occupied by Yosemite toad, a Forest Service sensitive species and therefore pack stock grazing is prohibited.

Tin Can Meadow is a dry to moist meadow with low to moderate forage production. The meadow has slight evidence of hydrologic function alteration and moderate compaction, related to the impacts from the camp on the meadow's edge and the trail that bisects the meadow (Table 3.56). Bull thistle is also present in the meadow. Reported use in 2004 was 48 stock nights, which correlates with the recommendation of up to 40 stock nights of use annually (Table 2.21).

Upper Goat Meadow has moderate forage production and 280 stock nights have been allocated (Table 2.21). This meadow has evidence of slight compaction and hydrologic function alteration (Table 3.56). Lower Goat Meadow was not assessed for grazing suitability in this analysis.

Upper Iron Creek Meadow has moderate forage production composed of many late seral species. A trail bisects the meadow which provides access to Iron Creek and the South Fork of the Merced River. This trail is routinely traveled by a small bunch of permitted cattle associated with the Iron Creek Allotment. An existing headcut in the western portion of the meadow appears to be stable, but may have influenced the overall

hydrologic function and productivity of the meadow (Table 3.56). Reported stock use is within the 100 stock nights which would be authorized. Use has not exceeded 64 stock nights since 2003.

Soquel Meadow is currently used as a gathering pasture for cattle associated with the Soquel Allotment. This meadow is entirely fenced, adjoins private land and has high forage production with 400 stock nights available on Forest Service portion of the meadow (Table 2.21). Soquel Meadow has slight hydrologic function alteration, low severity of sod fragmentation and slight compaction. Some isolated or patchy changes from PNC were observed (Table 3.56).

Use by pack stock in Soquel Meadow would be coordinated with the grazing permittee to ensure that standards are not exceeded. Recent reported use by YTPS was 25 stock nights in 2003 and 5 stock nights in 2004 and utilization inspections of the meadow at the end of the cattle grazing season have shown that the combined use has been within standard. In June 2005 a pair of great gray owls was observed in the western arm of the meadow. More restrictive grazing utilization standards would apply if this area is identified as a breeding site for the owl in an effort to maintain hiding cover for the owl's prey base (USDA Forest Service 2004).

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Meadows in this analysis unit that have been grazed during the 2003-2005 seasons are shown in Table 3.4. There would be no change in the effects to these meadows: Buffin, Dutchman, Grizzly, Grouse, Pike Cabin Camp and Upper Goat meadows, as they are not currently grazed by commercial pack stock. Biledo, Iron Creek and Soquel meadows were more often used than the other meadows in the analysis unit (Table 3.54). Little change would be seen in the grazed meadows within this analysis unit that had no or slight hydrologic function alteration, or slight to no sod fragmentation or soil compaction (Table 3.56). Meadows such as Tin Can, Grizzly and Buffin had moderate sod fragmentation or compaction due to trails crossing through these meadows. The trail in Tin Can is being re-routed out of the meadow under a separate proposed action. The general public and the permitted cattle in Iron Creek Allotment use the trail in Grizzly Meadow. YTPS does not use the trail through Buffin, however, the general public (hikers and riders) do use this trail. The no action alternative would not have any adverse or beneficial effects to vegetative or soil conditions in Tin Can, Grizzly and Buffin Meadows. The no action alternative would have potentially beneficial effects to vegetative or soil conditions in the remaining meadows due to rest from commercial pack stock grazing activities.

Cumulative Effects

Historic effects from unmanaged grazing are lingering in Buffin, Quartz and Upper Goat meadows. These meadows have altered hydrologic function evidenced by down cut stream channels. Those conditions would not change as a result of this alternative, except for Quartz Meadow, which has been grazed by commercial pack stock recently. Areas in

this analysis unit that would continue to receive use by cattle include Upper Iron Creek Meadow, Soquel Meadow, Buffin Meadow, Biledo Meadow, Quartz Meadow Complex and Grizzly Creek Meadow. The season of use in the Soquel Allotment which includes Soquel and Buffin meadows is from June 1 through October 15 with approximately 200 cow/calf pair. Quartz Meadow is within the Mugler Allotment with a season of July 1 through September 15 with 209 cow/ calf pair. Biledo, Upper Iron Creek and Grizzly meadows are grazed by cattle permitted in the Iron Creek Allotment with 160 cow/calf pair from June 15 through September 30. Recreational stock use is known to occur within the AU, but effects of this were not observed during field assessments. This use is expected to continue incidentally with localized effects and would not cause a cumulative effect. Various recreational activities (listed in Cumulative Effects- Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this alternative. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and pack stock grazing would not overlap since pack stock use would not be authorized and no cumulative effect would occur.

Alternatives 2 and 3

Direct and Indirect Effects

Adverse changes in the meadow condition and trend under these alternatives is not likely, based on the project design measures of utilization and streambank disturbance standards. The use of range readiness standards and guidelines would also reduce the potential effects of compaction and stream disturbance. Localized trampling, hoof punching and removal of vegetation would occur, however, the enforcement of the above mentioned standards, designed to maintain or move systems toward desired conditions, would limit adverse or lasting effects from grazing. Biledo Meadow is the only meadow in this analysis unit with a reduction in stock nights under this alternative from the current level of use. The proposed level of authorized use would limit the level and intensity of grazing in this meadow and reduce impacts. Utilization standards and guidelines are in place to ensure that both cattle and pack stock use, whether combined or not, does not exceed the maximum allowable use for the meadow.

Cumulative Effects

Soquel Meadow, Buffin Meadow, Biledo Meadow, Upper Iron Creek Meadow, and Grizzly Creek Meadow, all of which are proposed for pack stock grazing in this analysis unit, are currently grazed by cattle under grazing permits. There is potential for conflicting use by pack stock and cattle in these areas. Overlapping use from cattle and pack stock would occur but current conditions are not expected to change with the proposed levels of use. The existing roads and trails that are adjacent to these meadows have had lingering effects on the meadow condition, by interrupting natural hydrologic processes and water tables and by compacting soils adjacent to the meadow edge. These effects are considered lingering, but not actively impacting these meadows with the exception of the road adjacent to Biledo Meadow. Various recreational activities (Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this alternative. An increase in cattle use is not expected and current levels of use should

remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and pack stock grazing would overlap in Soquel, Buffin, Biledo, Upper Iron Creek, Goat Meadow, Bare Island, Tin Can and Grizzly meadows, creating the potential for a cumulative effect. This is unlikely since the levels of cattle use are not at or near thresholds of allowable use and maximum allowable use standards apply to the total amount of combined grazing by pack stock or cattle.

CLOVER (CLO)

Affected Environment

This analysis unit is located in the vicinity of the Clover Meadow Ranger Station west of the border of the Ansel Adams wilderness. Minarets Pack Station (MPS) has its base camp in the unit and generally uses this area for day rides and wilderness access. Soldier Meadow is the only meadow requested for overnight pack stock grazing in this unit, although this meadow is not currently used by pack stock. The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56.

In 1890, Yosemite was made a national park, and the U.S. government brought in the cavalry to guard and patrol the park boundaries to deter illegal timber and grazing activities (Blaney et al 2001). The cavalry grazed their stock on park meadows, including Soldier Meadow, which at the time was still within the boundary of the Park. The meadow was also briefly used by the Jones pack station during the 1950s-60s as a spike camp and has also been grazed periodically by cattle (pers. comm. Owen Topping 2004). The meadow has traditionally been used by the public since that time as a "tourist pasture" and more recently by the local chapter of the Backcountry Horsemen (BCH) for recreational stock use. Soldier Meadow has been requested for use as a stock camp and holding field for commercial pack stock; it has not been used by commercial stock in the past. This nine acre holding field has moderate forage production and some isolated changes away from the potential natural plant community. The channel within the holding field was rated as being in proper functioning condition. The Forest Service sensitive clover, *Trifolium bolanderi*, was found in the pasture. Although stock watering accessibility is limited in the fenced portion of the meadow, the IDT determined that the meadow was in good condition and suitable for stock use for approximately 180 stock nights based on an average of 1,650#s/acre forage production with a 40 percent utilization standard.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Direct impacts to soils and vegetation from stock use (i.e., soil compaction, vegetation trampling and utilization) would not occur at Soldier Meadow under this alternative. The meadow is rated at PFC, has little evidence of hydrologic function alteration, sod fragmentation or soil compaction and some isolated changes in species composition from the potential natural plant community (PNC) (Table 3.56). The no action alternative

would have no effect to the herbaceous vegetation from commercial pack stock use, as it has not been grazed by the pack station.

Cumulative Effects

The water table and general species composition of the meadow was considered slightly altered from historic past uses. Commercial cattle grazing would continue in the area and the meadow may be used by recreational pack stock users, as it has in the past. Cattle grazing would occur from June 16 through September 30 with 116 cow/calf pair. Use has been within standard. Recreational pack stock use may occur in this meadow in the foreseeable future, as part of low impact stock use seminars and campouts in conjunction with trail maintenance that a local BCH chapter facilitates. OHV and other recreational activities (Table 3.2) would continue in the AU with localized effects that would not cumulatively impact Soldier Meadow under this alternative. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

Utilization standards and guidelines are in place to ensure that both cattle and pack stock use does not exceed the maximum allowable use and that desired conditions are maintained or that vegetative condition trends toward desired conditions. Minor effects from hoof punching and grazing on herbaceous vegetation would occur, however changes in the overall meadow condition with the proposed grazing would not occur. Forage utilization and streambank disturbance standards and use of range readiness standards and guidelines would minimize impacts to soils and vegetation.

Cumulative Effects

Recreational use would occur on an intermittent basis. Use by commercial pack stock has not occurred in this meadow. Cattle grazing would not occur in this meadow but would continue in the adjacent South Jackass Allotment. The meadow condition is not expected to change from the current condition with the pack stock use as grazing standards and guidelines will be administered. Fuels or vegetation management activities are not proposed within the AU and past pre-commercial thinning projects have not directly beneficially affected Soldier Meadow in terms of increasing meadow productivity, but have had some minor beneficial effect on a watershed scale by reducing tree density (stocking) and increasing infiltration adjacent to and within the AU. The meadow is outside of wilderness and near system roads and two Off Highway Vehicle (OHV) Routes - Green Mountain and Cattle Mountain OHV Routes. There did not appear to be any OHV impacts or other recreation related impacts to the meadow were not evident at the time of the assessment. The adjacent road is in need of maintenance. OHV and other recreational activities (Table 3.2) would continue in the AU with localized effects, and are not expected to cumulatively impact Soldier Meadow combined with this proposal. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and

pack stock grazing would not overlap and levels of cattle use are not at or near thresholds of allowable use to create a cumulative effect.

EDISON (EDI)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Commercial pack stock grazing does not currently occur, nor is it proposed in this analysis unit.

Cumulative Effects

The no action alternative would have no adverse or beneficial effects to vegetative or soil conditions. Commercial cattle grazing would still occur in this analysis unit from July 1 through October 15 with 100 cow/calf pair, however, there would be no direct or indirect effects from pack stock use under the no action alternative from combined grazing (pack stock and cattle). Recreational pack stock grazing may occur in this analysis unit with localized effects to soils and vegetation. Various recreational activities (listed in Cumulative Effects- Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this alternative. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Pack stock grazing would not be authorized so there is no potential to combine to create a cumulative effect in the AU.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action would not result in direct effects to soils, water quality, or hydrology relative to the existing condition, as pack stock grazing is not proposed in this analysis unit.

Cumulative Effects

Effects from cattle grazing are expected to occur in this analysis unit, however, these grazing practices are managed using utilization standard and guidelines designed to mitigate lasting impacts of grazing use. Effects from combined grazing (pack stock and cattle) would not occur, however, private equestrian use would continue with localized effects to soils and vegetation. Other recreational activities (listed in Cumulative Effects- Table 3.2) would continue in the AU with localized effects that are not expected to cumulatively impact the AU when combined with this proposal. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Pack stock grazing would not be authorized so there is no potential to create a cumulative effect in the AU.

CHINQUAPIN (CHQ)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

The effects of pack stock grazing would not occur. Vegetation would not be removed and trampling by pack stock would not occur, therefore, impacts to soils, water quality, and hydrology are the same as the proposed action.

Cumulative Effects

Effects from cattle grazing are expected to occur in this analysis unit which is within the Hot Springs Allotment grazed July 1 through September 15 with 54 cow/calf pair, however, these grazing practices are managed under a permit that incorporates utilization standard and guidelines designed to mitigate lasting impacts of grazing use. No cumulative effect is expected under this alternative. Since pack stock use was not proposed for this area, any potential combined effects from both cattle grazing and pack stock would not occur. Recreation equestrian use would continue, but effects would be localized. Various recreational activities (listed in Cumulative Effects- Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this alternative. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Pack stock grazing would not be authorized so there is no potential to create a cumulative effect in the AU.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action would not result in increased direct effects to meadows and the associated soils, water quality, or hydrology relative to the existing condition.

Cumulative Effects

No additional use was proposed for this area, so any effects from combined grazing (pack stock and cattle) would not occur. Various recreational activities (listed in Cumulative Effects- Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this proposal. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

FLORENCE (FLO)

Affected Environment

HSPS uses the Jackass Meadow complex, a portion of which is physically located within this AU and in the John Muir Wilderness. Commercial pack stock grazing and associated effects are not addressed in this document for this analysis unit but are referenced in the 2005 Pack Stock Management EIS.

KAISER (KAI)

Affected Environment

Two meadows were assessed for grazing suitability in this analysis unit: NE Nellie Lake Meadow (9000' elevation) and Nellie Lake Meadow (8900' elevation). NE Nellie Lake Meadow is considered suitable for late season pack stock grazing. Although the majority of this meadow was dry, intermixed spring areas will be protected by controlled pack stock grazing (hand grazing). A small headcut in the upper portion of the meadow should be monitored as well as the downcut channel adjacent to the trail #26E06A that goes to Nellie Lake this portion of the trail, which lacks water bars, may be contributing to the observed channel instability. Cattle are permitted within and outside the Kaiser Wilderness northwest of Huntington Lake. The potential for overlapping use between cattle and pack stock is evident in the two meadows assessed in this analysis unit, although D&F Pack Station did not report any overnight grazing use in this area for the period between 2003-2005 (Table 3.54). Current livestock use by permitted cattle is within standard and overlapping use by pack stock may cause impacts. On-dates for grazing in meadows occupied by the Yosemite toad are determined by the Forest aquatic specialists based on predictions of snow melt and toad development timeframes. This information is provided to line officers and permit administrators for incorporation into the annual operating plans.

Nellie Lake Meadow is adjacent to Nellie Lake. The meadow had moist soils in October, so it is unlikely that this area dries out enough to support concentrated stock use. Hoof punching was observed where stock had been led to the lake to be watered. Several camps, including stock camps, are dispersed around the lake. Current use by permitted cattle is within standard. Range readiness concerns and water quality issues, due to the meadow's proximity to the lakeshore and overlapping use by permitted cattle are the primary reasons this meadow is unsuitable for pack stock use (Table 2.21). The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

The meadows in the analysis area have not been grazed by commercial pack stock (recently) and would not be grazed under this alternative, so the direct effects to vegetation and soils, such as trampling and soil displacement, would not occur. Meadow condition would remain unaffected as commercial use by pack stock has not been

reported or known to have occurred in this analysis area as a result of implementation of this alternative.

Cumulative Effects

Pack stock use would not be proposed for this area under this alternative. Grazing by cattle would continue from July 1 through September 30 with 100 cow/calf pair. There would be no change from current condition to soils and vegetation under this alternative. Recreational stock use would continue with associated localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, with no cumulative impact under this alternative. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns.

Alternative 2

Direct and Indirect Effects

D&F pack station is the only operator in the KAI analysis unit. Two meadows were assessed for grazing suitability, only one of which was determined suitable, NE Nellie Lake Meadow (Table 2.21). Pack stock grazing was not recommended at Nellie Lake Meadow due to range readiness concerns. NE Nellie Lake Meadow could support pack stock use, however this meadow is occupied by Yosemite toad and restrictions on grazing timing due to the toad's occupancy may limit the feasibility for pack station operators to graze this area. There would be direct impacts to soils, although the meadow is currently grazed by cattle, and soil compaction relative to the existing condition is not likely to be measurable (Table 3.56).

Cumulative Effects

Grazing by pack stock and cattle would overlap and in some areas with recreational stock users, as well. Cattle are currently permitted to use the area, and have used NE Nellie Lake and Nellie Lake meadows, although use was observed as light (6-20 percent use by weight) at the time of the field assessment. Commercial pack stock use is expected to potentially result in a slight adverse cumulative impact to meadow vegetation when compared to the no action alternative. Standards and guidelines would be implemented to minimize these effects. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and pack stock grazing could potentially combine to create a cumulative effect in the AU since use would overlap geographically at NE Nellie Lake Meadow. However, levels of use are not at or near thresholds of allowable use in terms of the cattle grazing.

Alternative 3

Direct, Indirect Effects and Cumulative Effects

This alternative places an emphasis on managing for conditions at destinations in the Kaiser and Dinkey Wildernesses and the South Fork of the Merced Wild and Scenic River. Specifically, grazing is proposed in the Kaiser Wilderness only and the total allowable use for the grazing that would be authorized in NE Nellie Lake Meadow would not differ from what is permitted under Alternative 2. Stock numbers would differ in that

D&F pack station would be authorized 25 stock at one time. Only 6 trips are authorized annually to this destination, whereas trips are managed by service days and trailhead quotas under Alternative 2.

Direct, indirect and cumulative effects under this alternative may be minimized compared to Alternative 2, as limits on the number of stock (stock at one time limits) in this area and the number of trips allowed provide a temporal control and subsequent use may be more restricted than what is described under Alternative 2. In addition to protecting critical areas from grazing impacts, this destination management alternative provides an improved opportunity to manage resource issues since the use is more strictly controlled and resource impacts. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since an increase in future recreational use is not expected. Again, commercial cattle and pack stock grazing could potentially combine to create a cumulative effect in the AU since use would overlap geographically at NE Nellie Lake Meadow. However, levels of use are not at or near thresholds of allowable use in terms of the cattle grazing.

EAST HUNTINGTON (HNE)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for any meadows in this analysis unit under the proposed action. Direct impacts to soils, water quality, and hydrology would not occur.

Cumulative Effects

No pack stock use was proposed for this area. Cattle grazing in the Blasingame and Kaiser allotments would continue in this analysis unit with effects to meadow soils and vegetation, water quality, and hydrology. Day use by recreational stock use would have localized effects. This area is used as access to the Kaiser Wilderness and overnight use would not likely occur in the AU. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since an increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Commercial pack stock would not be authorized so no cumulative effect would occur since use by cattle would not overlap geographically.

Alternatives 2 and 3

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for any meadows in this analysis unit under the proposed action. Effects to meadow soils and vegetation, water quality, or hydrology relative to the existing condition would not occur under this alternative.

Cumulative Effects

No pack stock use was proposed for this area. Cattle grazing and recreational stock use would continue to occur with associated localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these proposals, especially since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Commercial pack stock would not be authorized so no cumulative effect would occur since use by cattle would not overlap geographically.

WEST HUNTINGTON (HNW)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for meadows in this analysis unit under the proposed action. Effects to meadow soils and vegetation, water quality, or hydrology from commercial pack stock use would not occur under this alternative.

Cumulative Effects

No pack stock use was proposed for this area. Cattle are not permitted in this analysis unit due to conflicts with recreational use adjacent to Huntington Lake. Recreational stock use pass through this analysis unit to get to the Kaiser Wilderness and this use would continue with associated localized effects.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action would not result in increased direct effects to soils, water quality, or hydrology relative to the existing condition.

Cumulative Effects

No pack stock use was proposed for this area. Cattle grazing occurs within a portion of this analysis unit and recreational stock use would continue with associated localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase in future recreational use is not expected.

COYOTE (COO)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit. Rock Meadow is a location within the analysis unit that is currently used by D&F pack station.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for any meadows in this analysis unit under the proposed action. Possible improvement in vegetation cover and seral status would be expected from rest from commercial pack stock grazing in Rock Meadow. The meadow would need to be addressed by an IDT in order to authorize future use. Impacts to soils, water quality, or hydrology from commercial pack stock use would not occur under this alternative.

Cumulative Effects

Cattle graze within this analysis unit in the Blasingame Allotment with associated localized effects to soils and vegetation. Recreational stock use would continue. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action does not include pack stock use within this analysis unit. The proposed action would most likely improve the existing condition at Rock Meadow and Perkins Camp with rest from grazing.

Cumulative Effects

Cattle and recreational stock would continue to graze within this analysis unit with associated localized effects to soils and vegetation. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact to meadow condition under these alternatives, primarily since a measurable increase in future recreational use is not expected. An increase in cattle use is also not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Commercial pack stock would not be authorized so no cumulative effect would occur since use by cattle would not overlap geographically.

DINKEY LAKES (DIL)

Affected Environment

This analysis unit is used primarily by Clyde Pack Outfit (CPO) and D&F Pack station and is located entirely within the Dinkey Lakes Wilderness. CPO accesses the analysis unit from the Cliff Lake trailhead from the south. D&F accesses the analysis unit from the Badger Flat trailhead from the north. The meadows assessed in this Analysis Unit have either been identified as grazing use areas by D&F Pack Station or CPO Pack Station or have been inventoried due to their potential for future use by commercial outfitters. Both of these commercial outfitters have Special Use Permits that authorize incidental grazing, defined as day use or overnight grazing in all areas in the Dinkey Lakes Wilderness, with the exception of Dinkey Lakes Basin, where overnight stock use is prohibited. Commercial pack stock use is restricted in the Dinkey Lakes Basin in order to protect streamside and watershed conditions, as the Basin is considered "a heavily impacted day use zone" (USDA Forest Service 2001). Grazing by cattle does occur within portions of the Dinkey Lakes Wilderness.

Miner Camp Meadow (9300' elevation) has been identified as a grazing use area by D&F Pack Station and CPO has a client drop camp adjacent to this meadow. D&F and CPO are not authorized to graze stock in the Dinkey Lakes Basin, as indicated in the Wilderness Plan and Annual Operating Plans for these pack stations. Miner Camp Meadow is unsuitable for pack stock grazing due to low forage productivity (200-400 #/acre), saturated soils throughout the majority of the season and evidence of historic grazing impacts, all of which make this meadow highly susceptible to impacts (Table 2.21). Historic impacts may have been responsible for the apparent shift in composition from late to early seral species, represented by the abundance of *Aster alpigenus ssp. andersonii* present in much of this meadow. PFC assessment was conducted, and this channel rated functional at risk (FAR).

Southeast First Dinkey Lake Meadow (9239' elevation) was assessed by the IDT and was determined to be not suitable for grazing. Portions of the meadow appear to be in recovery from past disturbance as these areas are dominated by *Aster alpigenus* spp. *andersonii* and somewhat hummocky topography, which is often indicative of past impacts from overgrazing and hoof punching. A majority of this meadow is never range ready and the forage production is considered low because soils are to wet to support grazing impacts. A PFC evaluation was not conducted at Southeast First Dinkey Lake Meadow, although there is a perennial stream channel inlet that enters the southern portion of the meadow from South Lake. First Dinkey Lake Meadow has potential fen habitat, as sphagnum moss and peatland conditions were present in numerous locations. A complete fen inventory has not been completed for this meadow. There was no sign of incidental grazing in this meadow at the time of the assessment, although an area of decomposed granite located to the east of the meadow had been used as camp with pack stock at some point during the season. Overall, the meadow was considered to have a low to moderate resiliency due to soil moisture and the relatively short growing season and grazing is not recommended (Table 2.21).

South Lake Meadow (9320' elevation) was assessed by the IDT and is considered unsuitable for pack stock grazing due to the close proximity to the lake and associated water quality concerns, range readiness concerns due to high soil moisture and the patchy, low production of forage species on the site (Table 2.21). There was no sign of incidental grazing in this meadow at the time of the assessment. No PFC evaluation was conducted on this site, but site was visually estimated at PFC. A fen inventory has not been completed for South Lake Meadow. The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

The meadows in this analysis unit that were assessed were not considered suitable for commercial pack stock grazing. Based upon this determination, no commercial stock use is proposed for this analysis unit.

Cumulative Effects

Cattle grazing in the Blasingame Allotment would continue within the northwestern portion of this analysis unit with localized effects. The season of use is June 21 through September 15 with 235 cow/calf pair. Cattle from the adjacent Dinkey Allotment, also within the analysis unit, do not typically reach the boundary of the Dinkey Lakes Wilderness. Recreational stock use would continue in portions of the analysis unit, but the closure to overnight stock use in the Dinky Lakes Basin, established in the 2001 Wilderness Plan, remains in effect. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact within meadows under this alternative, since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

Grazing by commercial pack stock would not occur in this analysis unit based on the IDT concerns that direct impacts to soils, vegetation and possibly TES species such as the Yosemite toad and its habitat would occur with grazing. Meadows in the analysis unit are surface wet throughout much of the season and do not reach range readiness over a large portion of the meadow. Grazing impacts particularly in the Dinkey Lakes Basin meadows would further influence the species composition, which has already shifted away from desirable forage species to invader or increaser forbs such as *Aster* spp.).

Cumulative Effects

The meadow condition, mostly altered from historic high use, would continue to be rested and vegetative conditions could improve, but it could take decades of non-use to see any shift in species composition conditions. Recreational day use by stock users and hikers and back packers would continue, especially in the Dinkey Lakes Basin but the closure to overnight stock use in the Basin would continue to be in effect. Various

recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

HELMS (HEL)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for any meadows in this analysis unit under the proposed action. Soils, vegetation, water quality, or hydrologic function relative to the existing condition would not change under this alternative.

Cumulative Effects

No pack stock use was proposed for this area. Grazing by cattle does not occur within this analysis unit. Recreational stock use would continue with associated localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact in meadows under this alternative, since a measurable increase in future recreational use is not expected.

Alternatives 2 and 3

Direct and Indirect Effects

Pack stock grazing was not addressed in this document for any meadows in this analysis unit, therefore the proposed action would not result in increased indirect effects to meadow soils and vegetation, water quality, or hydrology relative to the existing condition for meadows.

Cumulative Effects

Commercial pack stock use was not proposed for this area. Grazing by cattle does not occur within this analysis unit. Recreational stock use would continue with associated localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact in meadows under these alternatives, since a measurable increase in future recreational use is not expected.

NELSON (NEL)

Affected Environment

One meadow was assessed for grazing suitability within NEL analysis unit. Little Lake Meadow (elev. 9200 ft.) is a 2 acre meadow adjacent to the Little Lake, which has been grazed recently by commercial pack stock? Riparian vegetation had low to moderate productivity and due to wet conditions, could easily be impacted by stock use. This meadow has a well established willow community, which although it provides stability for this higher gradient meadow (5-10%), the shrubs limit access to herbaceous feed. The meadow condition is good with late seral forage species present. Stock nights were calculated in the field based on estimates of production and acreage for an estimated 3 stock nights, which is not appropriate for commercial use. Based upon this determination, no commercial stock use is proposed for this analysis unit. The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

No commercial pack stock grazing would occur in Little Lake Meadow. The meadow is in good condition and has had no recent reported use. Changes from current condition are not expected under this alternative.

Cumulative Effects

Recreational stock use would continue with few if any localized effects if use levels remain what they have been for Little Lake. The analysis unit is within the surrounding Blasingame Allotment which is grazed from June 21 through September 15 with 235 cow/calf pair, although cattle do not reach the Little Lake area. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact in Little Lake Meadow. Under this alternative, since a measurable increase in future recreational use is not expected.

Alternatives 2 and 3

Direct and Indirect Effects

Little Lake Meadow was the only meadow assessed for grazing suitability within NEL analysis unit. This meadow is considered unsuitable for pack stock grazing due to water quality and range readiness concerns, low productivity, and high gradient. The majority of the meadow is wet and unsuitable for use therefore, the proposed action would not result in direct effects to meadows and associated soils, water quality, and hydrology. Meadow condition would remain static and in good condition.

Cumulative Effects

Cattle grazing and recreational stock use would also continue with associated localized effects, although the cattle use would not overlap with areas used commercially by the pack stations. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase in future recreational use is not expected. The

cattle use is nonexistent to slight in this AU and an increase in cattle use is not expected. Current overall levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

DINKEY FRONT COUNTRY (DFC)

Affected Environment

This Analysis Unit is used by Clyde Pack Outfit (CPO) for day rides and includes two pastures used in conjunction with the overall pack station operation. These pastures, Glen Meadow and Mill Meadow are located outside the wilderness and were reviewed for grazing suitability. Glen Meadow (T10S, R25E, sections 12 and 13, T26E, sections 7 and 18) is 18 acres and has moderate forage production of 1,650 pounds on average per acre. Glen Meadow (also known as "Family Camp Meadow") is within the boundary of the Dinkey Allotment. The portion of the meadow that is privately-owned. A majority of the National Forest section of Glen Meadow is suitable for grazing, with the exception of several fen-like habitat areas, one of which is occupied by the Forest Service sensitive moss species, *Meesia triquetra* (fen is approximately 10% of meadow area). There is a portion of the stream in the southwestern portion of the meadow that has both historic and current evidence of trampling and chiseling impacts to the streambanks from cattle grazing. The on date for this meadow would be between June 1st and June 15th in a normal year.

Mill Meadow is a small pasture located in the vicinity of the Clyde Pack Outfitter's (CPO) Dinkey Creek Spike Station (T10S, R26E, NW ¼ Section 17) and has been used for pasturing pack stock during the season. CPO is currently authorized to graze this meadow under their Special Use Permit. The meadow is suitable for grazing and the existing light use seems appropriate for the capacity and forage production of this meadow (Table 2.22). The IDT has concerns with the timing of the grazing, as it appears that CPO's past use of this meadow may have been too early as some hoof punching is indicative of use before the meadow was range ready. On dates of June 1 – June 15th would be applied, depending on annual range readiness factors.

There is some evidence of historic overuse of this meadow evident by the small, fairly stable headcut in the lower portion of the meadow. Approximately 18 stock nights per season are recommended for this meadow (Table 2.21). Intermittent use was reported at Mill Meadow by Clyde Pack Outfitters in 2004 (Table 3.54). The meadow assessments are summarized in Tables 2.21, 2.23, 3.55 and 3.56.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

The no action alternative would eliminate impacts from grazing activities at Mill and Glen Meadows. If the fences for these pastures are maintained, riparian vegetation can recover relatively quickly, however the recovery of the stream channel's shape and hydrologic function, altered by historic grazing in Glen Meadow, may take decades. If

the fences at Mill and Glen Meadow pastures are not maintained, the meadow could receive use from cattle drifting in from the adjoining allotment. The meadow condition, mostly altered from historic high use, would change as the rest from grazing would benefit vegetative conditions and hydrologic conditions. There would be less evidence over time as the impacts, such as bank chiseling and sloughing, would not occur.

Cumulative Effects

Both Mill Meadow and Glen Meadow have been impacted by historic grazing and somewhat by current use, as evidenced by the streambank conditions. The conditions in Glen Meadow would recover but it could take decades for the hydrologic disturbance to be fully ameliorated. Cattle use in the adjacent Dinkey Creek Allotment will continue under the current season of use from June 1 through September 20 with 220 cow/calf pair. If the fences at Mill and Glen meadows, designed to keep cattle out, are not maintained or removed, then the meadows would receive use from cattle drifting in from the adjoining allotments and recovery from past grazing impacts would be slowed. Various recreational activities (Table 3.2) would continue in meadows within the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action would continue the localized impacts to the streambank in Glen Meadow.

Cumulative Effects

Conditions in Mill Meadow and Glen Meadow will remain static if pack stock use continues at previous levels. Cattle will be excluded from grazing in these meadows under this alternative so a cumulative effect in these meadows would not occur from both types. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase in future recreational use is not expected. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions to meet habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and pack stock grazing would not combine to create a cumulative effect in the AU since the use would not overlap geographically and levels of use are not at or near thresholds of allowable use in terms of the adjacent cattle grazing. The commercial pack stock would not be foraging in meadows that cattle have access to and would have limited impacts on two meadows authorized for grazing in the AU.

TULE MEADOW (TUL)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Past effects to soils, water quality, or hydrology relative to the existing condition would take some time to recover after the removal of the facilities.

Cumulative Effects

Cattle graze the Patterson Mountain Allotment within this analysis unit from June 16 through September 15 with 200 cow/calf pair. Pack stock grazing is not proposed in this analysis unit so any cumulative effects of combined grazing would not occur. Recreational stock use may occur in the surrounding area, but overnight use and grazing would be limited if it occurs at all. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since the use is expected to remain static. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

Pack and saddle stock are fed hay in a confined pen and no free grazing occurs in this area by pack stock. Cattle are permitted to graze in the AU. There are impacts associated with the holding field at the CPO headquarters, including compaction of soils and removal of upland vegetation. The proposed action would not result in increased direct or indirect effects to soils, water quality, or hydrology relative to the existing condition.

Cumulative Effects

Cattle grazing would continue in the analysis unit with localized effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase recreational use is not expected in the future. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns. Commercial cattle and pack stock grazing would not combine to create a cumulative effect in the AU since the use would not overlap geographically and levels of use are not at or near thresholds of allowable use in terms of the cattle grazing. The commercial pack stock would not be foraging in meadows and would have no impact on meadows in the AU.

WISHON (WIS)

Affected Environment

Commercial pack stock grazing is not proposed nor addressed in this analysis unit.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Direct effects from grazing to soils, water quality, or hydrology would not occur under this alternative. Commercial stock is fed hay at the spike stations and impacts of compaction and denuded vegetation from concentrated use within the holding field at the Wishon spike station would recover. Effects to soils, water quality, or hydrology relative to the existing condition would not occur as grazing would not be authorized.

Cumulative Effects

Cattle grazing would continue with the current season of June 21 through September 15 with 130 cow/calf pair. This grazing would have minimal localized effects and since meadows of any size do not occur in the AU, grazing does not impact meadows within the AU, since it occurs in upland or minor riparian areas guided by standards and guidelines designed to limit effects. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under this alternative, since a measurable increase in recreational use is not expected in the future. An increase in cattle use is not expected and current levels of use should remain static or will more likely decrease due to restrictions due to habitat requirements for sensitive wildlife species and riparian concerns.

Alternatives 2 and 3

Direct and Indirect Effects

The proposed action would not result in increased direct effects to soils, water quality, or hydrology relative to the existing condition, since conditions are not expected to change under these proposals.

Cumulative Effects

Cattle grazing and possibly recreational pack stock use would continue in the analysis unit with localized effects. Cattle graze in the Collins Allotment, which includes this analysis unit from June 21 through September 15 with 130 cow/calf pair. The spike stations used by CPO are fenced so no overlapping impacts from cattle and pack stock would occur in these sites under this proposal. Various recreational activities (Table 3.2) would continue in the AU with localized effects, but are not expected to add up to a cumulative impact under these alternatives, since a measurable increase in grazing by cattle or recreational use is not expected in the future.

ANSEL ADAMS/JOHN MUIR (AA/JM)

Affected Environment

A comprehensive discussion of the affected environment for grazing resources in the Ansel Adam/John Muir Analysis Unit can be found in the 2005 Pack Stock Management EIS on page III-161. This analysis incorporates that information by reference only.

Environmental Consequences

A comprehensive discussion of the environmental consequences to the grazing resource for the Ansel Adam/John Muir Analysis Unit can be found in the 2005 Pack Stock Management EIS on pages IV-511, 516, 523, 577, 595, 611, 635, 650, and 670. This DEIS incorporates that information by reference. The areas used by commercial pack stock are a minor portion of the total wilderness area and limited to grazing zones. The direct, indirect, and cumulative effects of stock use would not be visible and may not be measurable at the wilderness or geographic scale. These effects could be measurable and visible at localized areas and would be measurable and visible at the site-specific scale. The vegetative resources in most locations are expected to be maintained at or toward desired conditions. The vegetative resources could trend away from desired conditions, for the long-term, at an estimated 21 of the locations.

Table 3.56: Summary of meadow condition.

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
Clover	**Soldier Meadow**	Mid to late seral	Rated PFC[1]; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow < 5% of meadow area	Low severity sod fragmentation observed due to hoof punching or other disturbance from 6-15% of meadow area	Slight compaction[2]; moderate extent from 5-15% of meadow area	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
Chinquapin	*No sites requested or assessed for grazing*		-	-	-	-
Coyote	*No sites requested or assessed for grazing*		-	-	-	-
Nelson	**Little Lake Meadow**	Mid to late seral	No channel; no evidence of hydrologic function alteration	No sod fragmentation observed	No compaction observed	None or few isolated changes from the potential natural community
Dinkey Lakes	**Miner Camp Meadow**	Early to mid seral	Rated FAR[5]; evidence of moderate hydrologic function alteration <10% of meadow area	Low severity sod fragmentation observed due to hoof punching or other disturbance from 6-15% of meadow area	Slight compaction[2]; moderate extent from 5-15% of meadow area	Well defined changes away from potential natural plant community, over more than 1/3 of meadow area
	South Lake Meadow	Mid to late seral	Visually estimated at PFC; no evidence of hydrologic function alteration	No sod fragmentation observed	No compaction observed	None of few changes away from potential natural plant community

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
	SE 1st Dinkey Lake Meadow	Early to mid seral	Rated at FAR; Evidence of moderate hydrologic function alteration <10% of meadow area	Low severity sod fragmentation observed due to hoof punching or other disturbance from 6-15% of meadow area	Slight compaction[2]; moderate extent from 5-15% of meadow area	Well defined changes away from potential natural plant community, over more than 1/3 of meadow area
Dinkey Front Country	**Mill Meadow**	Mid seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow < 5% of meadow area	Low severity sod fragmentation observed due to hoof punching or other disturbance from 6-15% of meadow area	Slight compaction[2]; moderate extent from 5-15% of meadow area	Well defined changes away from potential natural plant community, over more than 1/3 of meadow area (forbs component dominates upper portion of meadow)
	Glen Meadow	Mid seral	Needs PFC assessment, evidence of moderate hydrologic function alteration <10% of meadow area	Low severity sod fragmentation observed due to hoof punching or other disturbance from 6-15% of meadow area	Slight compaction[2]; moderate extent from 5-15% of meadow area	Some isolated , or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
Edison	*No sites requested or assessed for pack stock grazing*		-	-	-	-
Florence	*No sites requested or assessed for pack stock grazing*		-	-	-	-
Helms	*No sites requested or assessed for pack stock grazing*		-	-	-	-

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
Huntington East	*No sites requested or assessed for pack stock grazing*		-	-	-	-
Huntington West	*No sites requested or assessed for pack stock grazing*		-	-	-	-
Kaiser	**NE Nellie Lake Meadow**	Late seral	Visually estimated at PFC; evidence of moderate hydrologic function alteration over <10% of meadow area	Low severity sod fragmentation observed due to hoof punching up to 5% of the sod surface	Slight compaction[2]; moderate extent from 5-15% of meadow area	Some isolated, or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Nellie Lake Meadow	Mid to late seral	No channel; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow <5% of meadow area	Low severity sod fragmentation observed due to hoof punching up to 5% of the sod surface	Slight compaction[2]; moderate extent from 5-15% of meadow area	Some isolated, or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
Nelder	**Bare Island Meadow**	Late seral	Visually estimated at PFC; no evidence of hydrologic function alteration	No sod fragmentation observed	No compaction observed	None of few changes away from potential natural plant community

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
	Biledo Meadow	Late seral	Rated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow	Low severity sod fragmentation observed due to hoof punching up to 5% of the sod surface	Slight compaction over less than 5% of meadow area; weakly restrictive to water movement, root penetration and plant vigor, no evidence of platiness	Some isolated , or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Buffin Meadow	Mid to late seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow up to 10% of meadow area	No sod fragmentation observed	Moderate compaction[2] over more than 15% of meadow area	Some isolated , or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Dutchman Lake Meadow	Mid to late seral	Visually estimated at PFC; no evidence of hydrologic function alteration	No sod fragmentation observed	Slight compaction over less than 5% of meadow area; weakly restrictive to water movement, root penetration and plant vigor, no evidence of platiness	Some isolated , or patchy changes away from the potential natural plant community over less than 1/3 of meadow area

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
	Grizzly Creek Meadow	Mid to late seral	Visually estimated at PFC; no evidence of hydrologic function alteration	Moderate severity sod fragmentation observed, due to hoof punching up to 5% of the meadow area	Slight compaction over less than 5% of meadow area; weakly restrictive to water movement, root penetration and plant vigor, no evidence of platiness	None or few isolated changes from the potential natural community
	Grouse Meadow	-	*Not assessed*	*Not assessed*	*Not assessed*	*Not assessed*
	Lower Iron Creek Meadow	Mid to late seral	No channel –not riparian- dry meadow, no evidence of hydrologic function alteration	No sod fragmentation observed	No compaction observed	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Quartz Meadow Complex	Mid to late seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow	Moderate severity sod fragmentation observed due to hoof punching from 6-15% of meadow area	No compaction observed	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Pike Cabin Camp Meadow	-	*Not assessed*	*Not assessed*	*Not assessed*	*Not assessed*

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
	Soquel Meadow	Mid to late seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow up to 5% over meadow area	Low severity sod fragmentation observed due to hoof punching up to 5% of the sod surface	Slight compaction over less than 5% of meadow area	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Tin Can Meadow	Mid to late seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow up to 10% of meadow area	No sod fragmentation observed	Moderate compaction[2] over more than 15% of meadow area (compaction related to trail that dissects upper portion of meadow)	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
	Upper Goat Meadow	Mid to late seral	Rated at PFC; Evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow	No sod fragmentation observed	Slight compaction over less than 5% of meadow area; weakly restrictive to water movement, root penetration and plant vigor, no evidence of platiness	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area

SUP Analysis Unit	Site Name	Meadow Ecological Condition (IDT estimate of seral status)	Riparian Condition and Hydrologic Function Alteration	% of Sod Fragmentation Severity	Soil Compaction Severity and Extent	Vegetative Composition Change
	Upper Iron Creek Meadow	Mid to late seral	Visually estimated at PFC; evidence of slight hydrologic function alteration, including lowered water table and/or diversion of surface flow	No sod fragmentation observed	No compaction observed	Some isolated or patchy changes away from the potential natural plant community over less than 1/3 of meadow area
Tule Meadow	*No sites requested or assessed for pack stock grazing*		-	-	-	-
Wishon	*No sites requested or assessed for pack stock grazing*		-	-	-	-

[1] PFC = Proper Functioning Condition based on interdisciplinary assessment using USDI BLM *Proper Functioning Condition Assessment* protocol

[2] Slight compaction = weakly restrictive to water movement, root penetration and plant vigor, no evidence of platiness

[3]Moderate Compaction: moderately restricts water movement and root penetration. May be limited evidence of platy structure and mashed roots, "J" curve roots at the compacted layer may be present. Plant vigor appears to be affected. Compaction is not alleviated over the winter rest period.

[4] FAR = Functional At Risk based on Proper function condition Assessment USDI BLM *Proper Functioning Condition Assessment* protocol

Civil Rights and Environmental Justice

A specific consideration of equity and fairness in resource decision-making is encompassed with the concerns of environmental justice. As required, by Executive Order 12898, all federal actions must consider potentially disproportionate effects on minority or low-income communities. Principles for considering environmental justice are outlined in Environmental Justice Guidance under the National Environmental Policy Act (Council on Environmental Quality 1997). Those principles were considered in this analysis. The Socio-Economic portion of this chapter considered the demographics of the affected areas of the project area, including minorities and low-income populations. There are no adverse environmental effects relating to an environmental justice issue.

There is no evidence to believe that minority or low-income groups will be adversely or disproportionately affected by the alternatives that have been presented in this document.

After the Interdisciplinary Team concluded all of its analysis of all impacts, including the human environment, it was determined that there are no significant environmental impacts to the human environment that requires mitigation. Based on that conclusion, an Environmental Justice Analysis is not necessary.