3 AFFECTED ENVIRONMENT

Whiskeytown National Recreation Area Setting

Whiskeytown NRA is located in northern California within Shasta County, approximately eight miles west of Redding, California. The park measures 42,497 acres and elevations in the park range from 800 feet to 6,199 feet above MSL at the summit of Shasta Bally.

Resources Not Present

The following resources are not present or may be present within the Whiskeytown NRA, but are not present within the areas of interest:

- Flood Plains
- Indian Trust Resources
- Paleontology
- Prime or Unique Agricultural Lands
- Urban Quality
- Wild and Scenic Rivers
- Wilderness

Resources Present but Not Affected

NPS specialists have further determined that the following resources, although present in the project area, are not affected by the proposed Alternatives:

- Natural or Depletable Resource Requirements
- Water Rights
- Wetlands/Riparian
- Archeological Resources

Resources Present and Brought Forward for Analysis

The following resources have been identified as being potentially present and affected by the proposed Alternatives and are analyzed in this Environmental Assessment:

Physical Resources
- Air Quality
- Soils and Geologic Resources
- Water Quality

Biological Resources
- Ecologically Critical Areas
- Special Status Species
- Vegetation
- Wildlife

Cultural Resources
- Ethnographic Resources

Human Environment
- Park Operations
- Visitor Use and Experience
- Soundscape
- Visual Resources

Socioeconomic Considerations
- Environmental Justice

Resource Assessment

Physical Resources

Air Quality

The site and the entire Whiskeytown NRA lie within a Class II air shed under the Federal Clean Air Act (42 USC 7401 et seq. as amended). Under this Act, the federal land manager bears the responsibility of protecting a park's air quality and related values, such as visibility, biological resources, and visitor health from impacts caused by poor air quality.

National Ambient Air Quality Standards (NAAQS) have been established by the Environmental Protection Agency (EPA), as was required by the Federal Clean Air Act. These standards are in place for several pollutants, including ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and lead (Pb).

Air quality within the Whiskeytown NRA is regulated by the Shasta County Air Quality Control District, which upholds stricter state standards. According to the California Air Resources Board Almanac of Emissions and Air Quality designation map for 2004, and the proposed designation map for 2006, all of Shasta County is classified as being in non-attainment for the state standard for O_3 and PM_{10}.

Air quality within the Whiskeytown NRA and the site may be impacted by off-site sources such as fires (including wild and campfires) and pollution transported from metropolitan Sacramento. On-site sources can also include fires, on-site generators, as well as particulate matter from vehicle travel on the Shasta Bally road. The on-site generators are for emergency back-up use only and are used periodically during power disruptions.

Soils and Geologic Resources

Whiskeytown National Recreation Area is located within the Eastern Klamath Metamorphic Belt of the Klamath Geologic Province. The study area is comprised of the Cretaceous Shasta Bally Batholith within a zone that has a very high ratio of biotite to hornblende. Therefore, the material that underlies the summit and road is highly erosive and decomposing granite.

The soils within the study area are described as decomposed granite entisols formed by the parent material from the Shasta Bally batholith. The study area is located at higher elevations with steep slopes, which leads to poorly developed soils. These soils do not have any horizons except vegetative matter that forms a layer on top of the decomposed granite.

Water Quality

Whiskeytown NRA is considered a water-based recreation area with significant water resources including the 3,220 surface-acre Whiskeytown Lake. The lake is fed by seven major watersheds. Three of these watersheds, Crystal Creek, Brandy Creek and Boulder Creek, are located within the influence of the Shasta Bally summit, Shasta Bally road and associated powerline alignment. Water quality within the Whiskeytown NRA is considered high quality especially the streams on the southern side of the park. According to the California Regional Water Quality Control Board's Basin Plan for the Central Valley Region (revised 2006), the Whiskeytown Reservoir is a part of the Sacramento River Hydrologic Unit and has existing beneficial uses including municipal and domestic supply, irrigation, stock watering, power, contact and non-contact recreation, warm and cold freshwater habitat, fish spawning habitat and wildlife habitat. Therefore, it is important to preserve the quality of the watersheds that contribute to the Whiskeytown Reservoir.

A water quality monitoring station on Paige-Boulder Creek was established and baseline data was collected. Paige-Boulder Creek is considered representative of the park's south side streams including Crystal Creek, Brandy Creek, and Boulder Creek. The use of the Shasta Bally road and the associated erosion and deterioration of the soils and rock have the potential to increase turbidity in the watersheds by introducing sediments into the system.

Biological Resources

Ecologically Critical Area

The park is located on south-eastern edge of the Klamath-Siskiyou eco-region. This eco-region is considered a global center of biodiversity, an International Union for the Conservation of Nature and Natural Resources (IUCN) Area of Global Botanical Significance (1 of 7 in North America), and is proposed as a World Heritage Site and United Nations Education, Scientific, and Cultural Organization (UNESCO) Biosphere Reserve. The biodiversity of these rugged mountains is famous as they provide one of the four richest temperate coniferous forests in the world, with complex biogeographic patterns, high endemism, and unusual assemblages of species. Unfortunately, this eco-region has been heavily impacted and conservation of old growth forests and unique plant communities within National Park units is crucial not only at the park-scale, but also on a much larger global scale. In addition, Shasta Bally rises up from the Sacramento Valley floor to approximately 6,200 feet in elevation. Isolated mountains like Shasta Bally act as islands of high elevation habitat.

Regionally endemic species are geographically and therefore genetically isolated on this peak, which makes their presence on Shasta Bally significant. Although some of the species on Shasta Bally are naturally rare and are not necessarily in danger of extinction, they may have particular life history characteristics that make them at risk. These factors can include a specialization to a particular soil or rock substrate, which may be patchy and/or limited in area, or population isolation, and even specific relationships with pollinators, dispersers, or fungal partners. Locally endemic species that are trapped on mountain tops across the Klamath Mountains could have evolved as suitable habitat conditions shifted across the landscape over time or were found in localized patches.

Species may also be distributed as meta-populations, as species were at one time connected by recurrent extinctions and re-colonizations over time. Populations may have moved across the landscape as suitable habitat appeared and disappeared as disturbances and successional changes occurred over time (Stebbins and Major, 1965). However, some rare and uncommon plant species have become so due to changes in their environment, which are most often related to human-induced changes. These changes can include disturbances that involve the loss of habitat; disrupt relationships with pollinators, dispersal agents, or other plant partners, and the introduction of nonnative competitors, pathogens, and pests.

Conservation biologists are concerned that the effects of global warming on biodiversity, from extinctions of single populations of high elevation habitat-specific endangered plants to the extirpation of entire species, communities, and ecosystems. As climate warms, belts of plants and animals on mountains move upward in elevation. Some high-elevation species may get forced out when climate temperatures exceed the highest elevation or when habitat is reduced to fragments on mountain peaks. Since less habitat area is available on mountain summits, the probability of extinction greatly increases for species that need to ascend in elevation to track appropriate thermal regimes and resources. In addition, any existing human induced stressors (including nonnative and invasive species) that are affecting high elevation ecosystems will undoubtedly be further aggravated by climate change (Parmesan 2006).

The high elevations of Shasta Bally at Whiskeytown National Recreation Area have been included in the Klamath Network's Vegetation Monitoring Protocol (Odion et al. In Prep.) as "Sensitive High Elevation Vegetation". Sensitive high elevation habitat on Shasta Bally at Whiskeytown was identified as a priority. The summit area of Shasta Bally is unique, and characterized by extremes in weather and unique vegetation. The Klamath Network's Inventory and Monitoring Program considered sensitive high elevation habitat on Shasta Bally to be all area above 5,000 feet where unusual, isolated vegetation of red fir forests, upper montane chaparral, rare plants and granitic outcrops occur. Climate change and development are threats to this mountain-top-limited vegetation.

Special Status Species

Animals

The Threatened and Endangered Species Act of 1973 (16 USC 1531 et seq.) was enacted to provide special protection for plants, animals, and fish that are vulnerable to extinction. There is one federally threatened wildlife species that is known to occur within the Whiskeytown NRA, which is the Northern spotted owl (*Strix occidentalis caurina*). The bald eagles (*Haliaeetus leucocephalus*) were federally delisted on August 9, 2007.

The Northern spotted owl is found throughout much of northern California in dense old-growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats, from sea level up to approximately 7600 ft. (Zeiner et al. 1990). Old growth forests provide the best habitat.

Today, however, habitat is greatly reduced and fragmented, and owl populations have become increasingly vulnerable to loss of habitat due to fire (Lujan 1992). Fires can cause further habitat fragmentation and loss of preferred suitable old growth. One study showed that areas that had been clear cut or burned within the previous 20 years were rarely used by spotted owls for foraging. Additionally, spotted owls usually avoided crossing burned areas by traveling through corridors of unburned timber around the area.

Spotted owls tend to roost in small trees in the forest understory during warm weather and high up in the large trees during cold or wet weather. The layered canopy structure in old forests provides both types of roosts. (Thomas et. al. 1990). There is one known spotted owl site within the park, but more sites may be found as surveys are completed in some of the more remote areas of the park. Much of the higher elevations along the western boundary of the park that historically may have supported spotted owls were heavily altered by timber harvest activities in the 1960s and early 1970s. It is possible that these areas will be repopulated by spotted owls as the forest regenerates, matures and develops the complex structural characteristics commonly found in areas occupied by spotted owls.

A single pair of nesting northern spotted owls with two fledglings was discovered in the summer of 1994. The activity center has been be monitored annually since this time and records are kept detailing nesting location, status, and production. Whiskeytown NRA is located on the edge of the range of the northern spotted owl and some suitable habitat exists in the higher elevations along the western and southern park boundary. Generally, suitable habitat for the spotted owl is rarely encountered at Whiskeytown NRA

below 3000 feet in elevation. The detection of additional pairs of northern spotted owls is possible as all areas containing suitable habitat have not yet been surveyed. Most areas containing suitable habitat that have not been surveyed are in the more remote areas of the park. The USFWS is consulted, under Section 7 of The Endangered Species Act, prior to development or habitat manipulation in areas meeting the criteria for suitable spotted owl habitat.

The identified activity center within Whiskeytown NRA is located 2.3 miles northwest of the WCF site. The area directly surrounding the WCF is unlikely to provide suitable habitat, however, much of the area traversed by the powerline corridor is considered to provide suitable nesting, roosting, and foraging habitat. Much of this area has not been surveyed due to the difficulty of access. Additionally, portions of the area traversed by Shasta Bally road also contain suitable habitat.

Whiskeytown Lake supports breeding bald eagles as well as a substantial migratory wintering population. Bald eagle activity such as perching, foraging, nesting, and roosting is generally limited to the lower elevations of the park and occurs mostly within two miles of Whiskeytown Lake. Bald eagles are dependent on large, dominant trees for nesting and perching. The majority of foraging activity occurs on Whiskeytown Lake and prey species include a wide variety of fish as well as numerous ducks, coots, and grebes.

Bald eagles were first documented as nesting at Whiskeytown Lake in 1973. The goals of bald eagle management at Whiskeytown National Recreation Area are to protect nesting bald eagles from disturbance and to maintain and enhance bald eagle habitat. Whiskeytown National Recreation Area's nesting bald eagles were monitored for nesting success sporadically from 1979 to 1986. Bald eagles have been closely monitored for nesting success and productivity since 1986. Areas of the park that contain potential bald eagle nesting habitat are surveyed annually for potential new nesting territories. California Department of Fish and Game Bald Eagle Nesting Territory Report Forms are completed at the end of each nesting season. Additionally, the park participates in the annual USFWS mid-winter bald eagle survey.

Whiskeytown NRA currently has four pairs of bald eagles. The nearest nest site (current or historic) is 2.5 miles from the communication towers. Golden eagles and peregrine falcons have been seen in the vicinity of the site during migration. However, there are no known nesting sites in the park.

Two species of fish are federally listed as Threatened species. The spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and the Central Valley steelhead trout (*Onchorynchus mykiss*) are known to use portions of Lower Clear Creek for spawning habitat. However, Lower Clear Creek is located below Whiskeytown Dam.

The Pacific fisher (*Martes pennanti*) is a Federal Species of Concern, and is currently a candidate for listing under the Threatened and Endangered Species Act. The fisher is the second largest mustelid found in North America. Pacific fisher populations have steadily declined due to historic trapping and continued loss of habitat. They have a relatively sizeable home range and therefore require large, undisturbed sections of old growth forests. Although specific information on populations and distribution of the Pacific fisher is not available for the vicinity, several sightings have been reported within the Whiskeytown NRA. As with the Northern spotted owl, the presence of the powerline corridor presents a source of disturbance and fragmentation of this species' habitat.

Species can also be listed as threatened or endangered by the California Department of Fish and Game. Some of the species that have been documented at the Whiskeytown NRA include Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), yellow warbler (*Dendroica petechia*), and others.

Other Species of Concern known to occur in the area include the foothill yellow-legged frog (*Rana boylii*), northwestern pond turtle (*Clemmys marmorata marmorata*), and tailed frogs (*Asdaphus truei*). These

aquatic species may be present in the creeks influenced by the Shasta Bally summit, (Crystal Creek, Boulder Creek, and Brandy Creek), and therefore may be negatively affected by the sedimentation of the streams due to the site activities. The Shasta Bally road, in particular, results in an appreciable amount of accelerated erosion and sedimentation of the watershed.

There are a few other Federally listed Species of Concern that have been documented in the area, including the Northern goshawk (*Accipiter gentilis*), olive-sided flycatcher (*Contopus cooperi*), rufous hummingbird (*Selasphorus rufus*), red-breasted sapsucker (*Sphyrapicus rubber*), and California thrasher (*Toxostoma redivivum*), as well as a few species of bats (*Myotis* and *Corynorhinus spp.*).

Plants

There are no federally listed plant species occurring or identified within the park at the time of this assessment. There are sixteen species that are considered plant species of special concern by the California Native Plant Society. Limited plant surveys include Shasta County arnica (Arnica venosa), clustered lady's slippers *(Cypripedium fasciculatum,)* and snow mountain Penstemon *(Penstemon purpusii).* Additional surveys are needed to determine their distribution on Shasta Bally and if other rare plants exist on the summit.

Shasta County arnica *(Arnica venosa)* has a limited distribution and is only known to occur within a 35-mile radius around Shasta Lake, Trinity Lake, and Whiskeytown Lake. This plant is confirmed to be present within road cuts of Shasta Bally road. Clustered lady's slipper (Cypripedium fasciculatum) occurs on the northeast side of the summit. Snow mountain Penstemon *(Penstemon purpusii)*, which is a Klamath endemic plant, occurs and has been confirmed on the west side of the summit.

Vegetation

The park is located within the Klamath Mountain physiographic province and is an area of significant diversity due to proximity to the Cascade Range, Coast Range, and Sacramento Valley. Whiskeytown's diverse plant communities intergrade with one another in such a way that distinct boundaries are seldom observed. This complex vegetation pattern reflects a broad range in elevation, rugged topography, diverse soil types, and a history of natural and human disturbance.

For the purposes of this document, the diverse habitats at the top of Shasta Bally have been grouped into four plant communities based on descriptions by Biek (1988a) and Sawyer and Keeler-Wolf (1995).

Mixed Conifer

The mixed conifer community covers approximately 10,000 acres within the park and is primarily composed of a mixture of codominant tree species. These species are ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus decurrens*), Douglas fir (*Pseudotsuga menziesii*), sugar pine (*Pinus lambertiana*), and white fir (*Abies concolor*). Subcommunities contain species that are less dominant but regionally plentiful such as white alder (*Alnus rhombifolia*), California yew (*Taxus brevifolia*), Shasta red fir (*Abies magnifica* var*. shastensis*) and Jeffrey pine (*Pinus jeffreyi).* In areas of dense forest canopy, the understory shrubs are either sparse or scattered and consist of tan oak (*Lithocarpus densiflorus* vars. *densiflorus* and *echinoides*), greenleaf manzanita (*Arctostaphylos patula*), dogwood (*Cornus* spp.), western azalea (*Rhododendron occidentale),* snowbush (*Ceanothus cordulatus*), and sierra gooseberry (*Ribes roezlii*). Logging, debris flows, high severity fire and the nature of the granitic soils can create more open canopies so that montane chaparral species such as greenleaf manzanita, chinquapin (*Chrysolepis sempervirens)*, tan oak and huckleberry oak (*Quercus vaccinifolia*) can dominate.

The ground cover in the mixed conifer plant community is composed of grasses, ferns, sedges, and some of the park's most unique herbaceous species such as parsley fern (*Cryptogramma acrostichoides*),

twinflower *(Linnaea borealis var. longiflora*), and bride's bonnet (*Clintonia uniflora*). The forest floor vegetation layer consists of low-growing lichens and mosses.

The mixed conifer forests can be found between approximately 3,000 feet to 5,900 foot elevations on Shasta Bally. A prime example of the mixed conifer community is found along Crystal Creek road, from above the Crystal Creek Regional Boys Camp to Coggins Park. Jeffrey pine and white fir are found on the upper slopes of Shasta Bally, with the east side favoring Jeffrey pine. A few acres at the summit of Shasta Bally have a significant amount of Shasta red fir.

Montane Chaparral

A montane chaparral plant community occupies the loose, sandy, granitic soils between the 3,000 foot elevation and the top of Shasta Bally. This montane chaparral is dominated by greenleaf manzanita, combined with pinemat manzanita (*Arctostaphylos nevadensis*), common manzanita (*A. manzanita*), mountain whitethorn (*Ceanothus cordulatus*), huckleberry oak (*Quercus vaccinifolia*), and bush chinquapin (*Chrysolepis sempervirens*). Understory species in this community are usually absent, and this community appears to be the result of past crown fire in forest vegetation, as well as logging of mixed conifer forests at high elevations on highly erodible soils.

Dry Subalpine Meadow

On the east side of the summit is a low area, surrounded by red fir, where deep snow accumulates in the winter. This provides water to the area, but the soil is fine, decomposed granite and hence, quite porous. Flowing water is present only in the spring and early summer. Grasses, sedges, rushes and small herbs cover the ground. A small patch of False Hellebore (*Veratrum californicum*) also grows here, in the moistest spot. This species is characteristic of wet subalpine meadow, a community that typically occurs where the soil remains moist throughout the growing season. Common elsewhere in the Klamath Mountains, this is the only high elevation meadow within the park.

Yew-Willow Riparian Woodland

On the northeast side of Shasta Bally, there is a unique plant community that has yet to be described in the California Natural Diversity Database or in Sawyer and Keeler-Wolf's "A Manual of California Vegetation" (1995). Biek (1988b) described this area as an open bowl that has "yew-willow riparian woodland" at the headwaters of Boulder Creek. Most of the bowl is covered by a chaparral composed of huckleberry oak (*Quercus vaccinifolia),* Greenleaf manzanita (*Arctostaphylos patula)*, and tan oak (*Lithocarpus densiflora* var*. echinoides)*. However, along the east side of the bowl, there is a narrow ribbon of tall shrubs and small trees, which follow a shallow ravine. During a brief period in the spring, this ravine carries runoff from melting snow; it remains moist through the rest of the year. Here, between 5,500 and 6,000 feet, California yew (*Taxus brevifolia)* and willow speices (*Salix spp*.) dominate this ribbon. The trees and shrubs reach to about 20 feet in height. Growth is uniformly dense, in some places nearly impenetrable.

The woodland understory includes dwarf bilberry (*Vaccinium caespitosum*). Other interesting plants here (some of which are only found in the park in this community) include: Utah serviceberry (*Amelanchier utahensis*), American parsley fern (*Cryptogramma acrostichoides*), clustered lady's slipper (*Cypripedium fasciculatum*), rattlesnake plantain (*Goodyera oblongifolia*), Alaska Piperia (*Piperia unalascensis)*, white-veined wintergreen (*Pyrola picta*), and hooded ladies tresses (*Spiranthes romanzoffiana*).

Rare Plants

The first inventory of the vascular plants of Whiskeytown National Recreation Area was conducted by David Biek, a California Native Plant Society volunteer, from 1985-1987 (Biek 1988b). During this survey, Biek identified the park's major plant communities, summarized evidence for species thought to be

present in the park, and collected voucher specimens to begin the park herbarium. In conjunction with his survey, Biek identified rare plants and sensitive habitats present in the park and developed management recommendations for them (Biek 1988a). Biek's survey found that there were no federal or state listed vascular plant species within the park boundaries; however, he identified seven plants listed on the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants.

Since Biek's initial surveys, several additional plants found within Whiskeytown have been added to the CNPS list and some of his initial finds have been removed from the list (Table 3). Rare plant surveys on the summit and slopes of Shasta Bally have confirmed two former CNPS listed species: snow mountain beardtongue (*Penstemon purpusii*) and Alaska piperia (*Piperia unalascensis)*; and, one current CNPS listed species: clustered lady's slipper (*Cypripedium fasciculatum*). Three additional plant species have been considered by the CNPS as rare and endangered but were rejected: Newberry's beardtongue (*Penstemon newberryi* var. *newberryi),* Cascade bilberry *(Vaccinium deliciosum)* and California ground cone (*Boschniakia strobilacea*).

NPS policy mandates that sensitive species be treated as if they were listed species and this policy is consistent with the statutory duty of the NPS to conserve the scenery, natural and historic objects, and wildlife in national parks and monuments by such means as will leave them unimpaired for future generations (National Park Service Organic Act; 16 U.S.C. 1.) As new species are added to the park's plant list each year, future surveys will most likely uncover more rare plants. During the summer of 2006, five volunteers assisted park staff in preliminary surveys of the top of Shasta Bally. Within two 4-hour surveys, 12 new plant species were identified for the park's growing plant list. Thus, additional surveys are needed of the top of Shasta Bally to develop a comprehensive understanding of the species that are up there.

Table 3. CNPS and Park Status of Potential Rare Plant Species.

Family	Scientific Name	CNPS	Park Status
Alismataceae	*Sagittaria sanfordii*	1B	Verified
Asteraceae	*Arnica venosa*	4	Verified
Caprifoliaceae	*Sambucus mexicana*	NONE[1]	Verified
Cyperaceae	*Carex geyeri*	4	Needs verification
Cyperaceae	*Carex vulpinoidea*	2	Needs verification
Ericaceae	*Arctostaphylos malloryi*	4	Not Verifiable
Liliaceae	*Allium sanbornii var. sanbornii*	4	Verified
Liliaceae	*Trillium ovatum ssp. oettingeri*	4	Verified
Liliaceae	*Triteleia crocea var. crocea*	4	Needs verification
Orchidaceae	*Cypripedium fasciculatum*	4	Verified
Poaceae	*Puccinellia howellii*	1B	Verified
Polemoniaceae	*Navarretia heterandra*	4	Needs verification
Potamogetonaceae	*Potamogeton epihydrus ssp. nuttallii*	2	Verified
Rosaceae	*Rosa pinetorum*	1B	Reclassified
Crassulaceae	*Sedum paradisum*	1B.3	Verified on boundary

[1] *Sambucus mexicana* is not a CNPS listed species; however, it is potential habitat for the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

Species Specific Information

Clustered Lady's Slipper

Clustered Lady's Slipper (*Cypripedium fasciculatum)* is located in the understory of the yew-willow riparian woodland, described above. Certain features of *C. fasciculatum*'s biology and ecology have important habitat and viability implications. Individuals are long-lived, may take a number of years to mature to flowering, have a symbiotic relationship with a fungus that derives nutrition from organic layers of the soil for part or all of its life, and have a shallow rhizome system sensitive to mechanical and fire

disturbance. Knecht's (1996) observations indicate that plants growing in areas with <60 percent canopy closure was small and appeared faded. It is not known how long plants growing under these conditions will survive. The pollinator is unknown.

The major viability consideration for C. *fasciculatum* is loss of populations due to land management activities that directly or indirectly impact the species and its associated habitat. Populations of *C. fasciculatum* tend to be small and scattered, which makes them vulnerable to extirpation. Small populations are much more vulnerable to extinction from human and natural causes than are larger populations. This is due to the fact that they are more likely than larger populations to succumb to natural catastrophes such as wildfire, floods, landslides, drought, and loss of pollinating insects (Falk and Holsinger 1991) or to human perturbation such as timber harvest, road and trail construction, creation of recreation sites, harvesting of forest products that disturbs litter and soil (herbal medicine, mushroom collecting), or fire. Threats include activities that alter the microclimate (moisture or temperature), actions that disturb the soil and litter layer, or decrease vegetation cover to < 60 percent.

NatureServe (http://www.natureserve.org/getData/plantData.jsp) lists *C. fasciculatum* with a global ranking of G4 (not rare and apparently secure, but with cause for long-term concern). The California Natural Diversity Database has designated the Heritage Rank for this species to be S3.2 (rare or uncommon and fairly endangered in California). The USDI Bureau of Land Management lists *C. fasciculatum* as a Bureau Sensitive species in California, Oregon, and Washington. This means that even though this plant species is not on federal or state lists as endangered, threatened, candidate, or proposed, they are designated by the Bureau of Land Management (BLM) State Director for special management consideration. It is listed as a Sensitive species by the U.S. Forest Service, Region Six, as a threatened species in Washington State, and as threatened throughout its range by the Oregon Natural Heritage Program. *C. fasciculatum* is a California Native Plant Society category 4 (watch list) species. The species' large overall range and the number of known populations suggest that the taxon is not in immediate danger. However, the small size of most populations, their isolated nature, and the presence of conflicting land uses warrant concern for the species' long-term survival throughout its range.

Management recommendations (Seevers and Lang, 1998) for the species have included the following:

- Maintain sufficient canopy cover;
- Maintain decayed down logs, snags, and duff layer within the species habitat area for favorable forest floor conditions, habitat, soil moisture and mycorrhizal associates;
- Avoid activities that alter or remove soil, duff, or the organic matter in the species habitat area;
- Manage sites to include entire populations plus an area large enough to maintain current habitat and associated microclimate;
- Restrict activities within species habitat areas during the species' growing season; and
- Buffer the species location in order to capture dormant plants.

Three populations of *C. fasciculatum* have been identified on Shasta Bally with a total of 56 individual plants. *P. unalascensis* were scattered throughout the yew-riparian woodland (described above). Additional surveys are needed to determine if other populations exist on the summit. Small populations such as these are likely to suffer reduced genetic variability and may be less able to adapt to changing environmental conditions (Given 1994). Maintaining a minimum effective population size for each *C. fasciculatum* is essential for species survival. Given (1994) states that 500 individuals as an acceptable goal for minimum effective population size and if a population drops to 50-100 individuals, there is cause for concern. However, the minimum effective population size for *C. fasciculatum* has not been determined.

Snow Mountain Beardtongue

Snow Mountain Beardtongue *(Penstemon purpusii*) is an uncommon species of the Klamath Mountains and high elevation North Coast ranges. This species can range up towards 7,800 feet and is located on the western point of the summit of Shasta Bally in an area of loose dark-tinted soil. Three populations have been found—two groups in close proximity to one another and one single plant farther down the slope. These plants were in the large open areas of bare soil between montane chaparral. Several populations of *Penstemon newberryi* var. *newberryi* were noted on large boulders throughout the summit area. NatureServe (http://www.natureserve.org/getData/plantData.jsp) ranks *P. purpusii* with a global ranking of G3, which is vulnerable and at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

Shasta County Arnica

Shasta County Arnica *(Arnica venosa)* is an uncommon species of arnica and is endemic to the Klamath Mountains of northern California, where it can be found only in Shasta and Trinity Counties. There are several populations of Shasta County Arnica along the cut banks of Shasta Bally road, up to about 3,000 feet in elevation. Additional surveys need to be conducted to determine the elevational limits of this species, which can range upwards in elevation to 4,600 feet above MSL. NatureServe (http://www.natureserve.org/getData/plantData.jsp) ranks *S. arnica* with a global ranking of G3, which is vulnerable and at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. The California Natural Diversity Database has designated the Heritage Rank for this species to be S3.2 (rare or uncommon and fairly endangered in California) and it is listed by CNPS as a category 4 species (watch list).

Elk Sedge

Field surveys for determining the alliances and associations of Whiskeytown's plant communities (Stuart et al. 2003), added one additional species to the park's plant list: Geyer's or elk sedge (*Carex geyeri*) was found in vegetation plots sampled between 3,000 and 3,600 feet along Shasta Bally road. NatureServe (http://www.natureserve.org/getData/plantData.jsp) ranks *C. geyeri* with a global ranking of G5, which is secure (common; widespread and abundant). The California Natural Diversity Database has designated the Heritage Rank for this species to be S3.2 (rare or uncommon and fairly endangered in California) and it is listed by CNPS as a category 4 species (watch list). A voucher specimen for this species was not collected and additional surveys are needed to verify its presence in the park. This species is a Klamath endemic and can be found upwards of 6,700 feet in elevation.

Invasive-Non-Native Species

According to the Whiskeytown NRA Plant List, updated in May 2008, there are approximately 195 nonnative plant species present within the park and a proportion of which are considered highly invasive and subject to eradication. The mechanism of disturbance is believed to enhance the probability of non-native plant establishment in native plant communities (Rejmanek 1989, Hobbs 1991). Concern of non-native plant species is greater in that these activities may favor invasions by transporting propagules, disturbing the soil surface, and by creating gaps that allow the spread of invasives into uninfested areas (Brooks 2001).

Of greatest concern is the introduction and spread of invasive weeds into the higher elevations, which are considered relatively pristine. Equipment and material that is not washed and from outside the area can easily spread infested seeds along Shasta Bally road and into a subalpine plant community that has documented rare plants.

Other areas of concern include infestations that are impacted by vehicle traffic and road maintenance activities. The combination of increased traffic in association with the ground disturbing activities of

maintaining culverts and road infrastructure exacerbate the introduction and spread of invasive species throughout the park. Many of these species have been found to be creeping higher in elevation into more pristine habitats, which is an important threshold to defend. In some areas, these exotic pose a direct threat to species that are listed as rare by the California Native Plant Society. Klamath weed (*Hypericum preforatum*) was found extensively along Shasta Bally road and poses a direct threat to the rare endemic, Shasta County arnica (*Arnica venosa*). The roadside activities leading up to Sheep Camp can only exacerbate the problem and the tremendous amount of traffic and disturbance along the roads during seed set of Klamath weed will undoubtedly expand existing infestations into new and recently undisturbed areas.

High priority nonnative and invasive species of concern that are known to invade high elevation plant communities and pose the greatest threat include: yellow star thistle (*Centaurea solstitialis*), Diffuse knapweed (*Centaurea diffusa*), bull thistle (*Cirsium vulgare*), common mullein (*Verbascum thapsus*), Klamath weed (*Hypericum perforatum*) and wild parsley (*Torilis arvensis*).

Nonnative plant species consistently ranked among the highest priorities for biological inventory among the Klamath Network Parks, and was the top ranked vital sign in the Klamath Network overall. At Whiskeytown, several infestations have been successfully treated within the park, and control efforts for the next several years are expected to achieve a significant reduction in exotic plant populations.

Treated areas will require monitoring and retreating indefinitely. Mandates that require direct action to monitor and control the spread of exotics within the park include the 1916 NPS Organic Act, the General Management Plan for Whiskeytown National Recreation Area (2001), and agency-wide policy document National Park Service Management Policy (2006). Specifically, NPS the Management Policies (2006) state: "non-native species will not be allowed to displace native species if displacement can be prevented." In addition, Director's Order 12 states that activities may not be categorically excluded from NEPA if they contribute to the introduction, continued existence, or spread of non-native invasive species or actions that may promote the introduction, growth, or expansion of the range of non-native invasive species (DO-12 Handbook 3.5O, Executive Order 13112). Changes in vegetation resources must be observed and documented in order to interpret and analyze such changes as the basis of informed decisions. The goal of the park exotic plant program is to reduce exotic pest plant populations and allow re-colonization by native species.

Wildlife

The park harbors healthy wildlife populations, with more than two hundred vertebrate species having been recorded within its boundaries. Although the area has been subject to a certain amount of historic and ongoing use by man, the land within the park's boundaries provide relatively undamaged habitat, and the numerous vegetation types allow for a wide diversity of wildlife. The park's land managers continue to maintain the balance between protecting the area's wildlife resources and providing access and facilities for thousands of visitors.

Over 40 mammal species, 160 bird species, and 30 reptile and amphibian species have been documented within the park, the majority of which could occur within or near the site. Many rodents inhabit the mixed conifer forests on the slopes of Shasta Bally, including wood rats (*Neotoma* spp.), chipmunks (*Tamias* spp.), and mice (*Peromyscus* spp.). These rodents provide an ample prey source for larger carnivores such as coyotes (*Canis latrans*) and gray foxes (*Urocyon cinereoargenteus*). Black-tailed deer (*Odocoileus hemionus*) are fairly common throughout the entire NRA, including at the summit of Shasta Bally. The largest mammal present in the area is the black bear (*Ursus americanus*). Black bears sometimes become exceedingly accustomed to humans, a situation that can result in potentially dangerous encounters for visitors. While mountain lions (*Felis concolor*) could also be dangerous to humans, they are generally more reserved and encounters are rare.

The majority of birds frequently observed within the project area consist of species that dwell in mixed-conifer forests and montane chaparral habitats, as exists on the slopes and summit of Shasta Bally. Some of these species include bluebirds (*Siala* spp.), red-breasted nuthatches (*Sitta canadensis*) and white-breasted nuthatches (*S. carolinensis*), various woodpeckers (*Picoides* spp.) and dark-eyed juncos (*Junco hyemalis*).

Reptiles include various snakes such as the California mountain kingsnake (*Lampropeltis zonata*), the common kingsnake (*L. getula*), the western fence lizard (*Sceloporus occidentalis*), and a few species of alligator lizards (*Elgaria* spp.). The western rattlesnake (*Crotalis viridis*) is also relatively common, and many have been seen at the Shasta Bally communication site.

Some of the threats to the area's wildlife include wildland fires and the introduction of exotic species, including invasive plants that may affect the vegetation communities and therefore alter wildlife habitat. Habitat fragmentation, found outside and within the boundaries of the park, can also have a negative impact. The Shasta Bally road and the powerline corridor, two of the project's components, are a source of fragmentation. The powerline corridor traverses a portion of old-growth forest, habitat that is vital to many animal species. The powerline structures use an armless configuration, meaning that the wires are closer together than structures that use crossarm configurations. The armless structures increase the possibility of electrocution for birds, particularly for larger raptors, since the shorter distance between the wires makes it easier for birds to come in contact with two of them, which would result in an electrocution. There are no records of bird electrocutions along the powerline, but such incidents would be difficult to detect since the powerline is seldom inspected due to its remote location and challenging access. There is a possibility that some of the brief power interruptions experienced at the communication site are a result of bird electrocutions.

The towers at the communication site also have the potential to have an impact on birds. During inclement weather or low light conditions, the towers pose a collision hazard, particularly during spring and fall migration seasons. However, the NPS staff does not have any record of bird mortalities as a result of the tower arrays. The conditions around the communication site may also pose an injury hazard to other wildlife, as debris and poorly covered trenches surround the facility.

Cultural Resources

Ethnographic Resources

In May 2000, a study was contracted by the National Park Service to compile an ethnographic overview and traditional use study of the Native Americans affiliated with the Whiskeytown National Recreation Area (Emberson, 2000). The study indicated that the Wintu (or Northern Wintu) are the Native American group that historically utilized the land and resources of the Recreation Area. The Wintu are not currently represented by a single organization but 3 governmental bodies have affiliations: the Redding Rancheria, the Hayfork Band of the Nor-El-Muk Wintu Indians and the Wintu Tribe of Northern California and Toyon Wintu Center. Non-governmental groups that represent the Wintu Community (in part) include: Local Indians for Education (LIFE) Center, the Wintu Education and Cultural Council, the Pe'Lane Bos Camp, the Wintu Ad-Hoc Committee, the Winnemem Spiritual Organization and a Wintu NAGPRA Committee associated with the Redding Rancheria.

The ethnographic overview reviewed records and conducted interviews and meetings to gather information. The author indicated that some information was withheld and so the report provides selected concerns and issues that were shared. Issues or areas of common concern included: access to resources within the park, gathering policies, disposition of Wintu-associated cultural resources, continuance of the Pe'Lane Bos educational camp, training of the Recreational Area staff to include issues of cultural sensitivity and maintenance of Wintu culture through education and training.

In a 1988 National Park Service Report (Eidsness 1988) mentions that a prehistoric site was located on

Shasta Bally which "may represent a spiritual place where Indian doctors found solace and strength to carry out their responsibilities." This overlook may be a spiritual site of significance and concern by local Native Americans which may need to be taken in consideration and consultation.

There are no cultural landscapes within the project area. There is an ethnographic reference to Shasta Bally which is identified as "bohem buli" (big Mountain) in Bauman 1981.

Human Environment

Park Operations

Park operations that are affected by the presence of the communications site include maintenance, law enforcement, and fire and emergency services.

Law Enforcement and Fire Management

The law enforcement and fire management units for the park currently have 22 permanent staff members and ten temporary staff members performing law enforcement, fire management, clerical, fuel crew and engine management functions. Responsibilities of these staff members include search and rescue efforts, emergency medical assistance, assistance with traffic accidents, fire management, and fuel reduction. Fire management staff also works with the maintenance staff in hazard tree removals, cleanup and repair from storm damage, and the clearing of trails and roads of brush.

The Shasta Bally road represents a hazard due to the primitive condition of the road. The presence of a WCF with an onsite engineer increases the range of rescue efforts. The existence of the powerline and the WCF site increase fire hazard in the area.

Park Maintenance

Currently there are 16 permanent and 15 to 20 seasonal staff members who are responsible for the care and maintenance of park facilities, infrastructure, and physical and cultural resources. The maintenance staff performs a variety of duties including hazard tree removal and brushing trailside vegetation, inspecting and maintaining picnic areas, campgrounds, and maintaining water and wastewater systems throughout the park. In addition, the maintenance division is responsible for grading the Shasta Bally road once a year and repairing and replacing culverts.

Visitor Use and Experience

Public Health and Safety

The communications site is a gated FCC facility, but this has not deterred curious visitors from entering the facility. One site engineer is present at all times on the summit and stays for two weeks at a time. A halon fire suppression system has been installed in the buildings and represents a health hazard for the site engineers in the event of a fire. The multiple antennae present on the summit have been grounded with a copper grid buried under the site.

The Shasta Bally road is in poor condition in certain sections with high gradients and degraded road surface. This road is a potential hazard to unprepared public visitors without appropriate types of 4-wheel drive vehicles. Spring and summer storm events with periods of heavy rainfall cause significant erosion of the road. Large ruts and erosional features in the roadway are also a hazard to the public when using the road for biking, hiking, and other means of road use.

The powerline corridor is not readily accessible to the public; however, subcontractors hired by PG&E maintain the line and trim the trees along the corridor. The tree trimming activities are conducted in cooperation with the NPS and all the cuttings are scattered to reduce the fire hazard.

Recreation

The park attracted an average of approximately 750,000 visitors for the past several years. Many of them come to the area to enjoy recreational opportunities provided by Whiskeytown Lake, such as boating, kayaking, wakeboarding, fishing, swimming, and sailing. The park also offers numerous non water-based activities. Visitors venture into the backcountry to go hiking and backpacking. The park is also used for horseback riding, biking, and many visitors enjoy wildlife viewing in the park's backcountry. The park also maintains several campsites around Whiskeytown Lake, including tent camping and recreational vehicle sites.

Off-road enthusiasts may occasionally use the Shasta Bally road during summer and fall months, although the NPS policy requires that any vehicles traveling on roads within the park must be street legal. This still allows for use by many types of motorcycles. The road also allows use by hikers and bicyclists, and provides access for hunters. Some visitors also use the road to reach the summit of Shasta Bally to enjoy the views, hiking, and the local wildlife. The trail starts from the Shasta Bally road from the east side of the mountain, and wraps around to the north and west sides of Shasta Bally and ties into Queen Mary and Coggins Park.

Sheep Camp, one of the primitive campgrounds within the park, is located along Shasta Bally road at the eastern end of the site. It has a total of five campsites, and each site has a fire pit, tent pad, picnic table, and bear-proof storage. A vault toilet is also maintained for the campground.

Soundscape

The soundscape of the park and the site is an important resource to be managed and protected. Soundscapes can have a direct impact on wildlife populations and can also have a significant influence on visitor experience. As with other recreation areas, visitors of the park consider the quiet and natural peace of the area to be an integral part of the experience. Many enjoy the variety of natural and wildlife sounds that can be heard, such as singing birds or the sound of a creek or waterfall.

Human-related sounds are relatively common at the site, including vehicle noise from use of the Shasta Bally road. Several sounds can be associated with the telecommunication site at the summit of Shasta Bally. Typical maintenance activities at the telecommunication site, as well as access by maintenance or support vehicles can generate a significant amount of noise. Helicopters are also used on occasion to access the site during the winter season or to deliver heavy equipment. In addition, the mechanical sounds of cooling/ventilation fans operating on the buildings affects the natural soundscapes. The soundscape at the site is also occasionally affected by off-site human-related sources, such as airplanes flying overhead.

Visual Resources

The Whiskeytown NRA and the site provide an abundance of scenic opportunities to be enjoyed by park visitors. Shasta Bally summit is at an elevation of 6,199 feet above MSL, standing 5,000 feet above Whiskeytown Lake and Whiskeytown Dam. This setting provides scenery that can be viewed from the summit and the Shasta Bally summit itself can be seen from most areas within the Whiskeytown NRA. One of the most notable vantage points is from the highly frequented Visitor Center on Kennedy Drive at the east end of the lake. Motorists traveling along Highway 299 can also enjoy the landscape.

While the WCF at the summit of Shasta Bally is noticeable from the Visitor Center and most vantage points on the surrounding ridges, it is relatively inconspicuous and is not a dominant visual feature when

viewed from a distance. The Shasta Bally road is difficult to see from most distant vantage points, as it is mostly concealed by vegetation. From the west side of Shasta Bally, the powerline easement is also slightly noticeable, primarily due to the corridor that is cleared of trees. The power poles are relatively small and typically shorter than the surrounding old growth forest.

The Shasta Bally summit, being the tallest peak within the park and in the immediate area, provides a dramatic and unique vantage point to view surroundings. On a clear day, observers can see for hundreds of miles in several directions and enjoy views of Whiskeytown Lake, Mt. Lassen, and Mt. Shasta. Mount Shasta and Shasta Lake are visible to the northeast, and a magnificent view of the Trinity Alps can be seen to the northwest.

Views from the Shasta Bally summit are significantly impacted by the presence of the telecommunication site on the north side of the peak. From this vantage point, the buildings and antennas are a dominant visual feature, which attract attention and are difficult to overlook. A portion of the powerline and Shasta Bally road are also visible from the summit. However, the views are also impacted by off-site structures and man-caused landscape alterations, such as the Whiskeytown Dam, Highway 299, and transmission lines. In addition, old logging and mining roads are visible in the surrounding hills.

The night sky of the park is also a valuable visual resource. As more areas become developed throughout the nation, it becomes increasingly difficult to find night skies that are not impacted by artificial light. Light pollution increases the brightness of the sky and causes stars and other bodies to fade. Although there is a certain amount of light pollution from the city of Redding, the night sky at the Site provides excellent star gazing opportunities. The nature of the existing project has virtually no impact on the brightness of the sky. However, there is an external flood light at the communications site that may be visible from certain vantage points, and may affect night sky views for visitors at the summit of Shasta Bally.

Socioeconomic Considerations

Environmental Justice

Executive Order 12898 requires federal agencies to incorporate considerations in planning by identifying disproportionately high and adverse impacts from their actions and decisions with regards to low-income or minority populations and communities. Shasta Bally summit, the access road and the powerline are all located on lands managed by the National Park Service; however, the permittees provide services to rural communities far beyond the park boundaries in western Shasta, Siskiyou, Tehama, and Trinity counties. The WCF provide television, radio, intranet, and emergency services to the surrounding areas including some rural communities. Some current end users are located in remote areas and services provided by the WCF on Shasta Bally are the only access they currently have to these services. However, there are two WCF sites located adjacent to the park's northeast boundary on South Fork Mountain. One of these sites is managed by the Bureau of Land Management (BLM) and the second site is privately operated. Both of these WCF sites are currently accepting wireless telecommunication permittees.

The continued operation or maintenance of the WCF within the park boundaries will not result in any disproportionate health or environmental effects with regards to the issues of concern to Executive Order 12898 as long as the facilities remain on site or a suitable alternative is found.

This page intentionally left blank