Rationales for Animal Species Considered for Designation as Species of Conservation Concern

Inyo National Forest

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For:
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Introduction

In coordination with the Inyo National Forest, and pursuant to responsibilities and authority under the 2012 Planning Rule (36 CFR 219.7(c)(3)), the Regional Forester determined the terrestrial wildlife, aquatic wildlife, and plant species meeting the criteria for species of conservation concern (SCC) for the Inyo National Forests' Land Management Plan and Final Environment Impact Statement (FEIS). This document presents the rationales of plant (botanical) species considered for species of conservation concern.

The definition of SCC is found at 36 CFR 219.9(c), and criteria for identifying them are outlined in the Forest Service Handbook FSH 1909.12 Chapter 10, Section 12.52c. A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9).

Species of Conservation Concern Compared to Forest Service Sensitive Species

During the evaluation of species of conservation concern, approximately 120 terrestrial and aquatic animal species were considered, including consideration of all species on the Region 5 Regional Forester's sensitive species list for the Inyo National Forest. The Regional Forester's sensitive species list of wildlife, fish, and invertebrate sensitive species on the Inyo National Forest are based on the September 9, 2013 versions of the USDA Forest Service Pacific Southwest Region Sensitive Animal and Plant Species by Forest (United States Department of Agriculture 2013). Of the 27 animal sensitive species on the Inyo National Forest, 15 met the criteria as species of conservation concern. In general, sensitive species were determined not to meet the established criteria as a species of conservation concern for one or more of the following reasons:

- It is a federally recognized threatened, endangered, proposed, or candidate species under the Endangered Species Act and would be considered under that other category of at-risk species.
- The species does not have a known occurrence on the national forest.
- Previous occurrence records were determined to be incorrect identifications of the species and/or could not be re-located.
- Recent surveys indicated the species is more common than originally thought.
- Natureserve, California Natural Diversity Database, California Native Plant Society Rare plant inventory, or other best available scientific information or data sources indicate threats to the species were not substantial.
- There was no information about threats to the species. This was a relatively uncommon circumstance, because information about threats could be inferred from threats to the ecosystems upon which the species depend. Lack of information generally only limited species inclusion on

the list if the species had not been observed for decades or more, leading to uncertainty about the condition of its specific habitat.

The specific reasons a species was determined to meet or not meet the established criteria as a species of conservation concern are provided in the species rationales in chapters 1 and 2.

Procedure for Evaluation of Animal Species of Conservation Concern

Species are evaluated by following a process outlined in national directive FSH 1909.12 § 12.52c-d. Species are considered using databases, scientific studies, local information and expert knowledge. Initially, we included all known or potential species within or near the administrative boundaries of the forest, providing a comprehensive list for evaluation of other criteria. The list was based on a compilation of all California Natural Diversity Database polygons from the February 2016 dataset that intersect the Forest boundaries. Some of the species included from this step were based upon over-estimated delineations of map areas, particularly from the California Natural Diversity Database dataset. Only species with reliable documentation for presence within the plan area were carried forward for further consideration. More recent California Natural Diversity Database datasets, and other datasets, were reviewed for the updated rationales in this document as referenced.

In addition to research conducted by Forest Service specialists, the national directives require use of threat status rankings, determined in large part through NatureServe, a non-profit organization that provides proprietary wildlife and plant conservation-related data, tools, and services. The conservation status rank of a species is represented by a letter and a number. The letter represents one of two distinct geographic scales: global (G) and state (S). The status rank number is on a scale of one to five, where a ranking of one indicates a species at the highest level of risk and a ranking of five indicates the lowest level of risk. The status rank number is preceded by the letter reflecting the appropriate geographic scale of the assessment. For example, a status rank of G5 represents a species that has an extensive range of distribution and has a low risk of extinction. Infraspecific taxa refer to subspecies, varieties, and other designations below the level of species. The status rank of infraspecific taxa (subspecies or varieties) is indicated by a supplementary T-rank, following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1.

We also consider: species listed as threatened or endangered by states or federally recognized Tribes, or identified as a high priority for conservation; species petitioned for Federal ESA listing and for which a positive "90-day finding" has been made; and other species as outlined in national directive FSH 1909.12 § 12.52c-d.

If no information on threats or concern for persistence in the planning area was available, the species was determined to have insufficient information available to conclude there is a substantial concern about the species capability to persist in the plan area over the long term, and the species was not carried forward for further consideration.

Additional detail on the process used for evaluating potential plant species of conservation concern can be found in the Final Inyo National Forest assessment (USDA 2013) and accompanying topic papers completed as the first phase of plan revision. This information was considered to be evidence for concern for these species persistence, and was thus the reasoning for carrying them forward for further consideration.

Inyo National Forest Species of Conservation Concern

Based on reviews of best available scientific information for all species considered, twenty-one animal species meet the criteria for listing as species of conservation concern for the Inyo National Forest (Table 1).

Table 1. Regional Forester's animal species of conservation concern for the Inyo National Forest, updated June 2019.

Type	Common Name (Scientific name)
Mammals	Nelson Desert Bighorn Sheep (*Ovis canadensis nelsoni*) Sierra Marten (*Martes caurina sierra*)
Birds	Bald eagle (*Haliaeetus leucocephalus*) California spotted owl (*Strix occidentalis*) Great gray owl (*Strix nebulosa*) Mt. Pinos sooty grouse (*Dendragapus fuliginosus howardi*) Willow flycatcher (*Empidonax traillii brewsteri* and *E. t. adastus*)
Amphibians	Black toad (*Anaxyrus exsul*) Inyo Mountains slender salamander (*Batrachoseps campi*) Kern Plateau salamander (*Batrachoseps robustus*)
Fish	California golden trout (*Oncorhynchus mykiss aguabonita*)
Terrestrial Invertebrates	Sierra sulphur(*Colias behrii*) Square dotted blue (*Euphilotes battoides mazourka*) Mono Lake checkerspot (*Euphydryas editha monoensis*) Boisduval's blue (*Plebejus icarioides inyo*) San Emigdio blue (*Plebulina emigdionis*) Apache fritillary (*Speyeria nokomis apacheana*) A cave obligate pseudoscorpion (*Tuberochernes aalbui*)
Aquatic Invertebrates	Western pearlshell mussel (*Margaritifera falcata*) Wong's springsnail (*Pyrgulopsis wongi*) Owens Valley springsnail (*Pyrgulopsis owensensis*)

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Chapter 1 – Rationale for Animal Species Determined to be Species of Conservation Concern

Mammals

Nelson desert bighorn sheep - *Ovis Canadensis nelsoni*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long-term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long-term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Disease and reduced genetic diversity, isolation, habitat degradation, predation, and disturbance.

Rationale for Nelson desert bighorn sheep

Nelson desert bighorn sheep has a global rank of G4 (apparently secure), a subspecies rank of T4 (apparently secure), a California state rank of S3 (vulnerable), and is a Region 5 Forest Service sensitive species for Angeles and San Bernardino National Forests. This species is also recognized in California as a species of special concern and species of greatest conservation need.

Threats to the persistence of all desert bighorn sheep in California include disease transmission from domestic sheep and goats, competition with livestock, loss of genetic diversity, habitat loss and disturbance (U.S. Fish and Wildlife Service 2011). There is controversy regarding the literature on disease transmission, as no articles have been published that document a visual observation in the field of nose-to-nose contact between domestic sheep and goats and bighorn sheep which resulted in transmission of this disease. However, studies conducted in research facilities (Foreyt 1989) and literature on the presence of bacteria, such as *M. ovi*, before and after domestic sheep or goats were observed in bighorn habitat (Besser et al. 2012) have shown a correlation between contact and the spread of disease. Further, Besser and others (2012) demonstrated exposure to a single *M. ovi* infected animal resulted in transmission of infection and bronchopneumonia to all bighorn sheep both within the same pen and in adjacent pens located 7.6 to 12 meters apart.

Other potential threats to persistence include livestock grazing, habitat loss from wildfire, and reduced genetic diversity. Epps and others (2005) found a reduction in genetic diversity amongst desert bighorn sheep populations in southern California. Each of these populations was likely very small (fewer than 50 individuals each) and they found without maintaining gene flow between these populations, genetic drift could quickly eliminate diversity. Both human-made barriers and increased distance between herds likely contributed to the reduction in genetic diversity within this meta-population (Epps et al. 2005). Consideration should be given to balance the need to maintain connectivity between herds such as the White Mountains, Lone Mountains and Silver Peak Range herds in order to maintain genetic diversity and the need to reduce the risk of contact between healthy and infected individuals, which could result in mass die-offs.

Climate change may have negative effects on Nelson bighorn sheep; however, Epps and others (2006) found that populations at higher elevations had greater genetic diversity and these higher elevation sites

likely had better habitat conditions and may serve as refugia as the climate warms. While connectivity between populations was identified as an important factor in maintaining genetic diversity (Epps et al. 2006), consideration must be given to the risk of disease transmission and its implications as discussed above.

The losses of habitat due to development, disturbance, or stochastic events (wildfires) are very limited in the White Mountains, where the majority of bighorn habitat is located in designated wilderness. Wildfires, although a key disturbance regime in some vegetation types in this area, are limited in bighorn habitat. The amount of shrub vegetation provides suitable foraging habitat and is not a limiting factor in the plan area.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

There is an isolated population of Nelson bighorn sheep known to occur in the White Mountain area at elevations ranging from 6,000 to 12,000 feet, within the plan area. This is the most northern population of desert bighorn sheep in California. California Department of Fish and Wildlife has estimated this population to be about 300 sheep and the population appears stable. Most of these animals occur in the White Mountain Wilderness, with approximately 30 animals (or roughly 10 percent of the population) occurring outside this area in Silver Canyon.

Ecological conditions for this species

Habitat for Nelson desert bighorn sheep on the Inyo National Forest is in areas with steep, rocky cliff or rock faces. Shrubs located near or on these cliff faces and within meadow systems are important for foraging. Visually open areas with suitable escape terrain are key ecosystem characteristics. On the Inyo National Forest, these conditions occur in the alpine and subalpine assessment types, primarily within the White Mountains Wilderness which encompasses approximately 230,958 acres. The area is jointly administered by the Inyo National Forest (206,796 acres) and the Bureau of Land Management (24,162 acres). It is contiguous, with the Boundary Peak Wilderness along its northeast boundary.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Almost all (95 percent) of the alpine assessment type is within designated wilderness, where human impacts are relatively minor. Larger scale influences such as climate and air pollution are exceptions. There are approximately 129,805 acres of this assessment type on the Inyo National Forest, ranging from 9,000-14,500 feet, on the Eastern Slopes, Glaciated Batholith, Kern Plateau and White Mountains. Over the past several decades, subalpine tree species have encroached into alpine ecosystems as a result of changing climate, resulting in reduced acreage of alpine systems. The alpine assessment type occurs at the highest elevations of the forest, generally adjacent to and mixed with rock outcrops and talus slopes, and with high proportions of the landscape unvegetated (There is a 0.5:1 ratio for vegetated-to-unvegetated, near subalpine forests, sagebrush or patches of diverse subalpine shrubs. Trees are generally not present in alpine plots at the stand scale, although shrub species are often present. The ratio is 0:1 for tree-to-shrub cover and 2:1 for shrub-to-herb). Shrub species generally include dwarf woody species, or subshrubs, including *Salix arctica* and *Phyllodoce breweri.*

There are approximately 383,336 acres of subalpine conifer forest mapped on the Inyo National Forest occurring between 7,000-13,000 feet on the Eastern Slopes, Glaciated Batholith, Glass Mountain, Inyo Mountains, Kern Plateau and White Mountains. Subalpine conifer forest is characterized by much higher proportions of vegetated-to-unvegetated (11:1) and tree-to-shrub (47:1) conditions than alpine forest.

There are 12,397 acres of alpine, 4,510 acres of subalpine and 143 acres of meadow as potentially available habitat in the White Mountain Wilderness.

The projected status of those ecological conditions relative to the species considered

The relative inaccessibility of these assessment types puts them at less risk from human-induced changes. However, continued increases in tree/shrub cover and density related to climate change are expected to be significant. Recent climate models forecast a complete loss of alpine ecosystems from the White Mountains in the next 50-60 years. Substantial losses to subalpine conifer forests, primarily along the southern edge of the forest, which comprises the edge of that forest type's range, are also expected.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Acres of escape terrain (e.g., cliffs and rocky features) were not specifically analyzed but presumably this number remains largely unchanged from the reference condition and will continue to remain unchanged.

Key risk factors arising from non-ecosystem conditions and/or management activities

Within the White Mountains, the primary local concern for the continued persistence of Nelson desert bighorn sheep is disease transmission from domestic goats that graze from Chalfant Valley through Hammil Valley, adjacent to the plan area (CDFW 2015) (Figure 1). Epizootic pneumonia, caused by *Mycoplasma ocipneumoniae* (*M. ovi*), has been documented to occur in this herd and has caused respiratory disease and die-offs in bighorn sheep in the White Mountain herd (Besser et al. 2008, CDFW 2015). Possible intermingling between this herd and the Lone Mountain and Silver Peak Range Nelson desert bighorn sheep populations in Nevada during the breeding season pose additional risks since both of these herds have also been documented to carry *M. ovi* (California Department of Fish and Wildlife 2015). To date, there has been one documented case of pneumonia on the forest, an 11-year-old male in 2016 (Nelson 2016).

The area in which bighorn sheep occur in the White Mountains is within California Department of Fish and Game Hunt Zone 7 and overlaps with four active cattle allotments.

Lack of genetic diversity resulting from limited connectivity is another general concern; however, genetic diversity is not known to be a limiting factor for the White Mountains herd within the plan area.

A summary of the overall at-risk status along with a conclusion as to whether or not the species was considered at-risk for persistence on the planning unit

Future habitat loss due to warming temperatures and climate change is a threat, as is loss of genetic diversity. The most immediate and primary risk to Nelson bighorn sheep persistence on the Inyo National Forest, however, is exposure to disease. The forest limits this threat by restricting goat and sheep use in areas of the White Mountains which overlap with bighorn sheep within Forest Service management authority, but has limited ability to mitigate co-mingling with diseased animals such as stray domestic sheep and goats from private properties or animals from other bighorn herds in adjacent areas. Although disease may continue to be a latent threat, at this time there is no evidence of a decline in the Nelson bighorn sheep population on the forest.

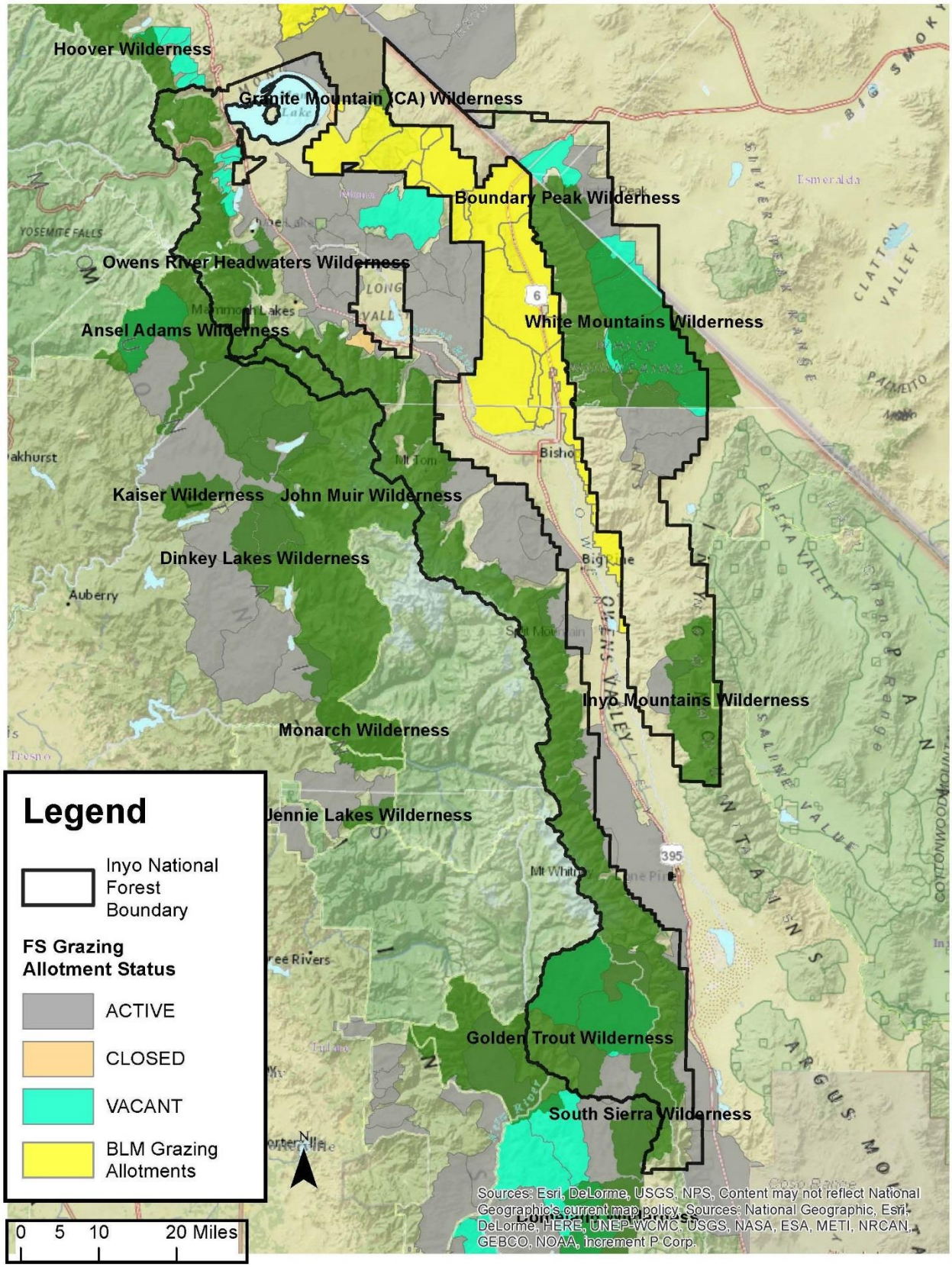

Figure 1. Current grazing allotment status on the Inyo National Forest and adjacent Bureau of Land Management allotments. There is an isolated population of Nelson bighorn sheep known to occur in the White Mountain area.

Threats to the persistence of all desert bighorn sheep in California include disease transmission from domestic sheep and goats, competition with livestock, loss of genetic diversity due to isolation, habitat loss and disturbance. Based upon the evidence, the Nelson desert bighorn sheep indicates substantial concern about the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the Nelson desert bighorn sheep **does meet** the established criteria at CFR 1909.12, chapter 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Sierra marten - *Martes caurina sierrae*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to Sierra marten

Martens are extremely sensitive to the loss and fragmentation of mature forest habitat (Zielinski 2014). From a relatively continuous higher elevation distribution in the early 1900s, martens have retracted to isolated and discontinuous populations (Zielinski et al. 2005). Martens are impacted by loss of contiguous old forest breeding habitat from multiple sources, including timber harvest/thinning, vegetation management, extensive tree mortality resulting from drought-mediated insect and disease and wildfire. Climate change also poses a serious threat due to the predicted increase in higher elevation fires. Lawler et al. (2012) predicted that as a result of changing climate, the range of martens in California will contract northward in latitude and upward in elevation, become less common, and functionally fragment. Recreational activities and roads (with associated roadkill) further increase habitat fragmentation. Additionally, the use of illegal rodenticide poisons to protect marijuana plantations is present throughout the marten's range in the Sierra Nevada (Gabriel et al. 2012). It should be noted that this marijuana growing activity is extensive, illegal, and neither authorized, funded, nor carried out by the Forest Service. Nonetheless, the impact to all predators is significant, and cumulatively presents an extremely detrimental effect to population health, survival and status.

Rationale for Sierra marten

Nationally, martens in the Sierra Nevada are ranked G4G5 (apparently secure/secure) by NatureServe but S3 (vulnerable) in California. The *sierrae* subspecies is ranked by NatureServe as T3, indicating they are thought to be 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. Martens are listed as Species of Special Concern (SSC) by California Department of Fish and Wildlife and were designated a Species of Greatest Conservation Need (SGCN) in the California State Wildlife Action Plan (California Department of Fish and Wildlife 2015). Sierra marten are Region 5 Forest Service sensitive and management indicator species.

Martens use habitat at multiple spatial scales, including resting/denning, stand, home range and landscape (Zielinski 2014), and the areas used may differ by season (Martin and Barrett 1991, Spencer 1987). Sierra martens primarily occupy mature coniferous forests, typically more mesic than xeric (Buskirk and Powell 1994), supporting large-diameter trees and snags, multi-layered canopies (Fuller 2006), large downed logs, moderate-to-high canopy closure, structurally diverse and complex understory and interspersed riparian areas and meadows. These features provide resting and denning sites, as well as escape and thermal cover. In one Sierra Nevada study, martens specifically selected riparian forests for foraging (Spencer et al. 1983).

Coniferous forest types important to Sierra Nevada marten include red fir (*Abies magnifica*), lodgepole pine (*Pinus contorta*), subalpine conifer, mixed conifer-fir, Jeffrey pine (*Pinus jeffreyi*), and eastside pine. Martens are more prevalent in the upper montane zone of the Sierra, Stanislaus and Inyo National Forests but will utilize lower montane forests as well as meadows (Zielinski et al. 1983).

The physical structure of the forest, including large live and dead trees, coarse woody debris, and a relatively low and closed canopy, appears more important for Sierra martens than species composition (Spencer et al. 1983, Hargis and McCullough 1984). Martens prefer forests with overhead cover and complex ground structure to allow winter access to subnivean (below snow) spaces (Buskirk and Powell 1994). The arboreal habits of martens may have been exaggerated in early research (Buskirk 1994), when in fact, they find much of their food on the ground or under snow. A preference for physical structure or overhead cover is thought to arise from a need for protection from predators and, in areas of deep snow, access to subnivean areas provided by complex structures on the ground such as logs and rocks. Dens occur both in hollow trees (usually within cavities) and on or under the ground in logs or rock piles.

Martens demonstrate a high sensitivity to loss and fragmentation of mature forest habitat, seldom occupying an area after more than 30 percent of mature forest has been harvested (Bissonette et al. 1997, Potvin et al. 2000). Indeed, Moriarty et al. (2011) postulate that even the total amount of habitat may not be the most important determinant of marten occurrence. Rather, attributes of the landscape like core patch size, distance and spatial configuration of patches and microhabitat features within patches may be very important (Hargis et al. 1999). Vegetation management activities must therefore be cognizant of these elements, many of which occur in the understory.

Although talus fields are occasionally used, martens usually avoid open areas, and even small openings less than 50 meters (164 feet) across negatively affect use of an area by martens (Heinemeyer 2002). This behavior is attributed to predator avoidance. How martens use the habitat via movements, both seasonally and daily, appears to coincide with prey availability **(**Zielinski et al. 1983). Microtine rodents are particularly common dietary items, with birds, squirrels and vegetation also reported (Martin 1994).

Martens appear to be very sensitive to removal of key resting and breeding habitat features from their home ranges. Moriarty et al. (2011) provide compelling evidence for a decline in the marten population on the Sagehen Experimental Forest (SEF) affected by the loss and fragmentation of habitat associated with decades-long timber harvest that consisted of clear-cut, shelterwood and salvage sales. This study documented a substantial decline in the number of martens detected. Key factors contributing to decline in marten numbers on the Sagehen site included decreases in habitat patch size, acres of core habitat area, total marten habitat and an increase in the distance between habitat patches (Moriarty et al. 2011). Loss and fragmentation of suitable habitat in the form of large live and dead/dying trees reduce availability of resting/denning sites (Moriarty et al. 2011). Reduced understory complexity may affect prey habitat and indirectly reduce the ability of marten to forage effectively (Moriarty et al. 2011, 2016); marten movement dynamics change as forest complexity declines, as a result of altering foraging strategy and changes in predator avoidance behavior.

Adult survival is the factor most critical for marten population sustainability (Buskirk et al. 2012), so the ability to avoid predation in structurally complex forests is a critical factor for martens. This has implications for energetic balances in these small carnivores (Taylor et al. 1970). Functional connectivity is mandatory for a species like martens to persist in fragmented landscapes (Moriarty et al. 2015). In fact, marten populations consistently decline or reach extirpation in areas below a threshold of 65-75 percent forest cover (Hargis et al. 1999, Moriarty et al. 2011).

Andruskiw et al. (2008) concluded that vegetation management actions reducing understory complexity have implications for marten prey as well as reducing the ability of martens to forage effectively. This effect was particularly notable in regenerating stands as opposed to older uncut stands. The same understory effects may also function to decrease marten escape cover, rendering them more visible to predators (Drew 1995). In general, martens avoid stands with simplified structure (Moriarty et al. 2016) and may use habitat differently in the summer as opposed to the winter (Zielinski et al. 2015).

The anticipated effects of climate change in the plan area include increased fires, especially an increase in higher elevation fires, which may result in a dramatic reduction in the forested habitat this species is dependent upon. Martens are extremely sensitive to the loss and fragmentation of mature forest habitat (Zielinski 2014). Changes could include a loss of red fir (Lenihan et al. 2003) and lodgepole pine habitat (replacement by white fir or loss due to catastrophic wildfire) and increased competition from other carnivores (e.g., fisher) no longer constrained by snow levels. Also, because of the marten's declivity to cross large openings, large fires may fragment marten habitat and isolate populations leading to localized extinction. Habitat connectivity for an old forest-associated species like marten should contain a mosaic of vegetation types and structures that provide foraging and breeding habitat and movement. Finally, increased drying conditions would lead to further desiccation of montane meadows. Drier meadows would likely reduce the prey populations upon which martens depend.

The southern extreme of the range for martens is within the plan area. Conventional ecology indicates that populations at the edges of their range 1) are more at risk than those in the center and 2) harbor more genetic diversity and thus the ability to adapt to changing environmental conditions. Lawler et al. (2012) predicted that as a result of changing climate, the range of marten in California will contract northward in latitude and upward in elevation and become less common and functionally fragment. Climate change is predicted to alter fire regimes and facilitate fatal tree infections such as insect and disease. Predicted long-term trends toward warmer temperatures are likely to decrease snowfall, and observations already suggest upper montane forests and associated species are migrating to higher elevations following the shifting snow line (Lawler et al. 2012). These same authors predict that a marten competitor, fisher (*Pekania pennanti*), may follow the warming climate upward and expand into current marten range.

Habitat quality for martens would likely be affected by both management actions and climate change. A vulnerability assessment by Hauptfeld et al. (2014) ranked overall vulnerability of the marten as moderate/high, due to its moderate/high sensitivity to climate and non-climate stressors, moderate adaptive capacity, and moderate/high exposure. Martens are also listed as "climate vulnerable" in the 2015 California State Wildlife Action Plan (California Department of Fish and Wildlife 2015).

Recreational activities and roads that fragment contiguous habitat or compact snow also affect marten. The only study to examine the effects of off-highway vehicles (not used on snow) on martens in the Sierra Nevada found that martens appeared unaffected by off-highway vehicle noise disturbance, remaining present in both the control and off-highway vehicle use areas (Zielinski et al. 2008). Over-snow vehicles have a potential impact to marten populations via several mechanisms. First, compacted snow from grooming and riding snowmobiles may facilitate access to marten habitat for predators and competitors that typically would not be able to traverse deep snows (Buskirk et al. 2000). There may also be snow compaction effects to the subnivean zone (Bunnell et al. 2006, Zielinski 2014). Martens and sables commonly appropriate the dens or subnivean refugia of prey species taken in winter, resulting in a much stronger dependence upon prey species (Zielinski 2015). Impacts to these below-snow areas will affect both prey populations and marten resting habitat in the critical winter season.

A study on ski area effects was conducted in the Lake Tahoe Basin region of California and Nevada to assess marten population dynamics and habitat use (Slauson and Zielinski 2013). Ski resort development and operation creates habitat loss, fragmentation and potential behavioral disturbance. Snow compaction results from grooming (see over-snow vehicle discussion). Marten movement was strongly affected by the width of individual ski runs, as well as by the cumulative width of runs that had to be crossed to move between habitat patches; females were less willing to cross the openings than males (Slauson and Zielinski 2013).

Habitat occupancy by martens was seasonally affected, with significant reductions within ski area operation boundaries during the winter (Ibid). There was not a reduction in occupancy during spring and

summer, suggesting that the combination of habitat alteration and the winter activities themselves are the factors responsible for decreased winter habitat use (*Ibid*).

Areas within ski area operation permitted acreages may also be developed for spring/summer/fall use such as toboggan slides, mountain biking, zip lines and canopy rides. The effects of these have yet to be empirically examined, but potential for habitat quality degradation is evident if forested habitats are cleared to create a new footprint (D. Macfarlane, pers. comm.). Also, impacts in the form of construction or use are potentially greater if conducted during the marten kit-rearing season from March to August (Slauson and Zielinski 2013).

In contrast to the above, Kucera (2004) examined marten use of the Mammoth Mountain ski area near the Inyo National Forest in 2002-2003. This is an east-side, drier, less productive Sierra Nevada habitat. Kucera (2004) identified a seasonal use pattern, with marten ski area occupancy in the winter when prey is least available and anthropogenic food sources are readily available, followed by movement into unmanaged forest in the spring.

Roads affect martens directly via roadkill of individuals as well as indirectly by providing a route for entry of marten predators and competitors into habitat they would otherwise be unable to negotiate (Slauson et al. 2010, Zielinski 2014), especially in winter. Predators include coyote, red fox, bobcat, and great horned owl (Bull and Heater 2001).

Another significant documented direct as well as cumulative impact is the use of illegal rodenticide poisons to protect marijuana plantations (Gabriel et al. 2012). It should be noted that this marijuana growing activity is extensive, illegal, and neither authorized, funded, nor carried out by the Forest Service. Nonetheless, the impact to all predators is significant, and cumulatively presents a detrimental effect to population health, survival and status.

In summary, key limiting factors affecting Sierra marten and their habitats are forest fuels reduction treatments, fire, insect and disease tree mortality, climate change and anticoagulant rodenticide poisoning. Recreational uses and development may also play a limiting role as marten are pushed upslope by climate change into smaller and more isolated patches of suitable habitat. Most of these factors are system drivers that serve to limit and fragment suitable Sierra marten habitat in California. These are clearly associated in scientific literature with declines in mature forest conditions.

The best available scientific information about Sierra marten habitat specificity, habitat loss/degradation and impacts of climate change indicates substantial concern about the species' capability to persist over the long-term in the plan area.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5, 8) the draft biological evaluation (Krueger 2016a) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Marten locations have been observed almost exclusively west of Highway 395, with only one occurrence east of the highway in the Jeffery pine forest (Figure 2). There are 12 records for martens in the NRIS database, located predominantly on the western side of the forest near Mammoth Lakes (Mammoth and Mono Lake RDs) and on the Kern Plateau adjacent to the Sierra National Forest (White Mountain Ranger District). There has been at least one documented denning site where two young were captured and

telemetered, (Inyo National Forest unpublished data); however, current specific population information for this species on the Inyo National Forest is unknown. The forest does have many years of vegetation survey data (Kucera 1996) and incidental observations to show that suitable habitat is available.

Ecological conditions for this species (see above for additional details)

On the Inyo National Forest, the ecological conditions for this species can be found in the mixed conifer and upper montane forest ecological zone which include the following ecosystem assessment types: 383,336 acres of subalpine conifer forest (19-20 percent of the forest), 118,039 acres of red fir (6 percent), and 45,671 of mixed conifer (2 percent). More specifically, there are approximately 99,760 acres of potential marten habitat on the forest, with 80,420 acres (or 80 percent) occurring west of Highway 395.

Species-specific plan direction for Sierra marten incorporates recent mapping of marten core habitat and information from the "Science Synthesis and Climate Adaptation Strategy for the Sierra Nevada." Much of marten core habitat overlaps with wilderness or inventoried roadless areas and would have limited management. Additional desired conditions and guidelines address management of core habitat to restore and maintain habitat quality and resilience to climate change (Krueger 2016a).

Kucera (1996) studied Marten ecology on the Inyo National Forest where he identified use of special habitat features in the area between Mammoth Lakes and June Lake area. He found marten used all forested types from relatively low-elevation, heavily managed Jeffery pine to the subalpine conifer. Martens also occurred in the managed pine forests, which were relatively dry, open-canopy, small-stem forests generally atypical of marten habitat. He hypothesized they may still exploit those areas because of the amount of course woody debris, snags, and even large diameter trees left in the stands from earlier logging activities (Kucera 1996). These materials provide thermally advantageous den sites, protection from predators and habitat for prey species such as chipmunks.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The majority of the red fir type is located on the Kern Plateau and Reds Meadow Valley areas. It is worth noting that a large proportion (80 percent) of the red fir forest type across the southern Sierras is within designated wilderness. Additional habitat occurs in the Mammoth Lakes – June Lake core timber management area and consists of Jeffrey (80 percent) and lodgepole pine (13 percent), mixed conifer (6 percent) and red fir (1 percent). Most trees in the area are 8-14 inches diameter with 50 to 400 or more trees per acre contributing to lack of structural diversity and recruitment of trees into older, larger size classes.

According to the aerial detection surveys of insect and disease mortality for the Inyo National Forest, over 205,000 acres of the forest have experienced some level of tree mortality caused by native forest pests over the past ten years (Forest Health Monitoring 2002-2012). Recent data from 2013 to 2016, show an additional 126,000 acres in tree mortality typically coincident with drought-stressed trees and an increase of native forest pest and pathogen infestations as a result (USDA 2014, 2015 and 2016b). In addition, high levels of conifer mortality have been recorded in association with extreme or protracted droughts in the Sierra Nevada range.

Forest structure for red fir forests in the southern Sierras at both the stand and landscape scales is more uniform and less heterogeneous than reference conditions. There has been a decrease in the density of large-diameter red fir trees in many areas (Meyer 2013). There are an average of 9.4 snags per acre in subalpine forests, but only 2.9 snags per acre were found for lodgepole pine (includes snags greater than 15 inches diameter), an average of 2.3 snags per acre in red fir forest and 1.9 snags per acre in mixed conifer (USDA 2013a).

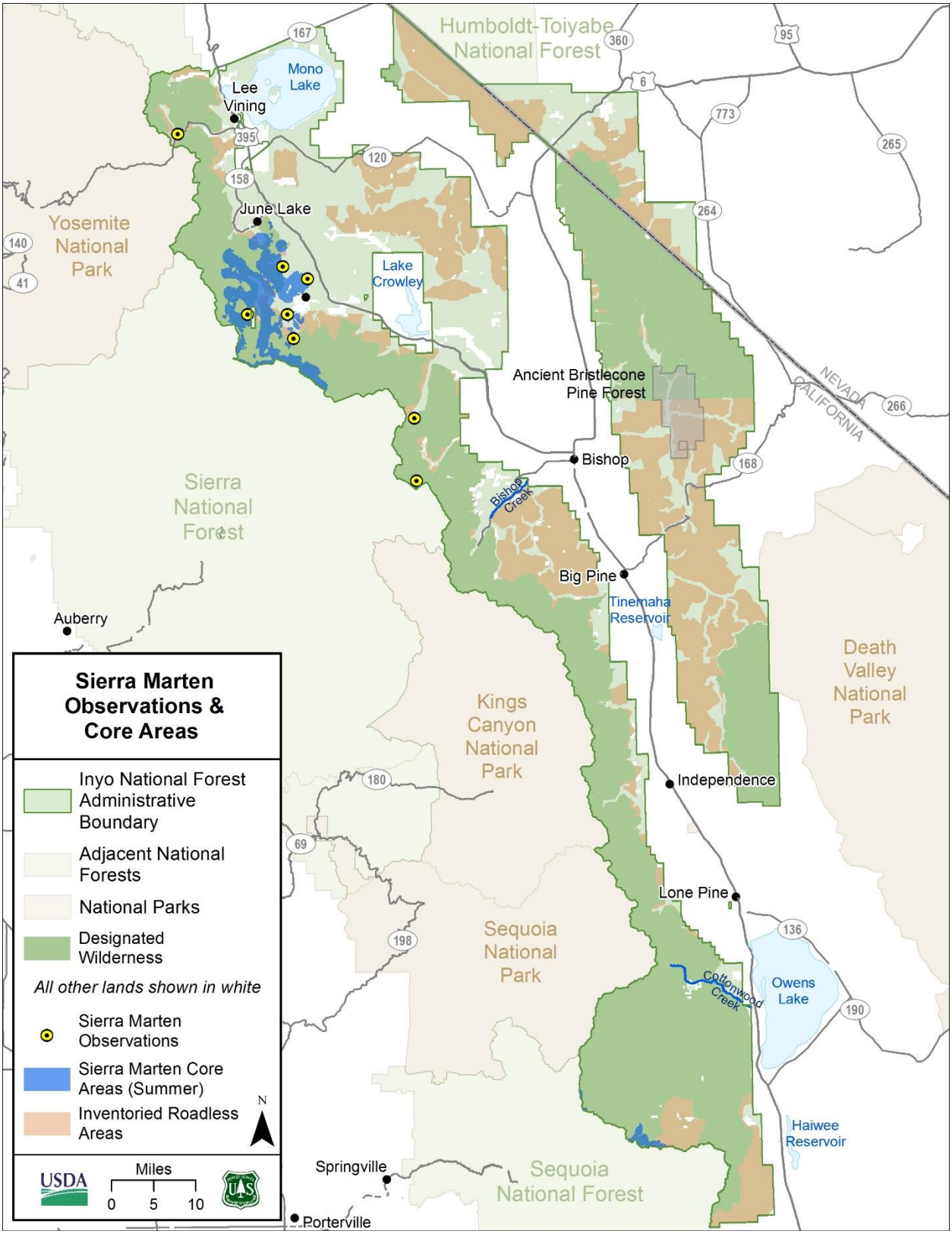

Figure 2. Sierra marten observations and core areas on the Inyo National Forest.

The projected status of those ecological conditions relative to the species considered

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar; trending towards higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate. In addition, projected increases (2006-2050) in mountain pine beetle activity for high-elevation white pine forest will have substantial cascading impacts on subalpine forest ecosystems, leading to outbreaks that can cause significant changes in forest structure, function and composition (Meyer 2013).

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Intensive monitoring of the habitat characteristics used by marten in Jeffery pine, lodgepole pine and red fir ecosystems on the Inyo National Forest has not been documented. Neither has talus fields/open meadow areas.

Key risk factors arising from non-ecosystem conditions and/or management activities

Fuel reduction treatments, loss of connectivity/movement corridors and, to a lesser extent, recreation and climate change.

Any activities that remove mature forest and or key structural elements such as large live and dead trees (e.g. snags greater than 35 inches diameter), logs and coarse woody debris.

Vegetation management is ongoing and contributes to ecological restoration; treatments largely occur in Jeffrey pine, mixed conifer, and subalpine forest assessment types in the Glass Mountain, Mammoth, and Upper Owens River areas. Cut and sold volumes have been relatively stable over the past decade and that trend is expected to continue. On the Inyo National Forest, there are approximately 3,814 acres of conifer (about 6 percent) in the Mammoth Lakes – June Lake core timber management area, which largely provides for personal and commercial fuel woods. The majority of Inyo National Forest mixed conifer forest is in wilderness. Krueger (2016a) notes that much of marten core habitat on the forest overlaps with wilderness or inventoried roadless areas and with little active management.

Fire suppression efforts within the Jeffery pine forest have led to an increase in understory cover, which may be providing suitable habitat for martens.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

There has been one documented denning site with young on the Inyo National Forest, and others, although undocumented, may likely exist because the species has persisted on the forest over time. Martins frequently change den locations and surveys for dens are intensive, making it difficult to estimate levels of abundance. Martens may move back and forth between the Inyo National Forest and neighboring Sequoia and Sierra National Forests as well as Yosemite National Park. The fragmented nature of upper montane forests on the Inyo National Forest, coupled with declining and/or small population numbers of the marten and reduced snow pack resulting from climate change, may put the species at future risk. This may be of particular concern with regard to range contraction given the Inyo National Forest's location at the edge of the species southeastern-most range. Further, loss of larger trees and heterogeneity in pine forests, increased risk to upper montane forest from uncharacteristic stands replacing fire, insect outbreaks and warming temperatures with reduction of snowpack creates substantial concern about this species' ability to persist on the planning unit and adjacent landscape.

There is substantial concern for this species to persist on the planning unit. Based upon the evidence and supporting best available science, Sierra marten **does meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Birds

Bald eagle - *Haliaeetus leucocephalus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Habitat loss, human disturbance and energy development.

Rationale for bald eagle

The bald eagle has a global ranking of G5, Secure "common; widespread and abundant". The ranking of S3 in California indicates the bald eagle is Vulnerable (NatureServe 2015).
The bald eagle was listed as endangered by USFWS on March 11, 1967 and down-listed to Threatened on July 12, 1995. The bald eagle was federally de-listed on August 8, 2007. The bald eagle is currently protected under the Bald and Golden Eagle Protection Act of 1940, and remains listed as endangered in California by the California Department of Fish and Wildlife.

Based on extensive survey data, breeding populations in 1997 were estimated at 142 pairs in California and two pairs in Nevada, and wintering populations were estimated at 574 individuals in California and 90 individuals in Nevada (Buehler 2000). The annual Midwinter Bald Eagle Survey from 1986-2010 showed a significant increase in population for the conterminous United States (+0.6 percent), positive trends in the northeast (+3.9 percent) and northwest (+1.1 percent), and a negative trend in the southwest (-2.2 percent) (Eakle et al. 2015).

Breeding season timing in California varies significantly, and is generally correlated with elevation, with the breeding season beginning earlier in lower elevation areas. Breeding season generally occurs from February through July but may start as early as November (Zeiner et al. 1990a). Pair initiation begins in January and egg-laying occurs from March through early May. Clutch size is one to four eggs (Evans 1982, Zeiner et al. 1990a). Incubation is usually 34 to 36 days (Evans 1982, Zeiner et al. 1990a) and fledging occurs at 10 to 12 weeks (Evans 1982). Semi-altricial young hatch asynchronously (Zeiner et al. 1990a). Bald eagles are monogamous and breed first at 4 to 5 years old (Zeiner et al. 1990a).

Bald eagles require open water with abundant food resources with adjacent mature trees or steep cliffs for nesting, perching, foraging and roosting (Murphy and Knopp 2000). This species typically perches in "large, robustly limbed trees, on snags, on broken topped trees, or on rocks near water" (Peterson 1986, Laves and Romsos 2000). Bald eagles are primarily fish eaters; however, they are opportunistic and will utilize avian and mammalian prey and carrion if readily available, especially in the nonbreeding season (Evans 1982, Zeiner et al. 1990a).

Suitable perch sites directly adjacent to foraging areas are important habitat features, as eagles often hunt from perches, swooping down to seize fish from the water. (Evans 1982, Zeiner et al. 1990a). Preferred perch trees are larger in diameter and taller than the dominant tree canopy, particularly trees greater than 100 centimeters (40 inches) in diameter, greater than 30 meters (98 feet) tall, and dead topped trees with robust, open branch structures. Perches function as resting, preening, foraging and feeding sites for bald eagles. Ninety-six percent of the perch sites (n=23) identified by Laves and Romsos (2000) were located within 0.25 miles of a large, open body of water.

In northern California, nest territories are typically within conifer stands with most nests in ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*) and sugar pine (*Pinus lambertiana*). Nests are generally within one of the tallest trees in the stand, and the majority of nest trees have an unobstructed view to a water body (Lehman 1979). In California, large diameter trees are used for nesting, with an average of 109 centimeters (43 inches) in diameter (Anthony et al. 1982). Nest trees must be sturdy to support the large, heavy stick nests built by this species. Most bald eagle nests are located within 1.6 kilometers (1 mile) of a large body of water (Lehman 1979, Anthony et al. 1982).

Bald eagles may roost communally in winter in dense, sheltered, remote conifer stands (Zeiner et al. 1990a). Roost trees are perches where one or more bald eagles rest at night and may occur long distances from open water bodies. Roost trees are similar in structure compared to perch trees: “dominant trees that have open and robust branches, are sometimes defoliated (that is, have snags), are protected from prevailing winds and are typically far from human development” (Anthony et al. 1982). Availability of food resources plays a central role for migrating and wintering eagles, and increases in available prey are highly correlated with bald eagle abundance and habitat use (Restani et al. 2000, Elliott et al. 2011).

The most significant threat to survival of the bald eagle in the 20th century was the widespread use of the organochlorine pesticide DDT, which interfered with normal calcium metabolism and caused abnormalities in bald eagle eggshells, resulting in widespread nesting failures and population declines. In the decades following the 1972 ban on DDT's agricultural use in the United States, bald eagle populations recovered significantly. There are several remaining threats to bald eagle populations, with the most significant being habitat loss and human disturbance.

Threats to habitat include any source of extensive tree mortality within suitable nesting and perching habitat adjacent to large lakes and rivers that support bald eagle food supplies. High-severity fire can eliminate large tree nesting and perching habitat. Extensive tree mortality caused by insects and diseases also removes suitable habitat. Additional threats to habitat include degradation of aquatic habitats that affect fish populations that serve as the bald eagle’s primary food source. Exceptional drought conditions can increase tree mortality as well as reduce reservoir levels and prey availability. Climate change could potentially accelerate the rate at which habitat is lost.

A variety of human activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed or raise young. Territories have been abandoned after disturbance from logging, recreational developments and other human activities near nests (Zeiner et al. 1990a).

Bald eagles may not begin nesting if human disturbance is present near nests (Zeiner et al. 1990a). Human recreational activities such as boating, jet-skiing, fishing and low flying aircraft can cause disturbances to nesting birds, but this species also shows a moderate tolerance for the presence of humans (Buehler 2000). Not all bald eagle pairs react to human activities in the same way. Some pairs nest successfully just yards from human activity, while others abandon nest sites in response to activities much farther away. This variability may be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans and tolerance of the individual nesting pair.

Human disturbance can also affect foraging activity. Recreational use of lakes and extensive shoreline development have reduced available foraging habitat (Evans 1982). In Washington, bald eagles have been found to be adversely affected by recreation that involves both pedestrian traffic and boat use by adversely affecting feeding activity (Stalmaster and Kaiser 1998). Wintering bald eagles may also be adversely affected by human disturbance and eagle distribution patterns can be significantly changed by human activity (Stalmaster and Newman 1978). Eagles were displaced in areas with high human activity and moved to areas with less human activity. Flush distances were lower when the disturbance was on land rather than in the water and lower still if the eagle couldn't see the cause of the disturbance.

The US Fish and Wildlife Service has provided recommendations for reducing disturbance to bald eagles, as well as recommendations for habitat management. The National Bald Eagle Management Guidelines contain recommendations for reducing disturbance at nesting, foraging, and communal roosts from a variety of human activities. These recommendations provide a sound scientific basis for reducing the effects of human disturbance on bald eagles (U.S. Fish and Wildlife Service 2007).

Additional threats to bald eagles include poisoning (especially lead poisoning), electrocution, collisions with electrical lines and shooting. Natural predation is restricted to nests and is rare, and diseases and parasites have been observed but apparently contribute little to mortality.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3 and 5) the draft biological evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Bald eagles have long been known to occur on the Inyo National Forest during winter months, with three nests observed on the forest since 2004 in the Upper Owens River and June Lake areas. The nest location in the Upper Owens River area may have subsequently been abandoned; only one adult bird has been observed in recent times and nesting activity has presumably stopped in that area. Another potential nest site may be present in the Hilton Lakes area where juvenile and adult bald eagles have been observed.

There is limited information on the bald eagle population numbers on the Inyo National Forest. Although nesting bald eagles have been observed and winter bald eagle surveys document wintering habitat use on the forest (California Department of Fish and Wildlife 2013), there is little information on actual population trends or density.

There are currently seven records of bald eagles in the NRIS database on the Mono Lake, Mammoth and White Mountain Ranger Districts. In eBird, there are 445 records with 515 individuals within the forest boundary, and within 5 miles of the forest boundary there are 1,198 records, with 1,861 individuals. In CNDDB, there are no records within the forest, and one record within 5 miles of the forest.

Ecological conditions for this species (see above additional details)

Bald eagles utilize large conifer stands (Jeffery pine and mixed conifer) where there is access to open water (e.g., lakes or reservoirs) or free flowing rivers for foraging, typically within 1 mile of large trees (40 inches diameter) and greater than 98 feet tall, snags and/or dead top trees.

On the Inyo National Forest, these ecological conditions can be found in the mixed conifer and Jeffrey pine and forest assessment types, of which there are approximately 45,671 acres (2 percent of the forest) and 135,086 acres (7 percent), respectively. The amount of potential nesting habitat on the forest for bald

eagles is somewhat limited, however, because there are relatively few forested areas near large bodies of water that offer a suitable prey base. After mapping potential nesting habitat on the forest, the Jeffery pine and mixed conifer types provide approximately 48 percent of potential nesting habitat for bald eagles.

Approximately 479 lakes occur on the Inyo National Forest, totaling about 46,000 acres. Many of the high elevation lakes support introduced trout species of brook, brown, rainbow and golden trout. There are no lakes in the White, Inyo or Glass mountains. Water bodies less than two acres are considered ponds, of which there are 1,372 on the Inyo National Forest, comprising a total of 662 acres. There are 26 lakes and meadows scattered throughout the lower elevations of the eastern Sierra Nevada foothills. These water bodies have been enhanced by dams to increase the water holding capacity. Large river systems that provide a consistent, abundant flow of water throughout the year, as well as fish species diversity include the upper Owens River through Long Valley, the South Fork Kern River and the San Joaquin River through Reds Meadow.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Water quality on the Inyo National Forest is generally good, due to low population and levels of development.

Jeffrey pine forest is found scattered along the escarpment of the Sierra, as well as on the Kern Plateau, but is most common in the Glass Mountains and Upper Owens River area. Fire and localized impacts from insects and disease have had past effects on this forest type. Jeffrey pine occurs within the Indiana Summit and Sentinel Meadow research natural areas. Only about 5 percent of the Jeffrey pine assessment type is within designated wilderness.

The mixed conifer assessment type is found along the escarpment of the Sierra, typically at the lower edge of the subalpine conifer forest and/or red fir assessment types and the upper edge of the pinyon-juniper assessment type. It occupies roughly the same elevation band as the mountain mahogany assessment type along the Sierra escarpment, but is restricted to the cooler, moister environments often found in deep drainages or on steep slopes. On the Inyo National Forest, it is most prevalent on the Kern Plateau. The mixed conifer assessment type includes various combinations of white fir, red fir and/or one or more pine species, typically with a very sparse understory. The majority of the mixed conifer assessment type (which does not necessarily include all mixed conifer *stands*) in the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately three-quarters of the mixed conifer assessment type is within wilderness.

The projected status of those ecological conditions relative to the species considered

Climate change may have enhanced drying effects on smaller ephemeral ponds and meadows, changing the timing and intensity of snowmelt and spring precipitation, and will also continue to put forests at risk for stand replacing fire. Anticipated trends for Jeffrey and mixed conifer are similar; trending towards higher fuel loading and changes in forest structure and composition associated with fire suppression, coupled with a changing climate.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

The current condition of ponds throughout the forest is poorly documented, mainly because most ponds occur within the wilderness where few authorized activities occur.

Key risk factors arising from non-ecosystem conditions and/or management activities

Recreation is also very popular in Jeffrey pine types on the Inyo National Forest and increasing population levels may lead to increases in recreation in the future. In addition, fire management, particularly suppression efforts where the wildland-urban interface meets Jeffrey pine, may lead to increasingly large and/or severe fires. Other than fire suppression, management activities during the past few decades in the mixed conifer forest assessment type in wilderness have been limited primarily to non-motorized recreation.

The increase in wind turbines throughout the United States in recent decades has led to bald eagle collision mortalities, with one study reporting six mortalities from data collected at 32 wind farms from 1997-2012 (Pagel et al. 2013). Although any mortality is alarming, the vast majority of mortalities at the studied wind facilities were from golden eagles (92.9 percent) rather than bald eagles (7.1 percent) (Pagel et al. 2013).

The largest current threat to remaining colonies may be disturbance from human recreational activities, such as boating, jet-skiing, fishing and low-flying aircraft, which can cause disturbances to nesting birds (Buehler 2000). Camping within 100 meters of a bald eagle nest can lower the amount of prey consumed (-26 percent) and prey fed to nestlings (-29 percent) relative to activity observed when camping is restricted to at least 500 meters from nests (Steidl and Anthony 2000).

Fishing opportunities and recreation uses are expected to continue and impacts from those activities will continue to occur. The California Department of Wildlife is expected to continue the fish stocking program in many of the lakes. Reservoirs will continue to exist under current management and jurisdiction to fulfill their water storage and hydroelectric needs. No change in management is expected to occur within the next 20 years for reservoirs.

A summary of the overall at-risk status along with a conclusion as to whether or No**t the species was considered at risk for persistence on the planning unit**

Bald eagles are currently known to use the Inyo National Forest for wintering with only a couple of nests since 2004. Habitat loss resulting from high-intensity fires continues to be a potential threat. Disturbance from recreationists is perhaps the biggest risk factor affecting bald eagles on the Inyo National Forest, and this will continue to be a potential risk factor for this species, as human population levels and recreation activity are expected to increase. *There is substantial concern for this species' ability to persist on the planning unit.* Based upon the evidence and supporting best available science, bald eagle **does meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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California spotted owl - *Strix occidentalis occidentalis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Habitat loss, degradation, or loss of connectivity from high severity fire and management activities such as timber harvest; expansion of barred owls, climate change, pesticides and carbonates, and reduced genetic diversity.

Rationale for California spotted owl

The California spotted owl has a global rank of T3 (vulnerable), a California state rank of S3 (vulnerable), is a Region 5 Forest Service sensitive species and a management indicator species (MIS) representing late seral closed canopy coniferous forest. The U.S. Fish and Wildlife Service is currently reviewing this species after a positive 90-day finding to determine if the species warrants protection under the Endangered Species Act. This species is also recognized as a California species of special concern and a species of greatest conservation need.

While there are no rigorous estimates of population size for the California spotted owl, an attempt was made to estimate the population size using data from California Department of Fish and Wildlife and consists of 1,865 owl sites, with 1,399 of them occurring on National Forest System lands (USFWS 2006). Caution should be used in the interpretation of these estimates because they represent all recorded sites from the past 30-40 years and current occupancy of these sites is unknown. Population trends from four demographic study areas in the Sierra Nevada suggest that the populations may be declining on National Forest System lands on the Eldorado, Lassen and Sierra National Forests, and may be stable or increasing in the Sequoia Kings Canyon study area (Conner et al. 2013, Conner et al. 2016,Tempel and Gutierrez 2013, Keane 2014, Tempel et al. 2014). It is important to note that the 95 percent confidence interval for lambda, rate of population change, overlaps with 1. A lambda of 1 indicates a stable population; less than 1 indicates the population is decreasing, and greater than 1 indicates an increasing population. The cause of the suspected declines are unknown at this time (Keane 2014).

California spotted owls primarily occupy coniferous and mixed pine-oak forests that have late stage characteristics with canopy cover and tree size being the most important predictors of California spotted owl presence (Jones et al. 2017, North et al. 2017, Wood et al. 2018) California spotted owls choose roosts and nest sites in microhabitats within areas of dense vegetation, dense canopy cover and complex, multi-story forest structure (Tempel et al. 2016, USFWS 2017). Being cavity nesters, they require snags or decadent trees that have cavities or mistletoe platforms, such as black oaks, multi-forked firs or broken top incense cedars. Snags and large downed woody debris are required as they provide habitat for important prey species including northern flying squirrels and mice.

California spotted owls are long-lived and exhibit sporadic reproduction in response to environmental conditions and therefore are slow to recover from population declines. They are territorial, defending non-overlapping nesting territories.

Threats to persistence of California spotted owls include habitat loss, degradation, or loss of connectivity from high-severity wildfire (Jones et al. 2016, Rockweit et al. 2017, USFWS 2017, Wood et al. 2018) and management activities, such as timber harvest, expansion of barred owls, climate change, rodenticides and noise disturbance (Gutierrez et al. 2017).

Timber harvest has been identified as one of the most significant threats to spotted owl persistence (Gutierrez et al. 2017). Effects of vegetation treatments on persistence of spotted owl across its range are complex and not well understood. Treatments that result in a reduction of: canopy cover to greater than or equal to 40 percent, surface and ladder fuels, and vertical and horizontal stand structure, with an increase in regularly spaced trees may have negative impacts on spotted owls (Stephens et al. 2014, Tempel et al. 2014, Tempel et al. 2014a). (Seamans and Gutierrez 2007) and (Tempel et al. 2014a) found the availability and amount of late seral forest (canopy cover greater than greater than70 percent and dominance of medium and large trees greater than greater than30 cm and greater than greater than60.9 cm) were positively correlated with territory occupancy, survival and population growth. Habitat edge is considered beneficial to spotted owls, perhaps increasing prey populations and access to prey by foraging owls. Recent changes in silviculture prescriptions that are designed to retain the stand structure and heterogeneity predicted based on historic vegetative patterns and also selected for by spotted owls (Knapp et al. 2012). Effects of these prescriptions on spotted owl populations are unknown.

Another significant threat to spotted owl persistence is habitat loss from high-severity fire. Spotted owls have been documented to use habitat that has burned at low-to-moderate burn severity that includes some proportion of high-severity fire (Roberts et al. 2011, Lee et al. 2012, Lee et al. 2013, Lee and Bond 2015). The amount of suitable habitat (green forest), the amount of suitable habitat that burned at high severity (Jones et al. 2016), and salvage logging likely affect continued occupancy by spotted owls (Gutierrez et al. 2017). High-severity fires that results in the loss of dense mature forest, large snags and downed logs effectively remove preferred nesting and roosting habitat and can take centuries to regrow. In the closely related northern spotted owl study, Clark (2007) found that while spotted owls did roost and forage within high-severity burn areas, the use was very low, suggesting that this cover type was poor habitat for spotted owls. Clark et al. (2011) found that annual survival rates were lower in northern spotted owls inhabiting burned areas or displaced by the wildfire as compared to owls that inhabited areas outside the burn perimeter. While short-term benefits may be realized by spotted owls, such as increased prey and edge habitat, uncertainties remain regarding long-term occupancy and demographic performance of spotted owls at burned sites (Keane 2014). Specifically, uncertainty exists regarding how the amounts and patch sizes of high-severity fire will affect California spotted owl occupancy, demographics and habitat over long timeframes (Keane 2014). The results of simulation modeling research (Keane 2014) suggests that some fuels treatments can reduce fire risk and with minimal effects on owl reproduction, and may have long-term benefits of reducing wildfire risk that outweigh short-term effects of treatments.

Barred owls are an increasing risk factor for California spotted owls in the Sierra Nevada. Barred owls can hybridize and also out-compete spotted owls. Barred owls were first recorded within the range of the California spotted owl in 1989 on the Tahoe National Forest. Two sparred owls (hybrids of spotted and barred owls) were reported in the Eldorado National Forest during 2003 to 2004 (Seamans et al. 2004). Barred owls were first recorded in the southern Sierra Nevada in 2004 (Steger et al. 2006). Ongoing research has documented 73 records of barred or sparred owls in the Sierra Nevada to date, with the majority of records from the northern Sierra Nevada (Tahoe, Plumas and Lassen National Forests). Of note, five new records of barred owls were documented in the Stanislaus and Sierra National Forests in 2012, indicating further range expansion of barred owls in the southern Sierra Nevada. In 2017, confirmed barred owls were on the Sequoia National Forest. Barred owl numbers are likely higher than documented in the Sierra Nevada, as there have been no systematic surveys for them to date.

Climate change may have negative effects on spotted owls. Increasing temperatures may affect spotted owl survival, reproduction, recruitment and population growth (Gutierrez et al. 2016). Climate change may also result in geographic shifts in habitat distribution, abundance, and quality, increase the amount of high-severity wildfire, increase large tree mortality caused by insects and disease, and change prey distribution and abundance (Gutierrez et al. 2017). Poisoning by rodenticides is considered a significant emerging threat, but there is little information available on the effects of and appropriate mitigations of this threat. Disturbance associated with human recreation and management activities is considered a threat to spotted owls and are considered localized in space and time. Protecting birds from noise disturbance during the breeding season, March 1 through August 15, can effectively mitigate acute noise and activity disturbance (Gutierrez et al. 2017).

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1, 3, 5, 8) the draft Biological Evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

There are currently no records in ebird, CNDDB or BISON for California spotted owl on the Inyo National Forest. However, forest level surveys have detected owls on the west side bordering the Sequoia National Forest, in wilderness and at the farthest south end of Inyo National Forest. In the past, this area of the Inyo National Forest was managed by the Sequoia NF, hence it was considered that there were no spotted owls on the Inyo National Forest. According to the California Department of Fish and Wildlife spotted owl database there are 19 data points for California spotted owl on the Inyo National Forest with 6 positive detections all occurring in the area just northwest of Monache Mountain from 1988-1991. A pair was observed in the area on two occasions during that same time frame. At the north end of the Inyo National Forest, there are also two positive detections in the Boundary Creek and Red Meadows area from 1981-1982.

Key ecological conditions for this species (see above for additional details)

Forests containing old growth characteristics (e.g. dense vegetation/canopy cover, snags, cavities, larger trees and large down woody debris) in coniferous and mixed pine-oak forests. On the Inyo National Forest, these ecological conditions can be found in the mixed conifer and upper montane forest ecological zone which consists of red fir, Jeffrey pine and lodgepole pine. The Inyo National Forest has 383,336 acres of subalpine conifer forest (19-20 percent of the forest), 118,039 acres of red fir (6 percent) and 45,671 of mixed conifer (2 percent) as potentially available habitat for the owl.

The mixed conifer assessment type is most prevalent on the Kern Plateau and includes various combinations of white fir, red fir and/or one or more pine species, typically with a very sparse understory. The majority of the mixed conifer assessment type (which does not necessarily include all mixed conifer stands) in the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately three-quarters of the mixed conifer assessment type is within wilderness.

The majority of the red fir type is located on the Kern Plateau and Reds Meadow Valley areas where a large proportion (80 percent) of the red fir forest type across the southern Sierras is within designated wilderness.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Tree densities and canopy cover likely exceed the natural range of variability (NRV) where decades of fire suppression and commercial timber harvesting have resulted in forest conditions greatly altered from pre-European settlement times (before 1860). A lack of low-intensity surface fires which would have occurred historically in drier forests have led to increases in surface and ladder fuels which has led to several high intensity fires on the Inyo National Forest. In general, the forest contains higher densities of small-to-medium-sized trees while there is a deficit of open-canopy mature and old forests in most of the planning area (Safford 2013).

According to recent insect mortality surveys for the Inyo National Forest, over 331,000 acres of the forest have experienced some level of tree mortality caused by native forest pests over the past 14 years (Forest Health Monitoring 2002-2016). Insect mortality is typically coincident with drought stressed trees, and high levels of conifer mortality have been recorded in association with extreme or protracted droughts in the Sierra Nevada range.

There are an average of 9.4 snags per acre in subalpine forests, but only 2.9 snags per acre were found for lodgepole pine (includes snags greater than 15 inches diameter), an average of 2.3 snags per acre in red fir forest, and 1.9 snags per acre in mixed conifer. Younger and intermediate-sized trees are denser than the desired condition, and there is a deficit of open-canopy mature and old forests, which are important habitat components for spotted owls, in most of the planning area. In 2011, 220 acres in the Reds Meadow area on Inyo National Forest lands outside of wilderness suffered severe tree damage from a blow down event which largely affected mature red fir and lodgepole pine in the larger (greater than 24 inches DBH) size classes (USDA 2012).

The projected status of those ecological conditions relative to the species considered

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar; trending towards higher fuel loading and changes in forest structure and composition associated with fire suppression coupled with a changing climate. In addition, projected increases (2006-2050) in mountain pine beetle activity for high-elevation white pine forest will have substantial cascading impacts on subalpine forest ecosystems, leading to outbreaks that can cause significant changes in forest structure, function, and composition (Meyer 2013). There may be increased future risk of inadequate number, distribution, and quality of large trees and snags. Snags are ephemeral features on the landscape, and fire and insect outbreaks may create both positive and negative opportunities for recruitment over time. As disturbance events (e.g., high-intensity fire and insects) increase in frequency and intensity, there may be short-term pulses of snags that are beneficial; however, these events may also act to limit recruitment of trees into larger trees size classes over time. However, The Sierra Nevada Framework Environmental Impact Statement (2001) habitat projections for old forest habitat (containing large trees greater than 50 inches in diameter and large snags) found those features to increase significantly over a 140-year time scale.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Historically, even aged management and loss of prey and nesting habitat that includes features such as logs, snags and adequate understory have been risk factors. However, vegetation management practices (post-1990) on the Inyo National Forest have shifted emphasis toward a restoration-based approach aimed at reducing stand density to improve overall forest health. The primary trees removed as a result of this

effort are small to medium diameter trees, rather than the larger-trees preferred for nesting by some species. This focus helps to reduce tree densities and improve overall resilience in the face of drought, insects and disease, and uncharacteristic high-intensity wildfire which can destroy entire forest stands as well as older, bigger trees and other critical habitat components that can takes many years to replace. As such, vegetation management is ongoing and contributes to ecological restoration; vegetation treatments largely occur in Jeffrey pine, mixed conifer, and subalpine forest assessment types in the Glass Mountain, Mammoth and Upper Owens River areas. Timber removal does not occur on the southern portions of the forest where historic California spotted owl detections occur.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The best available science indicates declining population trends throughout its range, low fecundity, high juvenile mortality and habitat specificity. These life history characteristics combined with relevant threats and stressors, including habitat loss resulting from high-severity fires, drought, beetle outbreaks, as well as the expansion of barred owls, indicate substantial concern about the California spotted owls capability to persist over the long-term in the plan area. Climate change and potential drought related effects will likely continue to exert pressure on the key ecological conditions (as noted above) that this species depends upon, which may be further exacerbated by habitat competition with barred owl. There is substantial concern for this species' ability to persist on the planning unit. Based upon the evidence and supporting best available science, California spotted owl meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Great Gray Owl - *Strix nebulosa*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Small population size, meadow and adjacent forested habitat degradation or loss from fires and management practices including livestock grazing and timber harvest, vehicle strikes, climate change, recreation and disease.

Rationale for great gray owl

The great gray owl has a global rank of G5 (secure), a California state rank of S1 (critically imperiled), is recognized as a California species of greatest conservation concern, and is listed as endangered under the California Endangered Species Act. The great gray owl is a Region 5 Forest Service sensitive species. Although no yet officially recognized, a new subspecies has been proposed in the Sierra Nevada based on data that demonstrates genetic distance from other geographic populations; the proposed subspecies is known as *Strix nebulosa yosemitensis* (Hull et al. 2014*)*. Great gray owls outside the Sierra Nevada and in California are most likely *Strix nebulosa nebulosa*.

Wu and others (2016) recently estimated a population of about 160 breeding adults in California. While trends are unknown, declines in the Sierra Nevada are suspected based on threats, including habitat loss or degradation, and the potential for inbreeding given such a small population size (Hull et al. 2010).

Great gray owls nest in conifer dominated habitats including montane hardwood conifer at lower elevations to Sierran mixed-conifer, white fir, red fir and lodgepole pine at higher elevations (Wu et al. 2016). Breeding sites are frequently closely associated with meadows (Winter 1986, Greene 1995, Sears 2006, van Riper and Wagtendonk 2006, Keane 2011), but some have been located up to 750 meters (2,460 feet) from the nearest meadow (Wu et al. 2015). They prefer dense canopy cover (greater than 80 percent) (Greene 1995, Wu et al. 2015) and high densities of large snags (Sears 2006, Wu et al. 2015). Great gray owls generally winter at lower elevations and use a variety of habitats including grassland, meadow, riparian areas, hardwood conifer and conifer forested habitats (van Riper and Wagtendonk 2006, Jepsen et al. 2011). They forage almost exclusively on gophers and voles, but take other prey in lesser quantities such as deer mice, moles, shrews, beetles, squirrels, chipmunks and alligator lizards (Winter 1986, Bull et al. 1989).

Threats to persistence of great gray owls include small population size, meadow and adjacent forested habitat degradation or loss from fires and management practices (e.g., livestock grazing and timber harvest), vehicle strikes, climate change and disease. In Yosemite National Park, human disturbance related to campgrounds and their development has been documented (Maurer 2006, Bull and Duncan 1993).

The great gray owl population in California is at risk because it is very small (Hull et al. 2010). Small populations are more susceptible to inbreeding, population bottleneck and founder effects. For example, in small populations, retention of maladaptive genes or the loss of adaptive genes could lead to reduced genetic diversity (Shaffer 1981, Lande 1993). Small populations are less able to recover from losses due to environmental stochastic events such as large wildfires (Wu et al. 2016).

Habitat degradation from livestock grazing and timber harvest are considered significant threats to great gray owl persistence (Wu et al. 2016). Livestock grazing can result in the removal of vegetative cover required by critical prey species (Beck and Winter 2000). Other secondary effects of grazing include lower water tables, lower meadow vegetative diversity and increased soil compaction or erosion (Fleischner 1994, Belskey et al. 1999), which degrade habitat for prey species (Torre 2007, Rickart 2013). However, deleterious effects to one prey species may be beneficial to another prey species. Voles are negatively correlated with grazing intensity (Winter 1986, Johnson and Horn 2008, Rickart 2013, Kalinowski et al. 2014) whereas gopher density may increase or decrease with grazing (Dull 1999, Powers et al. 2011). Recommendations include maintaining sward height of at least 20 centimeters (8 inches) (Kalinowski et al. 2014) or maintain herbaceous vegetation at a height of 300 millimeters (12 inches) (Beck 1985, Greene 1995). Limiting, restricting or resting meadows from grazing activity if they are not functioning properly is also recommended (Beck 1985, Beck and Winter 2000).

Timber harvest that results in reduced canopy cover, removal of nest structures and disturbance of breeding owls is also considered a threat to great gray owls. Within suitable breeding habitat, timber harvest prescriptions that include retention of large live conifers, all large oaks, snags at the rate of four per acre greater than 100cm dbh (40 inches) if possible or greater than 60cm dbh (24 inches), and maintenance of at least 65 percent canopy cover are considered compatible with great gray owl habitat requirements (Wu et al. 2016). Wu and others (2016) also recommend maintaining a limited operating period prohibiting road construction and vegetation treatments from February 15 through August 5 to protect breeding birds unless surveys indicate non-nesting status.

Additional threats to the persistence of great gray owls include vehicle strikes, which are considered a significant source of direct mortality because of their use of low perches when hunting (Wu et al. 2016). Reduced speed limits or increasing the height of roadside fence lines and posts is recommended. While the effects of fire on great gray owls is not fully understood, loss and degradation of breeding habitat, as described above, are considered a threat (Wu et al. 2016). Prescribed fire operations and suppression efforts should include protection of large trees (live and dead) as well as any known nest sites in occupied or suitable habitat areas (Wu et al. 2016). Great gray owls are considered vulnerable to climate change (Siegel et al. 2014a) that may result in reduced snowpack and moisture in meadow habitat (Hayhoe et al. 2004, Godsey et al. 2014) and range restriction which would reduce the overlap of great gray owls and one of only two vole species known to occur in the Sierra Nevada (Moritz et al. 2008). Disease, poisoning, predation and human disturbance are also considered threats to great gray owls; however, limited information exists on effects of and appropriate mitigations to these threats.

Forest-specific Rationale

Information on current distribution of the species on the planning unit

In the draft biological evaluation (Krueger 2016), great gray owls are thought to occur throughout the Sierra Nevada range, though local distribution may be highly variable. There are no records in the NRIS database for great gray owl on the Inyo National Forest; however there have been incidental sightings. In 2015, and injured bird was retrieved by hikers just north of Lake Mary in Mono County (e-bird data, accessed May 17 2017). The adjacent Sequoia and Sierra National Forests have 28 and 330 records respectively, with several detections close to the Inyo National Forest boundary. See Figure 4 of Krueger (2016) for a mapped distribution of the Great gray owl based on detections. It is important to note, that these areas represent the southeastern most edge of the species year-round range (Zeiner et al. 1990, Bull and Duncan 1993, Gogol-Prokurat 2016) and only a small portion of the Inyo National Forest is likely to provide suitable habitat for the owl which may be a factor in their limited distribution. Adult owls were last documented in Inyo and Mono counties approximately 30 years ago (Winter 1986). A review of "Sierra-Nevada Avian Monitoring Information Network" data, a collaborative project between the Forest Service and Point Blue Bird Observatory, yielded no recent observation information for great gray owls (Ballard et. al.2008).

In eBird, the Inyo National Forest has one record of one individual great grey owl within the forest boundary (i.e., injured bird discussed above) and three records of three individuals from within 5 miles of the forest boundary. There is one record within the forest boundary in CNDDB and three within a 5 mile buffer of the forest boundary.

Ecological conditions for this species (see section above for additional details)

The ecological conditions for this species include meadows and early seral-stage habitats that support sufficient prey (e.g., pocket gophers and voles); pine and fir forests adjacent to meadows between 3,500 and greater than 7,000 ft. (Wu 2016). The two factors that are considered most important in determining habitat use by breeding great gray owls are availability of nest sites and availability of suitable adjacent foraging habitat such as meadows (Duncan and Hayward 1994). On the Inyo National Forest, these ecological conditions can be found in the mixed conifer and upper montane forest ecological zone which consists of red fir forest, Jeffrey pine forest, and lodgepole pine, intermixed with meadows that form a patchy mosaic across the landscape. The Inyo National Forest has over 25,000 acres of meadows, 383,336 acres of subalpine conifer forest (19-20 percent of the forest), 118,039 acres of red fir (6 percent), and 45,671 of mixed conifer (2 percent) as potentially available habitat for the owl (USDA 2013a).

On the Inyo National Forest, the majority of the red fir type is located on the Kern Plateau and Reds Meadow Valley areas (USDA 2013). It is worth noting that a large proportion (80 percent) of the red fir forest type across the southern Sierras is within designated wilderness.

Suitable breeding habitat occurs at three different elevation ranges with different buffer zones dependent on region. For the Inyo, this includes low elevation (3,500-5,000 ft.; 1,640 ft. buffer); middle elevation (5,000-7,000 feet; 1,300 foot buffer), and high elevation (greater than 7,000 feet; 980 ft. buffer) (Wu 2016).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The number of large meadows has not changed significantly in the last decade (USDA 2016); however, composition structure and function has. According to the assessment of the natural range of variability for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also

departed from reference conditions in those areas. Long-term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program , show that most of those plots (74 percent) are in excellent to good vegetation condition with a stable trend, 5 percent of plots are in excellent to good vegetation condition and trending upward, 14 percent were in good vegetation condition with a downward trend, 2 percent were in fair vegetation condition with a stable trend, and 5 percent were in fair vegetation condition and trending downward while no plots were in poor vegetation condition (USDA 2013b).

Forest ecosystems, including Jeffrey pine and mixed conifer forests, and meadows of the Inyo National Forest are experiencing increasing tree densities and canopy cover that likely exceed the natural range of variability (Gross and Coppoletta 2013, Safford 2013). According to recent insect mortality surveys for the Inyo National Forest, over 331,000 acres of the forest have experienced some level of tree mortality caused by native forest pests over the past 14 years (Forest Health Monitoring 2002-2016). Bark beetle related mortality is typically coincident with drought stressed trees and high tree density; high levels of conifer mortality have been recorded in association with extreme or protracted droughts in the Sierra Nevada range.

Likewise, montane meadows and aspen stands have experienced increased conifer density and cover over the past several decades (Estes 2013, Gross and Coppoletta 2013). Changes to meadow composition structure and function post settlement include: longer fire return intervals, increased grazing and diminished frequency of small annual flooding events due to water diversions (Gross and Coppoletta 2013)

Forest structure for red fir forests in the southern Sierras at both the stand and landscape scales is more uniform and less heterogeneous than reference conditions. There has been a decrease in the density of large-diameter red fir trees in many areas (Meyer 2013). There are an average of 9.4 snags/acre in subalpine forests, but only 2.9 snags/acre were found for lodgepole pine (includes snags greater than 15 in. dbh), an average of 2.3 snags/acre in red fir forest, and 1.9 snags per acre in mixed conifer (USDA 2013a).

Younger and intermediate-sized trees are denser than the desired condition, and there is a deficit of open-canopy mature and old forests in most of the planning area (USDA 2016) which are important habitat components for great gray owls. In 2011, 220 acres in the Reds Meadow area on Inyo National Forest lands outside of wilderness suffered severe tree damage from a blow down event which largely affected mature red fir and lodgepole pine in the larger (greater than 24 inches DBH) size classes (USDA 2012).

The projected status of those ecological conditions relative to the species considered

Future changes in climate (i.e., increasing temperatures) combined with a change from a snow-dominated to a rain-dominated system will impact meadows due to changes in the hydrologic regime. Total meadow area may decline and wet meadows may shift to dry meadows, especially small irregularly shaped meadows at low to mid elevations (Gross and Copoletta 2013). This drying would decrease herbaceous biomass (which could in turn affect health rodent populations for the owl). Due to implementation of the amendment 6 grazing management strategy throughout the forest since 1996, vegetation and watershed condition trends are expected to improve, or continue to improve, for the next 20 years (USDA 2013a). The DEIS notes that pine forests and meadows are highly vulnerable to climate change (USDA 2016, Table 63).

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar; trending towards higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate (USDA 2013a). In addition, projected increases (2006-2050)

in mountain pine beetle activity for high-elevation white pine forest will have substantial cascading impacts on subalpine forest ecosystems, leading to outbreaks that can cause significant changes in forest structure, function and composition (Meyer 2013).

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

The key risk factors arising from non-ecosystem conditions and/or management activities include historic fire exclusion coupled with uncharacteristic stand replacing fire; decreases in small mammalian prey base resulting from meadow degradation and the interrelated effects of unmanaged grazing and conifer encroachment; timber harvest (lodgepole, Jeffrey pine); and loss of ecological connectivity which can lead to diminished gene flow.

Vehicle strikes are a possible but limited threat due to a limited paved road network.

Personal and commercial fuelwood sales have been relatively stable over the past decade and that trend is expected to continue. (USDA 2013c). The Mammoth Lakes – June Lake core timber management area is the primary timber location for the Inyo National Forest. It consists of Jeffrey (80 percent) and lodgepole pine (13 percent), mixed conifer (6 percent) and red fir (1 percent). Most trees in the area are 8-14 inches dbh with 50 to 400 or more trees per acre contributing to lack of structural diversity and recruitment of trees into older, larger size classes (USDA 2013b).

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

While the great gray owl is not currently known to breed on the Inyo National Forest, there have been incidental sightings on the forest as well as detections close to the forest boundary making it relevant to the plan area. Even if there are no breeding pairs, owls from the neighboring Sequoia and Sierra National Forests as well as Yosemite National Park, may utilize the Inyo as dispersal or foraging habitat. The fragmented nature of upper montane forests on the Inyo National Forest, coupled with declining and or small population numbers of the owl, may put the species at future risk, particularly given the Inyo National Forest's location at the edge of the species range. Further, vulnerability of meadow habitat to climate change and conifer encroachment, loss of heterogeneity in pine forests, and increased risk to upper montane forest from natural disturbance such as uncharacteristic stand replacing fire, insect outbreaks and warming temperatures put this species at future risk. Concern for disturbance from recreation, which is predicted to increase over time, also leads to concern for the species persistence. *There is substantial concern about this species ability to persist on the planning unit.* Based upon the evidence and supporting best available science, great gray owl meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Mount Pinos Sooty Grouse - *Dendragapus fuliginosus howardi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Threats include hunting, incompatible timber harvest, fire suppression and altered fire regime, livestock grazing, land development, recreational use of habitat and climate change.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T1T2

NatureServe State Rank: S2S3 (CA)

Other Designations: CA Species of Special Concern, CA Species of Greatest Conservation Need

At the species level, sooty grouse (*Dendragapus fuliginosus*) is dispersed throughout coastal northern California and Sierra Nevada. Although subspecies of *D. fuliginosus* are not identified in eBird; the majority of sightings are thought to be the subspecies *D. f. sierrae*.

The Mt. Pinos sooty grouse, *Dendragapus fuliginosus howardi*, is considered one of three subspecies of sooty grouse in California. The historical range of *D. f. howardi* is believed to have included parts of the Los Padres, Inyo and Sequoia National Forests; distributed in the southern Sierra Nevada south of Kings Canyon, Piute Mountains, Tehachapi Mountains, Mount Pinos/Mount Able (Cerro Noroestre) area, and

Frazier Mountain in southern Califronia (Willet 1933, Grinnell and Miller 1944). The CNDDB database contains two records for the subspecies: four birds found on the Los Padres National Forest in 1931; and six birds on Sequoia National Forest in May 2004. Surveys over the past century indicate the range of Mt. Pinos Sooty Grouse receded roughly 100 miles and recent data suggest that the northward decline is continuing (Bland 2013). Sooty grouse have not been found in the southern portion of this range (i.e., isolated mountain habitats) since the early 1990s, with rare reports from south of the Tulare-Kern county line (Bland 2008). Bland (2008) suggests that sooty grouse observed south of Tulare County in recent decades may have been birds dispersing from a Sierra Nevada source, rather than members of a resident breeding population. Currently, the southernmost known breeding locations are at Sunday Peak in south-central Tulare County and Sherman Peak in southeastern Tulare County (Bland 2008). Records for the White Mountains, Mono County, were once provisionally presumed to be *D. f. howardi*, but have since been considered *D. f. sierrae*. However, recent unpublished studies by G. Barrowclough of the mtDNA control region (for example, cited in NatureServe) suggest Mt. Pinos sooty grouse may be restricted to a smaller area and represent a distinct (and extinct) species; further genetic study is needed to determine if Mt. Pinos sooty grouse is in fact a distinct subspecies.

Sooty grouse are associated with upper elevation fir forests that may be affected by vegetation management and climate change. In early spring, sooty grouse congregate in open mature stands of conifers near the crests of ridges. These “hooting sites,” or “spring activity centers,” are traditional and are returned to year after year, generation after generation. Loss of large trees from these areas are detrimental to grouse. In late spring and summer through fall, females and their young are associated with meadows and other mesic areas. In winter, sooty grouse seek dense conifer stands at high elevations where they subsist almost entirely on fir needles. Sooty grouse is hunted in Fresno and Tulare counties.

California Department of Fish and Wildlife allow hunting of sooty grouse within both Inyo and Mono counties with a daily take of two birds, and a maximum possession of six birds (California DFW 2017 Regulations).

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013-chapters 1,3,5 8 (hunting, range and timber) 15),the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

The Mount Pinos sooty grouse has likely been extirpated from much of its historic range which occurred from Kings Canyon south and west to the Mt. Pinos region of Kern and Ventura counties (Bland 2013, Zeiner et al. 1990). It is now most abundant at the northern limits of its current range which occur south of 37 degrees north latitude. On the Inyo National Forest, this includes areas south of the town of Independence, in suitable habitat found in Kearsarge Pass, Onion Valley, Mt Whitney and Mt Whitney Portal, Olancha Creek and Haiwee Canyon (Bland 2013, Bland 2017).

The Inyo National Forest does not currently have information on abundance or population trend for this species on the forest. However, incidental sooty grouse sightings are plentiful in eBird (2012) and information on Mount Pinos sooty grouse subspecies locations can be extrapolated from that data using geographical boundaries and phenotypic markers (Bland 2017). Extant populations south of Kings Canyon and north of Kern Gap (Tulare/Kern Co. line) are *howardi* which can be distinguished from the *sierrae* subspecies primarily by tail measurements and plumage characteristics.

In the California portion of the Inyo National Forest, local game bird populations appear healthy but fluctuate drastically from year to year depending on moisture. In Mono County, California Department of Fish and Wildlife does not conduct upland game bird surveys, with the exception of some localized sooty grouse hoot surveys in the spring. These were last conducted in 2012 in the June-Lake area which occurs outside the known range of Mount Pinos sooty grouse. The results of that work are still being assessed, however, the *howardi* subspecies distinction was not made during those surveys (T. Taylor Pers. Comm.). Recent Breeding Bird Survey (BBS) data from the Inyo National Forest assessment suggest sooty grouse populations were increasing to stable in California overall (BBS data 1966-2010) and stable at moderate levels in NV (1966-2010). There is no distinction made between sooty grouse and the *howardi* subspecies for those data. However Shuford and Gardali (2008) note moderate declines for *howardi* throughout its range.

Ecological conditions for this species (see above additional details)

Different vegetation types may be used depending on season (breeding/non-breeding). On the Inyo National Forest, high elevation (6,000-10,000 ft.) pine/fire forests with large trees can be found in the mixed conifer and subalpine assessment types on the Kern Plateau and adjacent areas (where they occur below 37 degrees north latitude). The mixed conifer assessment type includes various combinations of white fir, red fir and/or one or more pine species, typically with a very sparse understory. The subalpine conifer forest assessment type includes whitebark pine, limber pine, foxtail pine, Great Basin bristlecone pine, lodgepole pine, western white pine and mountain hemlock. Subalpine forest can have long winter snowpacks and relatively high canopy cover, as well as woodlands which have more open stands and relatively low canopy cover.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

With the exception of Monache Meadow on the Kern Plateau, approximately three-quarters of the mixed conifer assessment type is within wilderness. Fire suppression has impacted mixed conifer forest, putting it at risk for stand replacement. Mixed conifer assessment types are considered to be strongly departed, with fires occurring less frequently now than during the historic period. Wildfires and invasive plant species are considered general threats to upland game bird species; however, these were not noted as primary threats for sooty grouse in the recent forest plan assessment.

With the possible exception of lodgepole pine, subalpine forests, due at least in part to their relative inaccessibility, have been less influenced historically by human activities than lower elevation forest types, though periodic bark beetle outbreaks and disturbance from fire have occurred. Modern subalpine stands on the Inyo National Forest are largely within the natural range of variation with respect to their composition, structure, and function, although higher densities of smaller tree size classes may occur in areas that were subjected to historic logging operations (Meyer 2013).

The projected status of those ecological conditions relative to the species considered

Anticipated trends in the mixed conifer forest assessment type include higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate. Subalpine conifer forests are highly vulnerable to climate change and are at risk of substantial future loss (average 85 percent) by the end of the century.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Even-aged forest management contributing to loss of heterogeneity, understory components and loss of larger trees (greater than greater than 40 inches dbh) has been noted as principal threats, (Shuford and Gardali 2008). Further, much suitable habitat for the grouse occurs in wilderness, and in remote and rugged terrain where management activities are largely limited to non-motorized recreation, and human disturbance may be more limited. However, recreational resorts and campgrounds can be located outside wilderness in this assessment type.

Grazing has also been listed as a threat, however, due to implementation of the amendment 6 grazing management strategy throughout the Forest since 1996, vegetation and watershed condition trends are expected to improve, or continue to improve, for the next 20 years. This should benefit Mount Pinos Sooty Grouse. The Kern Allotment group occurs within the southern portion of the Inyo National Forest and except for a small portion on the Monache Allotment (Monache Meadow), all four allotments in this group occur within the Golden Trout Wilderness. Two of the allotments are active and two have been vacant for twelve years. The majority of the sites (46 or 82 percent) rated as good/excellent for vegetation, with 10 sites (18 percent) rating as fair.

Sooty grouse hunting is authorized by California Department of Fish and Wildlife and Nevada Department of Wildlife. On the Inyo National Forest, specific hunt zones have been established and interest in hunting sooty grouse has been on the rise. The species continues to be allowed for hunting use suggesting populations of sooty grouse are at least stable. However, accurately differentiating between sooty grouse and the Mount Pinos subspecies in the field could be a potential risk factor.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

As mentioned above, there is currently a taxonomic debate about the proper classification for the *howardi* subspecies. Ongoing genetic research suggests all remaining populations recognized as *howardi* possess the same mitochondrial haplotypes as *sierrae* populations further north, and that the now extinct populations south of Kern Gap were once a unique species. This work has not yet been published, however, and resolving any taxonomic uncertainty is critical for future conservation work. Mount Pinos Sooty grouse is currently found in a geographically restricted area and may be a relict population of a once more widespread species that occurred in the southern Sierra Nevada. Due to this limited distribution and moderate population decline throughout its range, the Inyo National Forest may provide important refugia habitat. Some of this habitat, particularly in the subalpine forest may be especially at risk from climate change, further increasing viability risk. *There is substantial concern about this species ability to persist on the planning unit.* Based upon the evidence and supporting best available science, Mount Pinos sooty grouse meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Willow Flycatcher - *Empidonax traillii* (includes: *Empidonax traillii brewsteri and Empidonax traillii adastus*)

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Nest predation and parasitism, and breeding habitat degradation and loss from management practices such as grazing, road construction, and water diversion.

Rationale for willow flycatcher

The willow flycatcher (*Empidonax traillii*) has a global rank of G5, a California state rank of S1S2, is recognized as a species of greatest conservation concern, and is listed as endangered under the California Endangered Species Act. *E.t. adastus* has a global subspecies rank of T5 and *E.t. brewsteri* has a global subspecies rank of T3T4. The willow flycatcher is a Region 5 Forest Service sensitive species.

Generally, *E.t. brewsteri* breed in isolated patches in northern California and along the western slope of the Sierra Nevada and *E.t. adastus* breeds along the eastern slope of the Sierra Nevada and western Nevada. Since the boundary between *brewsteri* and *adastus* is indistinct, this rationale treats both subspecies simultaneously.

Green and others (2003) report population estimates for willow flycatchers in the Sierra Nevada range from 300-400 individuals with about 120-150 individuals occurring on National Forest System lands.

While breeding bird surveys across the state of California indicate a non-significant increase in willow flycatcher numbers between 1966 and 2013, available data suggests a substantial decline has been reported for willow flycatchers in the Sierra Nevada over the past 40 years, resulting in the absence or near absence from many historically occupied areas.

Willow flycatcher migrants occur throughout California while breeding residents occur in the Sierra Nevada. Migrants occur in a variety of open habitat types and are not as dependent on the integrity of any specific habitat or location. Breeding habitat consists of riparian stringers and meadow habitats at least 0.4 ha in size with saturated soils and dense shrubs (Green et al. 2013). Breeding birds are primarily associated with willow thickets 3-7 meters tall within or adjacent to meadows or forest clearings. They are less frequently found in riparian corridors dominated by other types of riparian shrubs. Most willow flycatcher nests are located in the lower branches of riparian shrubs, typically below 1.5 meters (5 feet) (Fowler et al. *in* Green et al. 2003).

Loss and degradation of riparian and meadow habitat is considered the most significant threat to the persistence of willow flycatchers in the plan area. Degradation of habitat from management practices including livestock grazing (historic and present), road construction and water diversion have resulted in a reduction (i.e., loss) of willow habitat, as well as compaction and drying of meadows. Drought and climate change are known to influence long-term patterns in meadow condition such as reductions in willow habitat; however, the recent declines in willow flycatcher population numbers and degradation of suitable breeding habitat have likely been accelerated due to anthropogenic factors (Green et al. 2003). Evidence of this is a large number of meadow sites that no longer support breeding willow flycatchers (Green et al. 2003). Habitat conditions on wintering grounds and along migration routes may be contributing to population declines; however, survival rates and return rates of individuals in the Sierra Nevada are similar or better than in other regions (Green et al. 2003). Restoration efforts that result in as little as a 10 percent increase in riparian shrub cover in meadows increases the likelihood of occupancy and nest success for willow flycatchers (Bombay 2003).

Livestock grazing has been documented to remove willow cover (Taylor 1986) and cattle occasionally knock down nests (Valentine et al. 1988). Livestock damage such as compaction and pedestalling can alter soil infiltration and water holding capacity in localized areas, resulting in drier meadows that either reduces or eliminates willows and therefore would not continue to support breeding willow flycatchers. While there is still debate over the correlation between livestock grazing and willow flycatcher status, there is evidence of past severe impacts to meadow habitat from livestock (Ratliff 1985).

Water diversions that result in a reduction of riparian vegetation, particularly willows, from either reduced water availability or inundation of riparian areas effectively degrade habitat quality for willow flycatchers. Recreation activities near breeding territories including hiking, camping, fishing, and off-road vehicle use can negatively affect flycatchers. Affects may include noise disturbance and increased risk of predation through the attraction of jays and squirrels, known predators, to food scraps and garbage that accompany public use. Roads near meadow and riparian habitat that alter the hydrologic function of these adjacent features can result in degrading habitat through dewatering or drying of meadows and riparian zones (Kattelmann 1996) and increased sedimentation that can have deleterious effects to aquatic invertebrate prey (Erman 1977 *in* Green et al. 2003).

Nest predation is common and is considered a likely factor most affecting population viability in the Sierra Nevada (Bombay 1999, Cain et al. 2003). Predators include milk snakes, common king snakes, red tailed hawks, weasels, chipmunks and squirrels. Standing water around nests is considered a deterrent to mammalian predators and nests farther from trees exhibit higher nest success (Cain et al. 2003). Similarly, (Bombay et al. 2003) found that nests success increased with increasing distance from trees. Maintaining

standing water or saturated soils in meadow habitat would contribute to promoting willow thickets and preventing conifer encroachment, resulting in favorable breeding conditions for willow flycatchers.

Brood parasitism from brown-headed cowbirds is also identified as a threat to willow flycatchers. Brown-headed cow birds have a commensal relationship with domestic livestock. Rates of parasitism are variable and may affect flycatcher productivity at the local level (Green et al. 2003).

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5,) the draft biological evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Two subspecies of willow flycatcher are known to occur on the Inyo National Forest. A third subspecies, the federally endangered southwestern willow flycatcher, *E. t. extimus* is not known to occur within the plan area. It is not possible to identify the two subspecies apart visually, only genetically. The 2004 Sierra Nevada Forest Plan Amendment (USDA 2004) listed eight willow flycatcher sites on the Inyo National Forest. These sites were considered occupied, historically occupied or conditionally occupied based on records of detection. More recently, The Institute for Bird Populations (IBP) synthesized data on willow flycatcher detection sites from numerous entities (e.g., Federal, state, private) and found that the Inyo National Forest has a total of 32 active flycatcher sites (2,238 acres), constituting 7 percent of all currently used flycatcher habitat in the Sierra Nevada (N=285 sites, 33,367 acres total). The authors of that study note that post and pre-breeding willow flycatchers in meadow habitat are regularly detected at MAPS stations and during point counts in Yosemite National Park and the Stanislaus, Sierra and Inyo National Forests (Loffland et al. 2014).

A recent query of the NRIS database shows 86 records for *Empidonax trailli* for the Inyo National Forest with the most recent detections in 2009. These detection records occur across the forest, on all four ranger districts, with the majority northwest of the Mammoth Lake area (Mammoth Lake and Mono ranger districts). Many are multiple detections at the same sites over time. In eBird, there are 536 records of 590 individuals within the Inyo National Forest boundary; within 5 miles of and including the forest, there are 1,116 records of 1,503 individuals. In CNDDB, there are 11 records within the forest boundary.

The Inyo does not currently have forest-wide information on population estimates or abundance, however detailed monitoring data is available for the Rush Creek population which occurs on the Inyo National Forest and also private lands managed by the Los Angeles Department of Water and Power (LADWP). Point Reyes Bird Observatory Conservation Science (PRBO) conducted population and habitat studies for the lower Rush Creek population between 2001 and 2010. In 2001, there were two nesting pairs of willow flycatcher in the lower Rush Creek area. In 2004, the population had increased to 16 individuals. The population then decreased annually, to a population of six individuals in 2010 (three males and three females) (McCreedy 2011).

Willow flycatcher surveys have been conducted at various other locations on the Inyo National Forest between 1995 and 2012. Several willow flycatchers were detected during these surveys; however, these were not thought to be breeding individuals.

Ecological conditions for this species (see above for additional details)

Known willow flycatcher sites have been found between 1,200 to 9,500 feet elevation, though most (88 percent, 119 of 135) are located between 4,000 and 8,000 feet. They are most numerous where extensive

thickets of low and dense willows edge on wet meadows, ponds, or backwaters. Meadows occupied by willow flycatchers typically range in size from less than 1.0 acre to 716 acres, averaging approximately 80 acres, and with high water tables in spring and summer (standing waters/saturated soils). More than 95 percent of breeding meadows are larger than 10 acres, and meadows where multiple territories have fledged young are larger than 15 acres (summarized in Green et al. 2003).

On the Inyo National Forest, potential habitat can be found in the riparian meadow and riparian non-meadow ecological assessment types. The largest riparian meadow systems on the Inyo occur on the Kern Plateau (approximately 10 percent) while about 1.5 percent of the land area in the Ansel Adams and John Muir Wildernesses is meadow.

However, the flycatchers in the lower Rush Creek area below Mono Lake occur in atypical habitat, at roughly 6,500 feet above sea level within a matrix of Great Basin big sagebrush scrub. Willow flycatchers on Rush Creek display preferences for high Wood's rose (*Rosa woodsii*) cover, lower (but still significant) willow cover, and low sagebrush scrub-associated species cover at the territory scale. Through 2010, 118 out of 188 located nests were built in Wood's rose (McCreedy 2011). Contrary to other reports in California, willow flycatchers at lower Rush Creek do not display any significant preference for the presence of surface water. Breeding territories averaged 59 meters from water.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The number of large meadows on the Inyo National Forest has not changed significantly in the last decade (USDA 2016), while composition structure and function has changed. According to the assessment of the natural range of variation for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also departed from reference conditions in those areas. Researchers sampled 10 randomly selected meadows on the Inyo National Forest as part of a Sierra Nevada study which found vegetation cover and bare ground cover ranged from natural condition to moderately or heavily altered, depending on location. Encroachment (the ingrowth of trees) was the most common impact, with 60 percent moderately impacted and 10 percent slightly impacted.

Previous project level analyses conducted on four meadows on the Kern Plateau (Tunnel, Tunnel Station, Ramshaw, and Little Whitney) on the Inyo National Forest have shown that elevation and canopy cover with influences of stand height are the most limiting factors in these meadows for flycatcher occupancy. The majority (88 percent) of willow flycatchers will nest between 4,000 and 8,000 feet elevation (Green et al 2003); however, all of the meadows on the Kern Plateau occur above 8,000 feet. In addition, percent canopy cover was below the minimum percentage (76 percent) for breeding territories and characterized by even aged stands with little structural complexity.

The Rush Creek area has been subject to decades of heavy water diversion, and under passive restoration for 22 years. Livestock grazing, once heavy on lower Rush Creek, has been excluded from the riparian corridor for over 10 years by the Inyo National Forest and the LDWP. Although lower Rush Creek (often referred to as the "Rush Creek Bottomlands") has one of the widest riparian corridors in the Eastern Sierra, the corridor's riparian vegetation can be patchy, with significant amounts of sagebrush scrub mixed within patches of riparian obligates that are supported by current and historic side channels.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Inyo, estimated to cover 3,093 acres. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley, and White Mountains subsections, but are not present in

significant amounts (those greater than greater than 300 feet in width) in the remaining subsections, including the Glass and Inyo Mountains.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the Forest.

Approximately 300 acres of non-meadow riparian are currently occupied by one or more non-native plant species, while approximately 175 acres of meadow riparian are occupied by one or more non-native plant species.

The projected status of those ecological conditions relative to the species considered

Long-term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program (Gross and Coppoletta 2013) show that most of those plots (74 percent) are in excellent-to-good vegetation condition and stable, 5 percent are in excellent-to-good vegetation condition and trending upward, 14 percent were in good condition with a downward trend, 2 percent were in fair condition and stable, and 5 percent were in fair condition and trending downward. No plots were in poor vegetation condition.

Meadows, which are depend on snowpack to maintain the water table, will continue to be at risk if the precipitation pattern in the southern Sierra Nevada shifts to more rain than snow (Gross and Coppoletta 2013). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology and surrounding vegetation (Gross and Coppoletta 2013). This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions. Invasive species will continue to be a primary issue of concern affecting meadow and non-meadow riparian ecosystems in the future. Warming temperatures will potentially influence the establishment and subsequent spread of non-native species in these areas.

Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired condition, 67 were in proper functioning condition and 21 were trending in an upward direction.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Loss of meadows and riparian habitat due to changes in water levels, diversions, grazing, meadow drying and conifer encroachment, snowpack and changes in spring precipitation related to climate change.

Livestock grazing can negatively affect flycatcher habitat; however, on the Inyo National Forest no known willow flycatcher sites currently co-occur on active livestock allotments (Krueger 2016). Unpublished Inyo National Forest data indicate that all stream reaches through meadows in grazed and rested allotments fell within expected values for width and width-to-depth ratios, except for Monache Meadow, which showed that widths were wider and depths shallower than they should be for a functioning hydrologic system. In the past 20 years, much restoration work has been completed in meadows on the Inyo, especially the Kern Plateau. Observations by national forest staff suggest that even in allotments that remain open to livestock grazing, restoration and changes in grazing management

appear to have improved stream and meadow condition overall (USDA 2016). During the recent forest plan assessment process, grazing monitoring data for 69 key meadow areas show that 35 percent were in excellent condition, 35 percent were rated as good, 23 percent as fair, and 7 percent as poor. Lower ratings indicated lack of surface litter, greater bare ground cover, soil compaction and/or rilling. Higher ratings were correlated to greater plant diversity and vegetation cover.

Additional risk factors that affect nest success through increased predation rates and nest parasitism can occur both on and off the forest. Placement of bird feeders in residential areas off forest is known to attract brown-headed cowbirds, which in turn leads to nest parasitism of willow flycatchers. Brown-headed cowbird nest parasitism has also led to direct loss of nest productivity and recruitment, on the forest, especially in the lower Rush Creek area where it is the primary cause for low productivity (McCreedy and Burnett 2011). Loffland et al (2014) note historic locations on the Inyo National Forest in close proximity of one another, including the area west of Mono Lake in the vicinity of Rush Creek and Lee Vining Creek. These areas may be candidates for meadow restoration efforts; however, it is believed that high cowbird densities in this area resulting from backyard bird feeders and other human-induced attractions (rather than livestock grazing) would need to be addressed before attempting to attract willow flycatchers into those areas.

Outside the forest, water diversions have impacted willow flycatcher habitat. As stated in Green et al. (2003), riparian vegetation in the Owens Valley located downstream of the intake to the Los Angeles aqueduct has dramatically changed to a more xeric condition due to the lack of water, and no longer provides habitat for nesting willow flycatchers. Increased water demands, coupled with more frequent drought events and drying conditions, will continue to act as negative stressors on flycatcher habitat, although Gardalli et al. (2012), found some willow flycatchers species (*Empidonax traillii extimus*) to be at lower risk (out of 358 total bird taxa analyzed) with regard to climate change vulnerability than other bird species.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The willow flycatcher has a global rank of G5, and a California state rank of S1S2. Since there is no visual way to distinguish between subspecies, and the southwestern willow flycatcher is federally endangered, risk of impact to any of the three subspecies is of concern. Overall, habitat conditions that support the willow flycatcher on the Inyo National Forest appear stable-to-improving. However, water use from expanding population pressure and human demands, coupled with increasing temperatures and temporal changes in precipitation and runoff events related to climate change, will continue to put this species and its associated habitat components at risk in the future. These factors, in addition to small, declining populations that are subject to nest parasitism by brown-heeded cowbirds, will continue to put willow flycatcher on the Inyo National Forest at risk. *There is substantial concern about this species ability to persist in the plan area.*

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Amphibians

Black toad - *Bufo exsul*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Climate change and disease are the primary threats to the black toad on the Inyo National Forest and water diversions and geologic action are secondary threats.

Rationale for black toad

From NatureServe, the black toad received a critically imperiled ranking both globally (G1) and at the state (S1) levels. *Anaxyrus exsul* is a California state threatened species and a Forest Service sensitive species for the Inyo National Forest.

The natural range of the black toad encompasses approximately 15 hectares (37 acres) of Deep Springs Valley, Inyo County, California. The toad is primarily associated with four spring complexes which lie on either private (Deep Springs College) or public (Bureau of Land Management) lands (Hammerson 2005). Due to the limited number of suitable habitats in the geographic range of the toad, each population is very vulnerable to stochastic events that could result in a local extirpation. The toads are highly aquatic in all seasons except winter, during which they disperse into upland habitats and seek refuge in rodent burrows or other refugia (Schuierer 1961, Kagarise-Sherman 1980, Murphy, et al. 2003).

Population estimates have been made at several locations, but some have been qualitative (based on only visual counts) with low levels of accuracy (Murphy et al. 2003, Fellers 2005). Several mark and recapture surveys at Corral Springs indicate the population at this site are fairly large (approaching 10,000 adults) and is stable (Kagarise-Sherman 1980, Murphy et al. 2003). However, Murphy et al. (2003) cautiously state that this is a stable population, but acknowledge amphibian populations can fluctuate dramatically and cannot make conclusive statements about population viability or stability based on their one-time survey. The marshy habitat at Buckhorn Spring is much larger than Corral Spring; however, it remains largely unstudied and could support a much larger population of toads (Murphy et al. 2003). The interconnectivity of populations is not known.

The primary threats to the species are largely outside of the control of the Inyo National Forest. However, any action the forest can take to maintain the integrity of spring sources within Deep Springs Valley, such as any historic artesian wells at Sam's Spring, may help maintain the existing habitat. Wright et al. (2013) list the black toad as one of the ten most likely species to be affected by climate change. Under their modeling, the black toad could see a reduction in suitable habitat by up to 80 percent during the forecast period. Murphy et al. (2003) indicate there is serious concern about the fungus *Batrachochytrium*

dendrobatidis (Bd) impacting populations of the black toad as it has many other amphibian species around the globe. Bd is known to affect other toads of the genus *Anaxyrus* and has been listed as a possible reason for observed declines in North American toad populations (Muths et al. 2003, Green and Kagarise-Sherman 2001). However extensive frog and toad work has occurred across Sierra Nevada Mountain range and while Bd continues to be detected in frogs, it has not been detected in toad populations (Fellers et al. 2011). Black toad was not included in these studies. The spread of the chytrid fungus into Bd-negative landscapes is not fully understood, can be mediated by many different vectors, and can have significant impacts to local populations of amphibians (Vredenburg, et al. 2010). Another threat beyond the control of the Forest is the reduction of water flow by geologic activity. The water source supplying the occupied springs comes from an area within a geologically active area; thereby creating the potential for groundwater interruptions through natural forces should an earthquake with sufficient magnitude occur and interrupt groundwater flow.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5, 10) the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Deep Springs Valley floor is about 15 miles long and 5 miles wide and was formerly occupied by a large lake. Currently, the saltpan and surrounding playa cover an area of about 5 square miles where detections occur (Jones, 1965). Deep Springs Valley offers dispersal opportunities to nearby aquatic habitats; population numbers for the toad have remained relatively stable with estimations of 7,897 to 9,744 toads. (USDA 2013a). The Bureau of Land Management manages known black toad populations at Corral Springs, Buckhorn Springs, Bog Mound Springs and Antelope Spring. All but Antelope Spring are immediately adjacent to Deep Springs Lake. Antelope Spring is approximately 3 miles north of these springs and is situated on a hillside adjacent to the boundary of Inyo National Forest (Wang 2009; USDA 2016). Forest-level surveys conducted in spring of 2017 following a rain event noted Antelope Spring had at least 10 individual egg masses.

There are 6 records for black toad in the NRIS database, with the most recent detections made in 2011 at two springs on the Inyo National Forest (Sam's Spring and an unnamed spring in Birch Creek). Birch Creek, however, was recently affected by alterations in flow regime and follow up surveys has failed to detect this species in that area. An incidental observation was reported in 2016 within the southeastern boundary of the White Mountain Ranger District near Deep Springs but follow-up surveys are needed to confirm this sighting (Pearce 2016).

Historical data suggest this species was never common on the forest. Most historic locations occur off the forest boundary in Deep Springs Valley. The BISON database shows 506 mapped occurrences in Inyo County, the majority of which are museum specimens collected in the 1970s. Only six records actually occurred on the Inyo National Forest during that time, five in Waucoba Canyon and one specimen occurred north of the Ancient Bristlecone Scenic Highway. The rest occurred just off forest and spread throughout the Deep Springs area. The VertNet database also notes 76 museum specimens collected from Deep Springs Valley, many collected in the 1930s.

Key ecological conditions for this species

On the Inyo National Forest, the general area of occurrence is characterized by the Pinyon juniper/sagebrush and desert assessment types; see maps 5 and 8 in the DEIS (USDA 2016a). Black toad

is an aquatic species restricted to wet areas near permanent springs with subpopulations separated by arid desert scrub at least 1.5 km apart. Short plant cover which provides shaded/cooler environments and unobstructed access to still or slowly flowing water, rodent burrows in winter and shallow marsh and pond waters for breeding are all important habitat elements (USDA 2016b).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The Antelope Spring Bureau of Land Management habitat differs greatly compared to nearby Sam's Spring FS habitat. Antelope Spring provides higher quality and greater quantity of suitable breeding and dispersal habitat than Sam's Spring. Antelope Springs may get approximately 10-20 percent shade from sedges and reeds. Habitat at the far end of the reach is characterized by open sedge/reed mud breeding grounds with sparse cottonwood, transitioning to rose, and then willow at the source. The edge quickly moves into sage habitat.

Sam Spring shows signs of historic water diversions, vegetation encroachment that may contribute to the lack of surface flow/change in suitability. Limited data on Buckhorn Spring has been reported. Forest surveys in spring of 2017 noted very little water at the site despite a recent rain event.

Near black toad populations, aquatic integrity scores range from 0 to -3 (best) and -6 to -9 (poor). Aquatic habitat integrity within the Inyo National Forest is generally highest in the higher elevation areas and within existing protected areas on public lands. See the forestwide assessment (page 47) for more information on aquatic ecological integrity (USDA 2013b).

The recent ecological assessment (USDA 2013a) notes that on the Inyo National Forest, springs and seeps are scattered throughout different habitats, and that there are approximately 1,472 mapped springs on the forest. Springs occur in most assessment areas throughout the forest. However, it is unknown how many of those springs support meadow or non-meadow riparian ecosystems. Seeps on the Inyo can be described as groundwater dependent ecosystems (GDEs) and are supported by groundwater. Groundwater dependent ecosystem surveys were last conducted in 2009 and 2010. Nineteen spring areas were surveyed across the Forests of which thirteen are considered meadow riparian ecosystems and six are considered non-meadow riparian ecosystems. Of the 13 meadow groundwater dependent ecosystems surveyed, six had no vegetation issues identified, two sites had only one issue identified, and five groundwater dependent ecosystems had two or three vegetation issues identified (out of seven questions).

Of the six non-meadow groundwater dependent ecosystems surveyed (see groundwater dependent ecosystem discussion in the meadow riparian section above), two had no vegetation issues identified, two sites had only one issue identified, one groundwater dependent ecosystem had two issues identified, and one had four vegetation issues identified (out of seven) that could affect the condition of the groundwater dependent ecosystem. These groundwater dependent ecosystems are springs that are dominated by trees (conifers) or shrubs (primarily willows).

Grazing monitoring data for 69 meadow key areas show that 35 percent were in excellent condition, 35 percent were rated as good, 23 percent as fair, and 7 percent as poor. Lower ratings indicated lack of surface litter, greater bare ground cover, soil compaction and/or rilling. Higher ratings were correlated to greater plant diversity and vegetation cover.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the forest. Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired

condition, 67 were in proper functioning condition and 21 were trending in an upward direction. Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the forest; estimated to cover 3,093 acres on the forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 feet in width) in the remaining subsections, including the Glass and Inyo mountains.

The projected status of those ecological conditions relative to the species considered

Stream and spring morphology have been affected by grazing on the forest, but more recent grazing practices seem to be allowing for maintenance of current conditions or improvement in most areas. Many springs have been fenced from livestock use, and this is expected to improve function and condition of these springs, this upward trend in these managed springs will improve water quality, although water quantity will show seasonal fluctuations, depending on water sources. Temperatures at the spring source will most likely remain stable as they are influenced by sub-terrain temperatures. It is also expected that even with predicted decrease in water throughout the area due to climate change, springs will persist, but may be the only water sources available for animals and could receive additional impacts from other animals including large ungulates, as other stream sources dry, especially in the White and Inyo mountains (USDA 2013c).

Under current management, meadow associated streams are expected to improve functionality, vegetation vigor, sediment reduction and species diversity, although early snow-melt and spring run-off is expected to have effects on some species in the long-term (greater than 20 years). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology, and surrounding vegetation (Gross and Coppoletta 2013). This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Drying of springs and any activities or processes that disrupt water flow (e.g., water diversions/dams, in-stream mining, stream capping, feral livestock (burros and cattle), upstream water pumping) will lead to direct mortality (desiccation) and loss of habitat/ vegetation encroachment into open waters is also a threat (USDA 2013a)

The amphibian fungus *chytridiomycosis* poses a huge threat which could devastate isolated populations. Further drying of springs and geological changes could further isolate populations and create localized extinction (Krueger 2016).

Stream and spring morphology have been affected by grazing on the forest, but more recent grazing practices seem to be allowing for maintenance of current conditions or improvement in most areas (USDA 2013b). The springs on the Inyo National Forest occur in the Deep Springs allotment, but cattle use has not been observed in the area, there are no authorized roads to the springs and activities are very limited in the area. (USDA 2013a). Sam’s Spring is in an active cattle allotment; however, no signs of cattle use have been evident at the site.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The black toad is a restricted endemic, limited to several isolated populations in Deep Springs Valley in Inyo County within close proximity to and or on the forest. The predominant population area is located on adjacent, private land. However, the Forest will continue to provide additional (ephemeral) fringe habitat for dispersing adults. While the ecological conditions the black toad depends on appear generally stable and or trending in a positive direction based on current management, there is still substantial concern for the species persistence by simple virtue of its rarity and uncertain climate change related effects. As a result of this rarity and its limited distribution, this species is highly susceptible to stochastic events and drying conditions resulting from increasing temperatures and climate change. Its limited dispersal ability and isolated populations put it at further risk for localized extinctions and susceptibility to disease outbreaks. *There is substantial concern for this species ability to persist on the planning unit.* Based upon the evidence and supporting best available science, black toad **does meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Inyo Mountains slender salamander - *Batrachoseps campi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Habitat alterations due to water diversion, feral livestock, human presence, mining, and climate change. The species' restricted distribution is assumed to be limited to relatively few areas associated with springs or mesic conditions (habitat specificity).

Rationale for Inyo Mountains slender salamander

The Inyo Mountains slender salamander is vulnerable to extinction at both the global (G3) and state (S3) levels according to NatureServe. It is also a species of special concern (SSC) and species of greatest conservation need (SGCN) as evaluated by the California Department of Fish and Wildlife. It is also a Forest Service sensitive species for the Inyo National Forest and a Bureau of Land Management sensitive species.

Relatively little is known about the Inyo Mountains slender salamander except for the general habitat associations from the locations where it has been observed. The species is known from fewer than 20 sites in the Inyo Mountains east of the Sierra Nevada range and is based on relatively few recorded observations. It is commonly associated with spring and riparian habitats from elevations ranging from approximately 1,800 to 8,600 feet (550 – 2,620 meters); however, the salamander may occur in other habitats (Evelyn and Sweet 2012, Hansen and Wake 2005) and may be more widespread than is currently known because it is hard to find in non-spring habitats (Jennings and Hayes 1994). Also, several suitable habitats have not been surveyed making it possible that additional populations will be found (Hansen and Wake 2005). The occupied sites are highly localized, springs surrounded by expanses of desert, and

apparently isolated from each other. Yanev and Wake (1981) support the concept of each population being isolated from each other based on high levels of genetic differentiation. This distributional pattern has a high potential for extirpations at the site level from stochastic events, that is, local populations may not recover from localized extinction events.

General life history aspects are assumed to be similar to other species of *Batrachoseps*, including direct development from eggs, invertiverous food sources, association with surface objects in wet habitats, and retreat into mesic refugia (Hansen and Wake 2005). Population size is not available for *B. campi*, but Hansen and Wake (2005) calculated a population size of 14,000 individuals based on the genetic differentiation described by Yanev and Wake (1981). There is no information on population trends, but NatureServe suggests short-term trends may be stable and longer term declines of 10-30 percent. Thompson and others (2016) state that most known populations appear to be stable, although populations may have declined or been extirpated at a few sites due to habitat modification.

The Inyo Mountains slender salamander is assumed to be restricted to spring habitats, any impact that influences stream flow (including duration and quantity) would threaten population persistence. If stream flow is reduced, it would be safe to assume that the obligate riparian plant species would decline and surface moisture would diminish. This would lead to a reduction in the habitats in which the salamander is found and could limit population size. Past impacts to stream flow and riparian areas include the capping of springs, diversion of stream flow, in-stream mining, and disturbances to riparian areas from feral livestock (burros and cattle). Several of these stressors are potentially restricted by state and federal agencies who manage resources. As an SGCN, California Department of Fish and Wildlife indicates *B. campi* is vulnerable to climate change and any changes in precipitation patterns that influence spring discharge would likely result in a decrease in available habitat. Wright, et al. (2013) modeled that up to 50 percent of the suitable habitat could be reduced by 2050 as a result of anticipated changes to climate.

Because the Inyo Mountains slender salamander is known from relatively few localities and populations are likely not connected, there is a risk of localized population extinctions. The species inhabits limited, fragile spring systems isolated in one of the driest desert habitats in the country (Yanev and Wake 1981). Any impact that affects water supply or riparian values likely limits the amount of habitat available to the species that would possibly reduce population sizes.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5, 10) the draft biological evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

The Inyo Mountains slender salamander is restricted endemic limited to Inyo County. It has been known to occur on all four ranger districts with the majority of detections occurring on the White Mountains and Mount Whitney Ranger Districts. Current population estimates of the species on the forest are not available, however, it has been detected at 16 locations within the Inyo Mountains and the Inyo National Forest contains all known populations occurring on forest service lands in region 5; figure 10 in Krueger (2016). Current distribution cited in the biological evaluation information includes museum vouchers, CDFG, CNDDB and forest specific information from the forest's NRIS database. Sites on the Inyo National Forest where salamanders have been repeatedly detected in recent (last 15) years include Water Canyon, Barrel Springs, and Lead Canyon. Additional sites with specimens collected greater than 15 years ago include Addle and Wacouba Canyon and Willow Creek (CNDDB data). Critical aquatic refuges (CAR) designated by the 2004 Sierra Nevada Forest Plan amendment that include habitat for the Inyo

Mountains slender salamander include Lead Canon critical aquatic refuges and Barrel Springs critical aquatic refuges.

Key ecological conditions for this species

Key ecological conditions for the salamander include flowing streams, spring/seeps (non-pool forming) and moist substrates (for egg laying), canyons, solid-rock cliffs, areas where outcrops or talus are in contact with surface flow. (See above section for additional details on habitat requirements).

Isolated springs in largely desert and desert scrub habitat are key habitat elements. The Inyo Mountains slender salamander occurs exclusively in desert ecosystems with habitat restricted to the Inyo Mountains and along the south Sierra escarpment. Salamanders tend to occupy "seeps," a type of spring that does not form a channel or pool. Seeps tend to keep an area moist, but not wet, a condition suitable for salamanders. Many mosses and other plants occupy spring sites, thriving on cool and humid conditions.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The recent ecological assessment for the Inyo National Forest notes that springs and seeps are scattered throughout different habitats, and that there are approximately 1,472 mapped springs on the forest. Springs occur in most assessment areas throughout the forest. However, it is unknown how many of those springs support meadow or non-meadow riparian ecosystems. The forest has very limited information related to spring flow alterations over time. In some arid portions of the forest, springs and streams emanating from them are the only water source, and therefore very important for those ecosystems.

Seeps on the Inyo can be described as groundwater dependent ecosystems and are supported by groundwater. Groundwater dependent ecosystem surveys were last conducted in 2009 and 2010. Nineteen spring areas were surveyed across the forests of which thirteen are considered meadow riparian ecosystems and six are considered non-meadow riparian ecosystems. Of the 13 meadow groundwater dependent ecosystems surveyed, six had no vegetation issues identified, two sites had only one issue identified and five groundwater dependent ecosystems had two or three vegetation issues identified (out of seven questions). Although no comprehensive surveys have been conducted for the Lead Canon and Barrel Springs critical aquatic refuges which occur on the forest, there are reports that the habitat appears to be intact and salamanders have been observed. Although, Barrel Canyon has been severely degraded. Overall, however, these areas have the highest aquatic integrity score (0-3), which is based on an index of stressors.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Forest, they are estimated to cover 3,093 acres on the Forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 feet in width) in the remaining subsections, including the Glass and Inyo mountains.

Habitat in Barrel Canyon on the Inyo has been degraded, and at another location on the forest, flash flooding in 1985 caused a scouring of the canyon bottom, resulting in complete loss of riparian vegetation.

The projected status of those ecological conditions relative to the species considered

Stream and spring morphology have been affected by grazing on the forest, but that more recent grazing practices seem to be allowing for maintenance of current conditions or improvement in most areas. Many springs have been fenced from livestock use, and this is expected to improve function and condition of these springs, this upward trend in these managed springs will improve water quality, although water

quantity will show seasonal fluctuations, depending on water sources. Temperatures at the spring source will most likely remain stable as they are influenced by sub-terrain temperatures. It is also expected that even with predicted decrease in water throughout the area due to climate change, springs will persist, but may be the only water sources available for animals and could receive additional impacts from other animals including large ungulates, as other stream sources dry, especially in the White and Inyo mountains.

Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology and surrounding vegetation (Gross and Coppoletta 2013). This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

There is no information regarding the proportion of springs that support meadow or non-meadow riparian ecosystems.

Key risk factors arising from non-ecosystem conditions and/or management activities

Springs are sensitive water features due to their relative rarity, their small area, and their ecological importance relative to their size. Any activities that disrupt water flow (e.g., water diversions/dams, in-stream mining, stream capping, feral livestock (burros and cattle), upstream water pumping) and climate change and related stochastic events like flooding or drought are risk factors. Persistence of the salamander populations may be closely tied to climate variations, especially if habitats experience extreme drying trends, or stochastic events such as flash floods.

Multiple municipalities, including the Los Angeles Department of Water and Mammoth Community Water District conduct groundwater pumping near the forest, though wells from these two entities do not occur on forest lands. Groundwater pumping affects groundwater dependent ecosystems such as meadows, springs and seeps, although the extent of those influences on the forest is not well documented.

Stream and spring morphology have been affected by grazing on the forest, but more recent grazing practices seem to be allowing for maintenance of current conditions or improvement in most area, however degradation of habitat by feral burros continues to be a threat.

Active mining claims are present within the Inyo National Forest and include lode, placer and mill site claims. Groupings of mining claims are found in the areas of Mazourka Canyon, Pine Creek, Mammoth Lakes Basin, Little Hot Creek, Black Point, Truman Meadows and Sugarloaf. Active mining claims are also scattered along the lower elevations of the west side of the White Mountains in California and east side in Nevada, the western slopes of the Inyo Mountains, and the eastern slopes of the Sierra Nevada near Big Pine and north to Lee Vining. These activities are expected to continue.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit.**

The Inyo Mountain slender salamander is a restricted endemic, limited to several isolated populations scattered throughout a small portion of the Inyo National Forest. While the ecological conditions the salamander depends on appear generally stable and or trending in a positive direction based on current management, there is still substantial concern for the species persistence by simple virtue of its rarity and uncertain climate change related effects. As a result of this rarity and its limited distribution, this species is highly susceptible to stochastic events such as flash floods, and drying conditions which may become

more frequent with climate change. The Inyo salamander's limited dispersal ability and isolated populations put it at further risk for localized extinctions from these types of events.

The best available scientific information about the Inyo Mountains slender salamander indicates substantial concern about the species' capability to persist over the long term in the plan area. Based upon the supporting best available science, the **Inyo Mountains slender salamander meets** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Kern Plateau salamander - *Batrachoseps robustus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Road construction, timber harvesting, water diversions, and climate change.

Rationale for Kern Plateau salamander

NatureServe ranks the Kern Plateau salamander as vulnerable to extinction at both the global (G3) and state (S3) levels. It is considered near threatened per the International Union for Conservation of Nature (IUCN) red list on the basis of small (less than 5,000 km^2) extent of occurrence.

The Kern Plateau salamander has been detected at 36 sites, mainly from the Kern Plateau in the Sierra Nevadas, but including a few isolated populations from the Owens Valley and the Scodie Mountains in

eastern California (Wake, et al. 2002). *Batrachoseps robustu*s are abundant on the Kern Plateau especially in mesic areas, and are found in nearly every drainage on in the eastern Sierra from Walker Creek (east of Olancha) to Nine Mile Creek (Hansen and Wake, 2005). The species is found from mid- to high elevations ranging from 4,690 to 9,190 feet (1,430 to 2,800 meters). Typical habitats are variable depending on the locality, ranging from mesic red fir/lodgepole pine at mid- to upper elevations of the plateau, to subalpine (wet meadow) habitats at high elevations in the Sierra Nevada, to springs located in desert scrub (Wake, et al. 2002). Individual salamanders are readily encountered under surface cover during favorable conditions which include high to moderate surface moisture (Hansen and Wake 2005). In the Owens and Indian Wells Valleys and Scodie mountains, individuals are intimately associated with the spring streams and the immediate wetted riparian area (Wake, et al. 2002). General life history traits appear to be similar to most other Batrachoseps.

Information on population status and trend is not available, but the species is considered to be common in most of its range and populations stable (Hansen and Wake 2005). Many of the known localities are in areas without roads or very low road density, or are in relatively inaccessible, steep drainages. As such, the habitats they occupy are considered to be stable (Hansen and Wake 2005). Wildfire risk is moderate at the lower elevations of its range and wildfire has impacted the Scodie Mountain populations (Hansen and Wake 2005). Timber harvesting on the Kern Plateau is currently not occurring and there are limited timber opportunities in the Scodie Mountains. Water diversions are not a threat on the Kern Plateau where the salamanders use a more general type of habitat influenced by snowmelt; however, in the Indian Wells/Owens Valley areas environmental conditions are much more arid and water diversions from the occupied springs would likely reduce the extent of the wetted in-channel and riparian areas. Climate change has the potential to impact all populations if snow pack and runoff conditions are significantly altered. Reductions in snow pack could affect the Kern Plateau populations and changes in infiltration that reduce spring flow in the Scodie Mountains or Indian Wells/Owens Valleys would probably reduce the extent and/or duration of spring flow and riparian development. The climate change modeling completed by Wright, et al. (2013) indicated a slight reduction (up to 20 percent) in habitat suitability by the year 2050.

The Kern Plateau salamander is well distributed in its range and occurs in a variety of habitats. Individuals are readily encountered when environmental conditions are suitable for surface activity. Within most of the range of the species, habitat is apparently stable with few threats. In the drier portions of its range, the spring and riparian habitats it occupies are fragile and vulnerable to damage, but the threats that could result in a long-term degradation of habitat are also few.

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5, 8), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

The Kern Plateau salamander has been detected at 36 sites, mainly from the Kern Plateau in the Sierra Nevadas, but including a few isolated populations from the Owens Valley and the Scodie mountains in eastern California (Wake, et al. 2002). *Batrachoseps robustu*s are abundant on the Kern Plateau especially in mesic areas, and are found in nearly every drainage in the eastern Sierra from Walker Creek (east of Olancha) to Nine Mile Creek (Hansen and Wake, 2005). There are 44 historic records (museum specimens collected in 1985) in BISON that occur in Inyo County on the southern end of the forest and in the vicinity of Olancha and Walker Creeks and Round Mountain.

Key ecological conditions for this species (see above for additional details)

Kern Plateau salamander occurs in perennially wet and moist habitat, usually associated with rocky outcrops or rock substrate, along the eastern escarpment of the Sierra Nevada Mountains. On the Inyo National Forest, these conditions can be found largely on the Kern Plateau. Within this area, the mixed conifer assessment type is most prevalent and includes various combinations of white fir, red fir, and/or one or more pine species, typically with a very sparse understory. The majority of the mixed conifer assessment type, which does not necessarily include all mixed conifer stands, in the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately three-quarters of the mixed conifer assessment type is within wilderness.

The majority of the red fir type is located on the Kern Plateau and Reds Meadow Valley areas where a large proportion (80 percent) of the red fir forest type across the southern Sierras is within designated wilderness. This area is known for large, open meadows surrounded by forests of subalpine conifers, red fir, lodgepole pine, and pinyon-juniper. Several critical aquatic refuges (CARs) at the southern portion of the forest are identified as providing habitat for Kern Plateau salamander. These include Olancha critical aquatic refuge and Haiwee Canyon critical aquatic refuge.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

In total, the Inyo National Forest has over 25,000 acres of meadows, 383,336 acres of subalpine conifer forest (19-20 percent of the forest), 118,039 acres of Red fir (6 percent), 45,671 of mixed conifer (2 percent) as potentially available habitat, however not all of these ecosystems may provide the specific microsite conditions necessary for salamanders.

The recent ecological assessment for the Inyo National Forest notes that springs and seeps are scattered throughout different habitats, and that there are approximately 1,472 mapped springs on the forest. Springs occur in most assessment areas throughout the forest. However, it is unknown how many of those springs support meadow or non-meadow riparian ecosystems. The forest has very limited information related to spring flow alterations over time. In some arid portions of the forest, springs and streams emanating from them are the only water source, and therefore very important for those ecosystems.

Seeps on the Inyo can be described as groundwater dependent ecosystems (GDEs) and are supported by groundwater. Groundwater dependent ecosystem surveys were last conducted in 2009 and 2010. Nineteen spring areas were surveyed across the Forests of which thirteen are considered meadow riparian ecosystems and six are considered non-meadow riparian ecosystems. Of the 13 meadow groundwater dependent ecosystems surveyed, six had no vegetation issues identified, two sites had only one issue identified, and five groundwater dependent ecosystems had two or three vegetation issues identified (out of seven questions). Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Forest; they are estimated to cover 3,093 acres. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 feet in width) in the remaining subsections, including the Glass and Inyo mountains.

The projected status of those ecological conditions relative to the species considered

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar; trending towards higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate. In addition, projected increases (2006-2050) in mountain pine beetle activity for high-elevation white pine forest will have substantial cascading impacts on subalpine forest ecosystems, leading to outbreaks that can cause changes in forest structure, function, and

composition (Meyer 2013). Climate change effects coupled with prolonged drought could be a potential risk factor by eliminating the moist microsite conditions needed by salamanders.

Stream and spring morphology have been affected by grazing on the forest, but recent grazing practices seem to be allowing for maintenance of current conditions or improvement in most areas. Many springs have been fenced from livestock use, and this is expected to improve function and condition of these springs, this upward trend in these managed springs will improve water quality, although water quantity will show seasonal fluctuations, depending on water sources. Temperatures at the spring source will most likely remain stable as they are influenced by sub-terrain temperatures. It is also expected that even with predicted decrease in water throughout the area due to climate change, springs will persist, but may be the only water sources available for animals and could receive additional impacts from other animals including large ungulates, as other stream sources dry, especially in the White and Inyo mountains. Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology and surrounding vegetation (Gross and Coppoletta 2013). This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

There is no information regarding the proportion of springs that support meadow or non-meadow riparian ecosystems.

Key risk factors arising from non-ecosystem conditions and/or management activities

Kern Plateau salamander occurs in areas of permanent or seasonal surface moisture. Any activities that limit these microsite conditions could negatively affect the species. This includes management activities such as road construction, timber harvesting, fire suppression and habitat degradation through capping of springs or alterations of spring water or habitat. However, on the Inyo National Forest, much of the salamander habitat occurs in designated wilderness, in steep, rocky and inaccessible terrain which may provide a natural buffer from human interactions and management activities. No threats to Kern Plateau salamander habitat were identified for the analysis of the 2009 Motorized Travel Management Project (USDA 2009).

Multiple municipalities, including the Los Angeles Department of Water and Mammoth Community Water District conduct groundwater pumping near the Forest, though wells from these two entities do not occur on Forest lands. Groundwater pumping affects groundwater dependent ecosystems such as meadows, springs and seeps, although the extent of those influences on the Forest is not well documented.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

Although the species is largely restricted to the Kern Plateau and western portions of Owens Valley, it appears to be well distributed throughout its range. Most populations are not imperiled by ongoing threats or known to be declining. However, habitat on the Inyo National Forest may be naturally limited and increased wildland fire events coupled with subsequent flash-floods that scour habitat are potential risk factors. Springs are sensitive water features due to their relative rarity, their small area, and their ecological importance relative to their size. Any activities that disrupt water flow (e.g., water diversions/dams, in-stream mining, stream capping, feral livestock (burros and cattle), upstream water pumping) and climate change and related stochastic events like flooding or drought put spring systems at risk. Persistence of the salamander populations may be closely tied to climate variations that affect their habitat, especially if they experience extreme drying trends, or stochastic events such as flash floods.

Given its endemism, restricted range and susceptibility to stochastic environmental events, there is substantial concern for this species ability to persist on the planning unit and adjacent area. Based upon the evidence and supporting best available science, Kern Plateau salamander meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Fish

California golden trout - *Oncorhynchus mykiss aquabonita*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Hybridization with rainbow trout, competition and predation from non-native trout, grazing, recreation, limited distribution and climate change.

Rationale for California golden trout

California golden trout is listed as G5, globally secure, at the species level (as rainbow trout); however, at the recognized subspecies level it is imperiled (ranked as T1). At the state level for California, the California golden trout is listed as critically imperiled (S1). It is a California species of special concern (SSC) and a species of greatest conservation need (SGCN). It is a Forest Service sensitive species for the Inyo and Sequoia National Forests.

California golden trout are native to Golden Trout Creek (GTC) and the South Fork Kern River (SFKR) in the upper Kern River basin (Moyle 2002). These two stream systems, located in an unglaciated portion of the Sierra Nevada, apparently represent remnants of the first invasion of rainbow trout into the region, and, being isolated, have maintained a distinct evolutionary path (Moyle 2002). They historically inhabited streams in their natural range, but were stocked into lake habitats within the Golden Trout Creek and South Fork Kern River as well as many other habitats throughout the state and country (Moyle 2002, Stephens et al. 2004). The habitat requirements basically follow those for rainbow trout with few exceptions. Among these exceptions is rapid growth at early life stages in order to compensate for the short open water period at the high elevations where they are found. Important habitat elements in streams include cold water, undercut banks, deep water habitats (runs and pools) and streamside vegetation (Matthews 1996, Moyle 2002). Spawning occurs once seasonal peak flows are receding, with redds being constructed in small gravel and coarse sand and at the daily high water temperatures (Knapp and Vredenburg 1996, Stephens et al. 2004). Growth to maturity is slow and the trout is apparently long-lived (Moyle 2002).

The original range of the California golden trout likely extended below the present-day location of Lake Isabella, ranging from 2,600 feet to over 10,000 feet (Stephens et al. 2004). The present extent of this original range is restricted to above Agua Bonito Falls, just upstream of the confluence of Golden Trout Creek and the South Fork Kern River. The waterfall constitutes a barrier to upstream movement by fish, including connectivity between the populations of golden trout in each of the two primary streams containing the fish. The overall range of the golden trout has decreased primarily due to the introduction of non-native fish, mainly brown trout, which displace and predate on the golden trout. Overall numbers may be as low as 5 percent of the original population size (CDFW 2015). Because the range of the trout has been severely reduced and is limited to two watersheds, this distribution makes the California golden trout vulnerable to stochastic events that can lead to localized extirpations or reductions in population size. Smaller populations are subsequently vulnerable to inbreeding which can influence long-term adaptability to changing environmental conditions. Little quantitative information is available to assess population trends, but they appear to be stable according to NatureServe. Knapp and Matthews (1996) reported abundance of the trout in the streams they surveyed to be very high compared to other trout species.

The primary threats to California golden trout is hybridization with rainbow trout and competition and predation by brown trout (Moyle 2002, Stephens, et al. 2004). Hybridization undermines the unique genetic integrity of the golden trout which results in a loss to the gene pool of the species (Stephens et al. 2004). This means the introduced genetic material may not allow the trout to persist as well as those genes with which they evolved. Cordes et al. (2006) found very few individual golden trout that did not have some level of hybridization in the Golden Trout Creek and South Fork Kern River watersheds. As noted, brown trout compete and prey upon the golden trout, even to the point of local extirpations. Brown trout are a desirable game fish and have been frequently encountered above barriers established to exclude them, either by passage at high flow or through angler introductions (Moyle 2002, Stephens et al. 2004). Once populations are established, they are very difficult to easily eradicate and populations of brown trout are downstream of the barriers. California Department of Fish and Wildlife and the Forest Service have worked cooperatively to improve conditions for golden trout including removal of obviously hybrid fish, the establishment of barriers to prevent the upstream movement of fish other than golden trout, and the planting of sterile rainbow trout in popular recreational fisheries in close proximity to occupied golden trout waters (Stephens et al. 2004).

Grazing is another primary threat to the continued existence of golden trout (Knapp and Matthews 1996, Moyle 2002, Stephens et al. 2004), causing impacts to riparian and bank structure thereby affecting the instream habitats the trout rely upon. Livestock impacts to trout habitat, more specifically impacts

associated with overgrazing, have been well studied and documented in literature. Generally, livestock impacts from overgrazing include a reduction in deep water habitats, detrimental sedimentation, reduced stream shading, loss of instream and riparian cover, and alterations in food resources. Under study conditions, riparian and instream habitat elements showed signs of recovery when livestock were excluded (Matthews 1996, Knapp and Matthews 1996). In recent years, grazing intensity (as measured in numbers of animals) has decreased and several grazing allotments have been in non-use status to allow recovery of stream and riparian habitats occupied by the trout (Stephens et al. 2004).

The impact of recreation on the California golden trout is relatively minor; however, human activities can result in impacts to stream and riparian features and the reintroduction of undesirable fish species into occupied golden trout waters. Public education programs have been implemented to increase awareness of conservation issues surrounding the trout.

California Department of Fish and Wildlife's state wildlife action plan listed the California golden trout as vulnerable to climate change. Climate change has the potential to further reduce the range of the California golden trout, primarily through increased water temperatures. Based on recent water temperature monitoring, daily maximum temperatures currently approach the upper thermal limit commonly recognized for rainbow trout (Matthews and Nussle 2014). Matthews and Nussle (2014) used climate change modeling which predicted water temperature increases of 1-7 degrees centigrade. Temperature increases of this magnitude could exceed the thermal maximum for rainbow trout in some streams and reach physiologically stressful levels in other occupied streams. Other commonly acknowledged outcomes of climate change include reduced snowpack and earlier snowmelt (CDFW 2015). Both of these impacts may make streamflow less abundant and reliable and, therefore, more vulnerable to water temperature increases because of reduced volume and duration.

California golden trout is restricted in range to two headwater stream systems in the upper Kern River. In many areas, habitat occurs in degraded meadows characterized by poor riparian and streambank conditions and widened, shallow channels. Water temperatures currently reach physiologically stressful levels and any additional impacts that impact instream and riparian conditions could lead to further detrimental water temperature increases. Further, hybridization with other trout species may be affecting the ability and resilience of the trout to adapt to changing conditions in its natural range.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1-3, 5, 8, 15) the draft biological evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

California golden trout are endemic to the South Fork of the Kern River and Golden Trout Creek, both located in an area referred to as the Kern Plateau in the Golden Trout Wilderness. A hatchery exists in the Cottonwood Lakes drainage which is used to transplant the golden trout into other lakes within the Sierra Nevada Mountains. According to the NRIS aquatic survey database, golden trout are distributed across all four ranger districts on the Inyo National Forest. They occupy all historic habitat within Golden Trout Creek (which is also a critical aquatic refuge) but only occupy about 25 percent of their historic habitat within the South Fork of the Kern River. There is also a population in Mulkey Creek that was transplanted above a natural barrier. Total population size has likely decreased from reference conditions in concordance with decrease in occupied habitat.

Populations of golden trout within Mulkey Meadow indicate densities of fish from three different sections to be relatively high, between 5,336 and 5,667 fish per mile (CDFG 2008). Populations in Golden Trout Creek were estimated at 10.399 fish per mile, Siberian Creek estimated at 5,650 per mile and Stokes Stringer estimated at 3,488 per square mile. Populations appear to fluctuate due to width of the stream and quality of habitat. Other estimates from California Department of Fish and Wildlife in 1987 and 1988 for population estimates in Templeton and Ramshaw meadows indicated population numbers ranged from 3,278 to 7,332 fish per mile. Further data would need to be collected to correlate stream size (width), habitat condition and annual climate conditions to equalize population estimates with current forest management and have a better understanding of trends.

Ecological conditions for this species (see above for additional details)

Key ecological conditions for California golden trout include sufficient water quality (cold water less than 24 degrees C, with pooling habitat/undercut banks and emergent vegetation) and quantity. On the Inyo National Forest, these conditions can be found primarily found in the GTW (196,630 acres) on the southernmost portion of the forest which is known for large, open meadows surrounded by forests of subalpine conifers, red fir, lodgepole pine, and pinyon-juniper.

All perennial flowing stream reaches within the plan area on the Kern Plateau provide physically suitable habitat for California golden trout. This includes approximately 85,000 acres of land, to include approximately 49 miles of reliable perennial stream, within the SFKR watershed and 35,000 acres (39 miles of stream) within the GTC watershed.

The North Fork Kern River and SFKR have been designated as wild and scenic rivers and the Inyo National Forest portion is a ¼ mile wide corridor on the east side of the river approximately 11.5 miles in length. The portion administered by the Inyo National Forest is located within the Golden Trout Wilderness

The Kern Allotment group occurs within the southern portion of the Inyo National Forest within the Sierra Nevada mountain range. Except for a small portion on the Monache Allotment (Monache Meadow), all four allotments in this group occur within the Golden Trout Wilderness.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Water quality on the Inyo National Forest is generally good, due to low population and levels of development. Aquatic habitat integrity within the Inyo National Forest is generally highest in the higher elevation portions of the analysis area and within existing protected areas on public lands. The primary factors contributing to the lowest aquatic integrity scores are road densities and riparian road networks, grazing, mining lands, and canals and diversions. The CAR area for the California Golden Trout is wholly encompassed within a high aquatic integrity, protected area (aquatic integrity score of 0 to -3 (best)) *(*see page 47 in the Assessment).

Stream habitat degradation caused by historical grazing practices may have reduced the suitability of existing habitat, but all historical habitats within the Forest are currently occupied by golden trout (or hybridized golden trout). Two of the four allotments in the Golden Trout Wilderness are active and two have been vacant for twelve years. Recent assessment of this area show that the majority of the sites (46 or 82 percent) rated as Good/Excellent for vegetation, with 10 sites (18 percent) rating as Fair. For watershed condition, 34 sites (63 percent) rated as Fully Functional, 13 sites (24 percent) rated as Functioning at Risk, six sites (11 percent) rated as Degraded and one site (1 percent) rated as Non-functional. All sites that rated as degraded and non-functional occurred in the vacant allotments. Active allotments with Functioning at Risk ratings have had utilization levels adjusted to move conditions in an

upward ecological trend. The Proper Functioning Protocol for stream channel function rated 33 reaches at PFC, 17 rated as Functioning at Risk (FAR) with an Upward Trend, 4 FAR with no apparent trend, three at FAR with a downward trend and 2 reaches were rated as Non-functional. The two Non-Functional reaches include the section of the South Fork Kern River that flows through Monache Meadow. This area experienced a heavy flood event in the early 1980s, leaving sandy exposed banks that have been slow to re-vegetate. The majority of this section is fenced to exclude cattle use.

The projected status of those ecological conditions relative to the species considered

Improvements in grazing management and a decision to rest two grazing allotments (USFS 2001) have improved stream habitat conditions throughout the GTC and SFKR watershed. The SFKR in Monache Meadows is likely the only reach on the Kern Plateau where habitat improvement is questionable. An extensive channel downcutting event occurred in the 1980s and habitat conditions will likely remain poor in this reach for some time. Overall, land use practices, including more appropriate grazing strategies aimed at improving fish habitat and streambank conditions, will continue to be implemented, allowing for an upward trend in California golden trout habitat.

Climate change may have enhanced drying effects on smaller ephemeral ponds and meadows, changing the timing and intensity of snow melt and spring precipitation, and will also continue to put forests at risk for stand replacing fire which can cause sedimentation and negative changes to water quality and flow.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Hybridization and competition with rainbow and brown trout in the South Fork of Kern River is a persistent threat in addition to high levels of endemism which put them at greater risk from stochastic events (e.g., flooding, wildfire, and drought). Hybridization has already occurred to some degree in a majority of golden trout populations, but is kept in check by existing barriers. Additional hybridization may occur within fragmented habitats as pure individuals mate with hybrids, but the degree to which this occurs is unknown. Brown trout prey extensively on golden trout below Templeton Barrier which may result in a severe decline of golden trout in this reach.

Overfishing and heavy grazing were primary stressors in the 19th and first half of the 20th century; however, current cattle management on the forest focuses on restoring the hydrologic and vegetative function of meadows in golden trout habitat. Fishing opportunities and recreation uses are expected to continue and impacts from those activities will continue to occur. Angling opportunities on the Forest do include the chance to catch California Golden Trout in their native habitat of the South Fork Kern River and Golden Trout Creek. A hatchery exists in the Cottonwood Lakes drainage which is used to transplant the Golden Trout into other lakes within the Sierra Nevada Mountains and The California Department of Wildlife is expected to continue this fish stocking program.

It is important to note that these potential threats are all addressed by the Conservation Assessment and Strategy for the California Golden Trout (Stephens et al 2004). Additionally, a Comprehensive Management Plan for the North Fork and South Forks of the Kern Wild and Scenic River was completed in September, 1994 (USDA Forest Service 1994) and provides overall management direction for the Wild and Scenic River.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The California golden trout is an endemic fish species, limited to a small portion of suitable habitat on the Inyo National Forest. While the ecological conditions the trout depends on appear generally stable and or trending in a positive direction based on current management, there is still substantial concern for the species persistence by simple virtue of its rarity coupled with the potential for genetic introgression and competition from non-native fish species. Uncertainty with regard to climate change related effects poses an additional longer term threat. As a result of its rarity and limited distribution, this species is highly susceptible to stochastic events and drying conditions that may result from increasing temperatures and other climate change related disturbance in the future. Its isolated populations put it at further risk for localized extinctions.

The best available scientific information about the California golden trout indicates substantial concern about the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the **California golden trout meets** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Terrestrial Invertebrates

Sierra sulphur - *Colias behrii*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Water withdrawal, restricted distribution, food supply specificity, grazing, conifer encroachment, and climate change.

Rationale for Sierra Sulphur

NatureServe Global Rank: G2G3

NatureServe State Rank: SNR (CA)

IUCN rank: Near threatened

Xerces Red List: None

CA State Status: None

The Sierra sulphur is a high elevation meadow species of butterfly that is endemic to the Sierra Nevada of California. It occurs mainly in meadows over 9,000 feet in elevation (Schoville et al. 2011, Schoville et al. 2012). The range of the Sierra sulphur is restricted to the following counties in California from the north to the south: Tuolumne, Mono, Mariposa, Madera, Fresno, Inyo, and Tulare (Schoville et al. 2011). The collection record for *C. behrii* is relatively well described from a variety of sources. A query of the USGS's BISON database revealed 178 records, Scheingross (2007) reported 110 occurrence records based on museum collections, Garth and Tilden (1963) documented 34 discrete localities in Yosemite National Park, and there are 76 verified occurrences (unknown number of localities) as reported at the Butterflies and Moths of North America (BAMONA) website between 1910 and the present. The BISON query yielded several occurrences from the Inyo National Forest, primarily in the vicinity of Tioga Pass. Schoville (2009) indicated the Sierra sulphur was one of the most common butterflies encountered in alpine and sub-alpine meadows with a few local population sizes exceeding thousands of individuals. However, local population sizes vary considerably throughout the range of the species including several sites with a few hundred individuals, smaller populations in the southern portion of the range, and the largest populations occurring in large, continuous meadows (Schoville 2009).

Adult Sierra sulphur have a single flight period (univoltine) from July to August and characteristically aggregate in large colonies with the number of males greater in the early season and females more abundant later in the flight period (Watt et al. 1977, Schoville et al. 2012). Some life history specifics are poorly known, but it is believed that the adults lay their eggs during the flight period, the larvae feed for a short period, then overwinter by burrowing into the leaf duff only to emerge again the following spring to continue the larval stage before the pupation-emergence cycle begins again (Schoville 2017). As with other alpine butterfly species, populations are frequently regulated by a short seasonal growth period that

is dependent upon temperature and precipitation (snow depth and persistence), periods of drought, and diffuse metapopulations (Watt et al. 1977, Skophammer 2009). Annually, an adequate period of time is required to complete the seasonal life cycle (larvae to adult to egg to larvae). During prolonged periods of cold with persistent snowpack or episodic drought, the development of specific life stages may not be attained (e.g., the adult flight period may not allow for effective reproduction, egg deposition, and larval growth before overwintering) or the larval host plant may not grow sufficiently to support the growth and development of large populations of larvae. However, favorable conditions for larval plant growth can result in rapid population growth (Schoville 2009).

The larvae of *C. behrii* is associated with dwarf bilberry, *Vaccinium cespitosum* (Schoville et al. 2012). In western North America, dwarf bilberry is a high elevation shrub (7,000-12,000' in CA), requiring moist soils that are found in wet and mesic meadows or along waterways and lakes (Tirmenstine 2000). Dwarf bilberry is rhizotomous, it mainly spreads vegetatively by underground "runners", thus making it a fire-adapted species (Tirmenstine 2000). Schoville (2017) has observed that bilberry growing in wet sites provides better larval forage than plants in drier sites, possibly explaining their absence in dry meadows with bilberry.

Genetic work by Schoville et al. (2011) and Schoville et al. (2012) indicates the Sierra sulphur has undergone several prolonged periods of population contraction and expansion corresponding to glacial and interglacial periods, respectively, as evidenced by extremely low genetic variation across all studied populations. However, there is an observed genetic divergence separating northern and southern populations near the relatively low headwaters of the San Joaquin River suggesting a possible isolation of populations on a relatively recent, postglacial timescale (Schoville 2009, Schoville et al. 2012). At present, there is relatively little gene flow between the northern and southern populations (Schoville 2009, Schoville et al. 2012), and the lack of populations in the Mammoth, CA area may prevent dispersal between populations in the 100 years or more (Schoville 2017). In a study of limited scope, Skophammer (2009) did not find any migration between widely spaced metapopulations, possibly reflecting low dispersal ability through a complex matrix of habitats.

Alpine habitats are topographically and vegetatively complex which may limit dispersal between populations (Watt et al. 1977, Roland and Matter 2007, Schoville et al. 2012). Based on values for other Colias species, Schoville (2009) estimates the dispersal distance of *C. behrii* to be approximately 2 kilometers (1.2 miles). For species with limited dispersal ability, topography, geography, or intervening patches of different vegetation can effectively isolate suitable habitat patches from each other, thereby limiting the potential for recolonization of local extirpations or by restricting gene flow (Roland and Matter 2007, Schoville et al. 2012). Dispersal between habitat patches in another alpine meadow species, Parnassius smintheus, with a similar dispersal distance was limited by the presence of intervening forested patches (Roland and Matter 2007).

There is little information about recent population changes. As noted previously, the genetic work by Schoville et al. (2012) indicated a relatively recent geologic expansion in overall population size in the Sierra sulphur. The lack of recent bottlenecks in the populations studied do not indicate inbreeding populations which suggests adequate gene flow between populations and/or populations have sufficient heterozygosity at the scale of the individual site (Schoville et al. 2012). Garth and Tilden (1963) indicated *C. behrii* was abundant in the large Tuolumne Meadow complex, but recent surveys have failed to detect individuals (Schoville 2009). The cause of this loss is unknown; however, it may be due to the degraded condition of the meadow or to other factors that are not understood at present (Schoville 2017). At the scale of the species' range, NatureServe considers the short term population status to be stable, but the long term predictions are unknown.

There appear to be relatively few existing threats to the Sierra sulphur; most of the occupied sites occur in protected areas in National Parks and wilderness areas within lands administered by the Forest Service. However, the Sierra sulphur's reliance on relatively wet meadows indicates that any actions or forces that result in reduced water tables puts the species at risk from short- and long-term habitat loss, both for the host and nectaring plants (Watt et al. 1977). Dwire et al. (2006) and Loheide and Gorelick (2007) describe the link between meadow vegetation patterns and zonation and depth to water table, with wetter riparian species being supported by a higher water table. The water table in alpine meadows is dependent upon multiple factors including depth and persistence of snowpack and access of streamflow to the floodplain.

Numerous meadows in the high Sierra have been degraded in the past from a variety of causes including logging, overgrazing, and railroad and road construction (Loheide and Gorelick 2007, Viers et al. 2013). In many cases, the streams in degraded meadows have incised within the meadow and have associated poor streambank stability, headcuts, lack of riparian vegetation, and other factors that make them vulnerable to further degradation. Within the range of the Sierra sulphur, logging and road construction (including railroads) are no longer occurring and grazing is very limited within the range of the species. In meadows with unstable stream channels, poorly managed livestock grazing (overgrazing) has the potential to further degrade the meadow by maintaining streambank instability, thereby making the meadow vulnerable to continued incision and disassociation with the floodplain (Loheide and Gorelick 2007). Livestock browsing on and trampling dwarf bilberry could inadvertently remove individuals from colonized plants and reduce the amount of vegetation available to caterpillars of C. *behrii*.

Conifer encroachment into meadows and climate change are two other threats to the habitats the Sulphur relies upon (Scheingross 2007). Conifer encroachment has been observed in several high elevation mountainous meadow situations and may be attributed to climatic changes, fire suppression, or grazing (Rochefort et al. 1994, Millar et al. 2004, Halpern et al. 2010). In wet meadows, conditions are generally unfavorable for conifer establishment primarily due to intense competition from obligate meadow species, but as high elevation meadows become drier (for example, periods of drought or lowered water table) and temperatures increase, they become more suitable for conifer encroachment and meadow loss (Millar et al. 2004, Viers et al. 2013). Since the largest populations of the Sierra sulphur are associated with large meadows (and smaller populations in smaller meadows (Schoville 2017)), meadow loss is a threat to the species.

Climate change is potentially the greatest threat to the continued persistence of the Sierra sulphur according to NatureServe. The species is already restricted to the highest elevation meadows in the Sierra Nevada and has a limited amount of upward elevational relief available to utilize if lower elevation sites become unsuitable through climate change impacts. Potential effects include reduced snowpack, earlier melting of snowpack, greater variability in precipitation, and warmer temperatures (Null et al. 2010, Viers et al. 2013). The amount and persistence of snowpack are important variables in maintaining high water tables and wet meadow conditions. The Sierra sulphur is dependent upon meadows with unimpaired hydrology; therefore, any factors that result in a lower water table could affect the habitat elements the species relies upon, especially the larval host plant (dwarf bilberry) and nectaring plants. Dwarf bilberry growing in drier or degraded meadows may not provide the high quality larval food resource that bilberry growing in wet habitats does (Schoville 2017). Specific to the Sierra sulphur, Scheingross (2007) used BIOCLIM and MAXENT models to predict the range of *C. behrii* based on climate change predictions. The modeling predicted a contraction of range, with most of the suitable habitat remaining in the higher, southern portion of the species' range (Scheingross 2007).

Another important climate change consideration for the Sierra sulphur is the synchrony of dwarf bilberry and the larval growth phenologies. Alpine environments typically provide a relatively short window for the completion of the annual life history cycle; therefore, rapid completion of the caterpillar to adult

stages in the early summer increases the chances of successful reproduction given this limited active period. For many butterflies, larval growth depends on the quality of food they consume, and young leaves, being higher in nitrogen and water relative to older leaves, are preferred and promote rapid growth (Coley et al. 2006). Since dwarf bilberry is deciduous, the timing of leaf and plant growth needs to be timed to coincide with the emergence of the overwintering caterpillars to ensure adequate caterpillar growth. If the caterpillars emerge before the plants begin leaf development, or the leaves mature before the caterpillars emerge, the phenological synchrony is disrupted which poses a risk to the developing caterpillars. McLauglin et al. (2002) documented that this type of disrupted synchrony was attributable to the localized extinction of two populations of butterfly in the East Bay of the San Francisco area. In their study, McLaughlin et al. (2002) demonstrated that precipitation variability reduced the overlap between the availability of larval food resources when caterpillars were present, which increased larval mortality thereby driving subsequent population fluctuations which led to the extirpations. This study occurred in an environment where the natural plant community was impacted by habitat degradation.

In summary, the Sierra sulphur is a species endemic to relatively large high elevation meadows with high hydrologic function. The butterfly relies on a single plant species for larval foraging with the highest quality forage provided by early plant growth from plants growing in wet sites. Dispersal between sites is limited by the distance that adults travel, especially in their alpine environment where numerous barriers to dispersal occur. Some large populations occur; however, many of the southern and lower elevation occurrences have lower population sizes. There also appears to be a dispersal barrier connecting northern and southern populations that will influence gene flow among populations within the range of the species. Threats to the species are generally limited, but they live in environments vulnerable to degradation and sensitive to climate change.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

The range of the Sierra sulphur is restricted to the following counties in California from the north to the south: Tuolumne, Mono, Mariposa, Madera, Fresno, Inyo, and Tulare (Schoville et al. 2011). This species is found on the Inyo National Forest, although records are limited to three observations. The northern portion of the range (Mariposa, Mono and Tuolumne counties) appear to be genetically different than the southern portion of the range. For the Inyo National Forest, there appears to be a congregation near Mono Lake and one to the south in Inyo and Tulare counties. Based on an average dispersal distance of 1.2 km, it is highly unlikely that these two populations interact with one another.

Key ecological conditions for this species

The Sierra sulphur is a species endemic to high elevation wet meadows where *Vaccinium cespitosum* occurs. In addition, this species is dependent upon meadows with unimpaired hydrology; therefore, any factors that result in a lower water table could affect the habitat elements the species relies upon, especially the larval host plant dwarf bilberry (*Vaccinium cespitosum)* and nectaring plants.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

The number of large meadows on the Inyo National Forest has not changed significantly in the last decade (USDA 2016); however, composition structure and function has. According to the assessment of the natural range of variation for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also departed from reference conditions in those areas. Researchers sampled 10 randomly selected meadows on the Inyo National Forest as part of a Sierra Nevada study which found vegetation cover and bare ground cover ranged from natural condition to moderately or heavily altered, depending on location. Encroachment (the ingrowth of trees) was the most common impact, with 60 percent moderately impacted and 10 percent slightly impacted.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the forest, they are estimated to cover 3,093 acres on the forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 feet in width) in the remaining subsections, including the Glass and Inyo mountains.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the Forest.

Approximately 300 acres of non-meadow riparian are currently occupied by one or more non-native plant species, while approximately 175 acres of meadow riparian are occupied by one or more non-native plant species.

The projected status of those ecological conditions relative to the species considered:

Long term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program, show that most of those plots (74 percent) are in excellent to good vegetation condition and stable, 5 percent are in excellent to good vegetation condition and trending upward, 14 percent were in good condition with a downward trend, 2 percent were in fair condition and stable, and 5 percent were in fair condition and trending downward. No plots were in poor vegetation condition (Gross and Coppoletta 2013).

Meadows, which depend on snowpack to maintain the water table, will continue to be at risk if the precipitation pattern in the southern Sierra Nevada shifts to more rain than snow (Gross and Coppoletta 2013). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology, and surrounding vegetation (Gross and Coppoletta 2013).This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions. Invasive species will continue to be a primary issue of concern affecting meadow and non-meadow riparian ecosystems in the future. Warming temperatures will potentially influence the establishment and subsequent spread of non-native species in these areas.

Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired condition, 67 were in proper functioning condition and 21 were trending in an upward direction.

Climate change may impact the ecological conditions for this species. Already restricted to the highest elevation meadows in the Sierra Nevada, this species has a limited amount of upward elevational relief available to utilize if lower elevation sites become unsuitable through climate change impacts. Potential effects include reduced snowpack, earlier melting of snowpack, greater variability in precipitation, and warmer temperatures (Null et al. 2010, Viers et al. 2013). The amount and persistence of snowpack are important variables in maintaining high water tables and wet meadow conditions. The Sierra sulphur is dependent upon meadows with unimpaired hydrology; therefore, any factors that result in a lower water table could affect the habitat elements the species relies upon, especially the larval host plant (dwarf bilberry) and nectaring plants.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Water withdrawal or modification and grazing could potentially impact this species habitat.

On the Inyo National Forest where this species is known to occur (Mammoth Lakes Ranger District) grazing was removed from high elevation meadow systems as part of the recovery efforts for the Yosemite Toad. Pack station outfitters are restricted from meadow areas for the same reason.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

The Sierra sulphur is a species endemic to high elevation meadows with strong hydrologic function. The butterfly relies on a single plant species for larval foraging with the highest quality forage provided by early plant growth from plants growing in wet sites. Dispersal between sites is limited by the distance that adults travel, especially in their alpine environment where numerous barriers to dispersal occur. Some large populations occur; however, many of the southern and lower elevation occurrences have lower population sizes. There also appears to be a dispersal barrier connecting northern and southern populations that will influence gene flow among populations within the range of the species.

Climate change may impact the habitat of this species. Any changes in water availability or bloom of the host plant may be restricting the species survival rate. Already restricted to the highest elevation meadows in the Sierra Nevada, there is a limited amount of upward elevational relief available to utilize if lower elevation sites become unsuitable.

The best available scientific information about the Sierra sulphur indicates substantial concern about the species' capability to persist over the long term in the plan area.

Based upon the evidence and supporting best available science, the Sierra sulphur meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Square dotted blue - *Euphilotes battoides mazourka*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Species is only known from one area near Mazourka Peak in the Inyo Mountains. Invasive species, off-road vehicles, and climate change.

Rationale for Square Dotted Blue

NatureServe Global Rank: G5

NatureServe T Rank: T1T2

State Rank: SNR (CA)

Other Designations: None

The species has a spotty distribution from Washington south to Baja California Norte, thence west to southern Colorado and New Mexico. However, this subspecies is found at Badger Flat in Inyo Mountains (Davenport 2016) ranging from 8,000 to 13,000 feet on scree slopes, barren ridges, and pumice fields. Geographically close to *Euphilotes battoides hadrochilus* but phenotypically are strikingly different.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

The species is known from Badger Flat adjacent to Mazourka peak from 8,000 to 13,000 feet elevation.

Ecological conditions for this species (see above additional details):

Key ecological conditions include the food plant *Eriogonum umbelatum subaridum* and the subspecies is univoltine and flies during July (Davenport et. al. 2006). Caterpillar plant host may be various wild

buckwheats (*Eriogonum* species) including coastal buckwheat and sulphur-flower. The larvae feed on the flowers and fruits of *Eriogonum* species. The larvae are tended by ants. The species overwinters in its chrysalids in sand or leaf litter.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

The host plants do occur on the Forest and suitable habitat is available. Species habitat is at 8,000 to 13,000' on scree slopes, barren ridges, and pumice fields.

The projected status of those ecological conditions relative to the species considered:

Scree slopes, barren ridges and pumice fields can be impacted by invasive plants. NatureServe listed cheatgrass may threaten a portion of the population.

Already restricted to the highest elevation in the Sierra Nevada, there is a limited amount of upward elevational relief available to utilize if lower elevation sites become unsuitable.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Impacts to the square dotted blue may arise from human-caused activities that include the use of pesticides and herbicides treating undesirable species and noxious weeds. Off-highway vehicles may enter into this area as there are four-wheel drive trails in and adjacent to Badger Flats and Mazourka Peak. At the top of Mazourka Peak, there is a radio facility. In addition, numerous mines are in its vicinity. Potential of harvesting pumice is of concern if any modification to the host plant or the ants would be at risk.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

The species is known from only one location on the forest. Any modification to the area that could impact the host plant, the ants, or individuals would have a deleterious effect on the species. Climate change could shift the species range up elevation with would eliminate the host plant, the ant, or the butterfly.

The best available scientific information about the square dotted blue indicates substantial concern for the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the Square dotted blue meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Mono Lake checkerspot - *Euphydryas editha monoensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Pesticide Use, lack of fire intervals, conifer encroachment.

Rationale for Mono Lake Checkerspot

NatureServe Global Rank: G5

NatureServe T Rank: T2T3

State Rank: S1S2 (CA); S1 (NV)

Other Designations: Forest Service R5 Sensitive Species

Edith's checkerspot, *Euphydryas editha* is a highly variable species occurring across the western United States, with at least 12 subspecies recognized in California (Crabtree 1998). Populations of subspecies are highly localized and adult butterflies do not disperse much beyond the localized habitats where their larval food plants occur (Baughman and Murphy 1998). Generally, this species is known to occur in wet meadows and pine forests on the east slope of the Sierra Nevada Mountains in Alpine and Mono counties. Mono Lake Checkerspot occur in scattered colonies on the east side of the Sierras in Great Basin Scrub habitat, from east below Sonora Pass to Big Pine Creek Canyon.

Adult male Edith's checkerspot butterflies have been observed drinking water from puddles and both sexes take nectar from a variety of mostly low-growing flowers (Shapiro 2011), but will also take nectar from yellow pincushion (*Chaenactis glabriuscula*), Yerba Santa (*Eriodyctyon californicum*), milkweeds (*Asclepias* spp.) and coffeeberry (*Rhamnus rubra*). The preferred larval host plant is blue eyed Mary *Collinsia parviflora*. Secondary larval host plants include *Penstemon heterodoxus* and *Plantago lanceolata.* Other potential foodplants include *Penstemon rydbergii* and possibly *Castilleja* species.

Adults of the Mono Lake checkerspot butterfly fly from late April to early July (Davenport et al. 2006, Austin & Murphy 1998). This butterfly may appear very early in the season when snow remains under fir trees and on protected north- and east-facing slopes.

Miller and Hammond (2007) provide some general guidelines on how to manage habitats occupied by Taylor's Checkerspot, *Euphydryas editha taylori*, a closely related subspecies: Creation and maintenance of suitable habitat for this species requires periodic disturbance from ground fires or thinning of encroaching trees and shrubs to establish open habitats. Maintenance of the Indian paintbrush food plants in natural meadow and prairie habitats is particularly important. This species is highly vulnerable to extermination during insecticide spray programs for insect pests in either forest or rangeland ecosystems. Miller and Hammond (2007) identified the critical importance of low and sparse vegetation for *E.e. taylori*, since the caterpillars appear to require solar basking near the soil surface in late winter and spring for successful development.

There are historical records for the Mono Lake checkerspot butterfly from over 20 years ago, which indicate that this subspecies was found in the Humboldt-Toiyabe National Forest. However, no more current records or observations are known. The subspecies historically occurred in Nevada in Carson City, Douglas, Lyon and Washoe counties. Austin & Murphy (1998) concluded that the populations around Mono Lake in Mono County may have been extirpated. In Biodiversity Information Serving Our Nation (BISON) database, there are location on the near the Inyo National Forest near Mono Lake in Mono County, thus the species is not extirpated.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, Chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

Mono Lake checkerspot was previously described as having potentially been extirpated. Dr. Kenneth Davenport provided updated information about his collection of 20 specimens from 1979 to 2014, many of which came from the Inyo National Forest, but the exact number is unknown (Davenport 2016, pers. comm). One record also exists on the Inyo and is documented in Butterflies and Moths of North America (www.butterfliesandmoths.org/sighting_details/476786); however, no photograph was included with the record. The range extent is from eastern slope of Sierra Nevada, from Bishop, CA to Schneider Meadow, near Carson City, NV; from pinon-juniper woodland, meadows, mountain slopes; host may be *Collinsia parviflora* based on association of adults.

Ecological conditions for this species (see above additional details):

Generally, this species is known to occur in wet meadows and pine forests on the east slope of the Sierra Nevada Mountains in Alpine and Mono Counties (Schlick 2015). Host plant may be *Collinsia parvifloria* based on association of adults (NatureServe 2017).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

The number of large meadows on the Inyo National Forest has not changed significantly in the last decade (USDA 2016); however, composition structure and function has. According to the assessment of the NRV for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also departed from reference conditions in those areas. Researchers sampled 10 randomly selected meadows on the Inyo National Forest as part of a Sierra Nevada study which found vegetation cover and bare ground cover ranged from natural condition to moderately or heavily altered, depending on location.

Encroachment (the ingrowth of trees) was the most common impact, with 60 percent moderately impacted and 10 percent slightly impacted.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Forest; they are estimated to cover 3,093 acres on the Forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 ft. in width) in the remaining subsections, including the Glass and Inyo mountains.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the Forest.

Approximately 300 acres of non-meadow riparian are currently occupied by one or more non-native plant species, while approximately 175 acres of meadow riparian are occupied by one or more non-native plant species.

The projected status of those ecological conditions relative to the species considered:

Long term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program, show that most of those plots (74 percent) are in excellent to good vegetation condition and stable, 5 percent are in excellent to good vegetation condition and trending upward, 14 percent were in good condition with a downward trend, 2 percent were in fair condition and stable, and 5 percent were in fair condition and trending downward. No plots were in poor vegetation condition (Gross and Coppoletta 2013).

Meadows, which are depend on snowpack to maintain the water table, will continue to be at risk if the precipitation pattern in the southern Sierra Nevada shifts to more rain than snow (Gross and Coppoletta 2013). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology, and surrounding vegetation (Gross and Coppoletta 2013).This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions. Invasive species will continue to be a primary issue of concern affecting meadow and non-meadow riparian ecosystems in the future. Warming temperatures will potentially influence the establishment and subsequent spread of non-native species in these areas.

Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired condition, 67 were in proper functioning condition and 21 were trending in an upward direction.

Climate change which could shift conifer species upward into non-conifer areas would be a threat to this species

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Impacts to the Mono Lake checkerspot may arise from human-caused activities that include the use of pesticides treating invasive species. The habitat being meadow and or grassland associated, it is key to allow fire to keep the vegetation species intact and reduce conifer encroachment.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

Mono Lake Checkerspot is an endemic butterfly that ranges from Sonora Pass to Mono Lake. Species have been recently documented on the Inyo National Forest, where a portion of the population was once thought extinct at Mono Lake. Due to its narrow distribution, *there is substantial concern about this species ability to persist in the plan area.* Based upon the best available science, the Apache fritillary does meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Boisduval's blue - *Plebejus icarioides inyo*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Pesticides for removal of invasive species, recreational development, mining, and road building.

Rationale for Boisduval's Blue

NatureServe Global Rank: G5

NatureServe T Rank: T1T3

State Rank: SNR (CA)

Other Designations: None

Plebejus icarioides has a wide distribution with occurrences from British Columbia east to the western edge of the Great Plains, south to New Mexico, Arizona, southern California, and Baja California. Generally, this species is found in forest clearings and edges, prairie, sagebrush, chaparral, coastal dunes, fields.

Many of the subspecies of *Plebejus icarioides,* blues, are rare to their known locality and do separate by species even at a puddle (Shapiro 2017). From Shapiro (2017), *Plebejus icarioides* has one brood, from April through June at Gates Canyon, and from June through August (rarely later) at higher elevations. Their host plants are many species of perennial lupines, but tend to have the preferred species varying by locality. Adults visit a great variety of flowers, including Pink Pussy Paws, Wild Buckwheats, Composites and the like. In Sierra Valley, they can often be found with the host plant far out in sagebrush steppe, where nothing (or nothing but lupine, which they do not use as a nectar source) seems to be in bloom.

Very little is known about subspecies *Plebejus icarioides inyo*. They are considered widespread in the Inyo Mountains.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit.

Annual surveys from 2005 to 2012 have a total of 1145 recorded detections of this species throughout the Inyo Mountains (Schlick 2015). Sightings of Boisduval blue in the Inyo Mountains occur all the way to 2016 in the Biodiversity Information Serving Our Nation (BISON) database. The Inyo Mountains are the only known location for this subspecies.

Ecological conditions for this species (see above additional details)

The species only occurs in the Inyo Mountains. Although the species is wide ranging, most of the subspecies are specific to localized areas.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The Inyo Mountains do have the host plants of lupines, as well as nectar plants. Limiting factors appear to be location.

The projected status of those ecological conditions relative to the species considered

Habitat that includes lupine and nectar species is projected to persist throughout the planning unit.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities

Invasive plant species such as cheatgrass may threaten an unknown proportion of the population, especially in areas where cheatgrass limits the establishment and persistence of native plant species. Any use of pesticides to remove invasive species could inadvertently impact the lupine or other nectar plant species. Other activities that could bisect or remove area suitable habitat include recreation development, mining, and road building. Recreation is expected to increase over time.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The species is only known on the Inyo Mountains. Although the species appears to be utilize Lupines and numerous nectar plants, the subspecies is unique to the Inyo Mountains, thus there must be a specific ecological condition in the Inyo Mountains for this species. Threats to the area include pesticide use to remove invasive species, recreational developments, mining and road building. *Best available science does indicate a substantial concern about the species' capability to persist over the long term in the plan area.*

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San Emigdio blue - *Plebulina emigdionis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Invasive species, fires, unauthorized OHV use, road expansion, agricultural and urban development.

Rationale for San Emigdio Blue

NatureServe Global Rank: G2G3

NatureServe T Rank: None

State Rank: S1S2

Other Designations: Forest Service R5 Sensitive Species

San Emigdio blue butterfly *(Plebejus emigdionis)* has a limited distribution with collection records from the southern San Joaquin Valley and Mojave Desert south to the Victorville area. Known populations are from only about a dozen locations which are isolated from one another. The San Emigdio blue butterfly has been found on the Angeles, Inyo, Los Padres, San Bernardino, and Sequoia National Forests.

Isolated populations occur in the Owens Valley and it has been reported from Inyo, Kern, Los Angeles, San Bernardino and Ventura counties (Davenport 2004, Emmel and Emmel 1973, Garth and Tilden 1986). It has been collected along the Mojave River near Victorville (north of the San Bernardino National Forest). Isolated colonies have been reported from Bouquet and Mint Canyons near Castaic, in canyons along the north side of the San Gabriel Mountains near the desert's edge, and in arid areas south of Mount Abel near San Emigdio Mesa (Emmel and Emmel 1973, Murphy 1990). The most concentrated area is around Sand Canyon and Lake Isabella. Pratt (2011) reports concerns of each of the populations are gradually being lost.

Penrod *et al.* (2002) and Stephenson and Calcarone (1999) state that the San Emigdio blue populations have been in decline due to urbanization near Victorville and along the Mojave River.

San Emigdio blue butterfly *Plebejus emigdionis* is a rare and localized species. Populations are generally localized along perennial and intermittent streams. Typical occupied habitats are along dry river beds, intermittent streams and adjacent flats.

The San Emigdio blue butterfly requires an ant (*Formica pilicornis)*, a scale species (*Ceroplastes irregularis)*, and one of three *Atriplex* or shadscale plant species (*Atriplex lentiformis, A. cannescens,* and *A. polycarpa*). *Atriplex canescens* is the most important. The presence of the scale is the most critical

variable. Without the scale, the ant is not present which protects the larvae against parasitism (Pratt 2011). Pierce *et al.* (2002) describes the importance of ant/larval dependence for many species in this family of butterflies. Typically, the larva produce honeydew harvested by ants and the ants protect the larva from predators.

Limited range is partly due to symbiotic relationship with ant species *Formica pilicornis*. The host plant, *Atriplex canescens*, is widespread, the distribution of the butterfly is much more localized and may indicate that other factors are important in habitat suitability (Emmel and Emmel 1973; Stephenson and Calcarone 1999).

The largest threat to this species is urbanization and habitat loss. A general threat to butterflies, especially rare butterflies, is that of collectors. Disturbances and destruction of habitat as a result of fire suppression activities (dozerlines, handlines, staging, etc.), road maintenance activities, and illegal off-highway vehicles are the threats to this species and its habitat.

The effects of climate change on butterfly populations are difficult to assess but it is likely that changes in temperature extremes and precipitation could affect host availability and thus affect butterfly population viability. More information on the status and ecological requirements of these populations are required in order fully assess potential threats.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

This butterfly is rare and localized species ranging from 3,000 ft to 5,000 ft elevation in washes and alluvial fans (Schlick 2015). Only known locations occur in the southern portion of the Inyo National Forest in the desert scrub habitats that include desert saltbush species (Atriplex) and associated scale insects and ants. Ecological conditions for this species (see above additional details)

Key ecological conditions for this species include the presence of the ant species *Formica pilicornis*, in which this butterfly has a symbiotic relationship. Other key habitat features include shadescale scrub in desert canyons and near washes and where the host plant species (*Atriplex*) occurs.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The key ecological conditions are very limited for this species on the Inyo National Forest.

The projected status of those ecological conditions relative to the species considered:

The potential expansion of Highway 395 can potentially fragment the existing ecological conditions since it is very localized.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Habitat is subject to destruction due to agricultural and urban development.

The potential expansion of Highway 395 can potentially fragment the existing ecological conditions since it is very localized. The population at Cartago is unique, and is in great danger of being exterminated if and when Highway 395 is widened at that point. The larval foodplant at Cartago is *Atriplex polycarpa* which is unusual because vast areas of desert are covered with *A. polycarpa* yet *emigdionis* is not found in these areas. At Cartago, the butterfly is able to use the *A. polycarpa* because it is heavily infested with a scale insect which in turn is heavily tended by ants, and the ants also protect the *emigdionis* larvae. Without the ants, *emigdionis* could not survive. There are also possibly hydrologic factors at the Cartago site which make it favorable for the *emigdionis* larvae which spend most of their time on the *Atriplex* trunks just below soil level (Schlick 2015).

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

Impacts to the San Emigdio blue habitat may arise from human-caused activities that include the use of pesticides and herbicides treating undesirable species and noxious weeds.

This butterfly is rare and localized (i.e., only known locations occur in the southern portion of the Inyo forest in the desert scrub habitats that include desert saltbush species (*Atriplex*) and associated scale insects and ants) due in part to its symbiotic relationship with the ant species *Formica pilicornis*. This symbiotic relationship paired with potential habitat fragmentation or loss due to agricultural and urban expansion impact this species ability to persist. *As a result, there is substantial concern for this species' ability to persist on the planning unit.*

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Apache fritillary (Apache silverspot butterfly) - *Speyeria nokomis apacheana*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Wildfire, water diversions, invasive species, and loss of thistle.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: T2

State Rank: SNR (CA); S2 (NV)

Other Designations: Forest Service R5 Sensitive Species

Apache silverspot butterfly, *Speyeria nokomis apacheana,* is found on the east slope of the Sierra Nevada Mountains in Alpine, Inyo and Mono counties where it occurs in marshes and wet meadows near springs, seeps and riparian areas (Fleishman et al 2002, Britten et al. 2003). The larval food plant is the violet *Viola nephrophylla*. Typical habitats where Apache silverspot adults may be observed from late July to early September (Emmel and Emmel 1973, Davenport et al. 2006) are mountain meadows, forest openings and exposed rocky ridges. Since these habitats are highly localized, minimal migration occurs between populations.

There are records from the Inyo, Stanislaus and Humboldt-Toiyabe National Forests, although the Stanislaus location is thought to be wind-blown and not localized in that location. Biodiversity Information Serving Our Nation (BISON) database has 43 locations for this species, but only 14 are georeferenced. Of the records showing, Apache silverspot is found in the Owens Valley, off the national forest, and on the Humboldt-Toyabe National Forest. Most were museum collections from the 1990.s.

The Apache silverspot butterfly represents a member derived from basically a desert fauna that has been in retreat since the drying trend began at the end of the Pleistocene Epoch about 1.5 million years ago (Shapiro 1996).

Fleishman et al (2002) developed a logistic regression model to identify environmental variables, listed in order of importance, that were most strongly associated with the occurrence of Apache silverspot butterflies. They also observed that bull thistle *Cirsium vulgare* tended to be present in colonized patches.

Patches that went extinct were in close proximity to other extirpated sites, lacked the lavender thistle *Cirsium neomexicanum*, and had a higher percent cover of live vegetation and litter. Presence of both *Carcuus nutans* and *Cirsium scariosum* thistle species had no significant association with the presence of Apache silverspot butterflies.

The violet food plants and habitat of the Apache silverspot butterfly are susceptible to destruction from wildfire (Shapiro 1996), water diversions such as in the Owens Valley (Hammond and McCorkle 1983), grazing (Fleishman et al. 2002), or other activities that alter riparian vegetation. Habitat for the Oregon silverspot butterfly *S. zerene hippolyta* includes meadows along the Oregon coast. It was compromised when fire was excluded, allowing encroachment by trees and accumulation of grass thatch that smothered violet food sources (Hammond and McCorkle 1983). Occurrences of the violet species associated with this butterfly should be identified and protected.

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

Only known locations occur in Round Valley, Inyo County and Mono Lake area (NatureServe 2017).

Ecological conditions for this species (see above additional details)

The Apache silverspot butterfly occurs on the east slope of the Sierra Nevada Mountains and inhabits marshes and wet meadows near springs, seeps and riparian areas. Larval plant is *Viola neprhropylla*. Based on the work by Fleishman et al (2002), presence of bull thistle *Cirsium vulgare* tended to be present in colonized patches, as well as the importance of the lavender thistle *Cirsium neomexicanum*.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The number of large meadows on the Inyo National Forest has not changed significantly in the last decade (USDA 2016); however, composition structure and function has. According to the assessment of the natural range of variation for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also departed from reference conditions in those areas. Researchers sampled 10 randomly selected meadows on the Inyo National Forest as part of a Sierra Nevada study which found vegetation cover and bare ground cover ranged from natural condition to moderately or heavily altered, depending on location. Encroachment (the ingrowth of trees) was the most common impact, with 60 percent moderately impacted and 10 percent slightly impacted.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Forest, they are estimated to cover 3,093 acres on the forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 ft. in width) in the remaining subsections, including the Glass and Inyo Mountains.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the Forest.

Approximately 300 acres of non-meadow riparian are currently occupied by one or more non-native plant species, while approximately 175 acres of meadow riparian are occupied by one or more non-native plant species.

The projected status of those ecological conditions relative to the species considered:

Long term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program, show that most of those plots (74 percent) are in excellent to good vegetation condition and stable, 5 percent are in excellent to good vegetation condition and trending upward, 14 percent were in good condition with a downward trend, 2 percent were in fair condition and stable, and 5 percent were in fair condition and trending downward. No plots were in poor vegetation condition (Gross and Coppoletta 2013).

Meadows, which are depend on snowpack to maintain the water table, will continue to be at risk if the precipitation pattern in the southern Sierra Nevada shifts to more rain than snow (Gross and Coppoletta 2013). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology, and surrounding vegetation (Gross and Coppoletta 2013).This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions. Invasive species will continue to be a primary issue of concern affecting meadow and non-meadow riparian ecosystems in the future. Warming temperatures will potentially influence the establishment and subsequent spread of non-native species in these areas.

Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired condition, 67 were in proper functioning condition and 21 were trending in an upward direction.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Loss of meadows and riparian habitat due to changes in water levels, diversions, grazing, meadow drying and conifer encroachment, snow pack and changes in spring precipitation related to climate change. According to Fleishman et al (2002), loss of the violet, lavender thistle or bull thistle due to using pesticides for other species, would be a major threat to the species.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

The Apache Silverspot is known from a small distributional range and is thought to be from a range contraction since the Pleistocene. There are few known locations on the Inyo National Forest. Due to the concerns about the loss of violet or thistles and the few known locations on the forest, t*here is substantial concern about this species ability to persist in the plan area.* Based upon the best available science, the Apache fritillary does meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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A cave obligate pseudoscorpion - *Tuberochernes aalbui*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant Threats to Species

Environmental conditions of cave, if changed could extirpate this species only known location.

Rationale for Species

NatureServe Global Rank: G1G2

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

Representatives of Tuberochernes are presently known only from caves at moderately high elevations.

The widely separated and restricted localities of the two species in this genus *T. aalbui* in California and *T. ubicki* in Arizona strongly suggest that these species are relicts of a formerly widespread ancestral population, fragmented by desertification in the intervening areas. It will not be surprising if additional representatives of this genus are found in other montane or subterranean refugia in California and Arizona. (Muchmore 1997). In Biodiversity Information Serving Our Country (BISON) database, only two locations are noted but not georeferenced for the Genera.

This species type locality is from Poleta Cave, Westgard Pass, Inyo-White Mountains, Inyo County, California, at about 2200 m elevation. This location is on the Inyo National Forest and is behind a locked gate (R. Aalbu Pers. Comm. 2017). An additional endemic species, the beetle *Ptomophagus inyoensis* is also endemic to this cave (R. Aalbu Pers. Comm. 2017) but has no ranking in NatureServe (2017).

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

The only known location is Poleta Cave, Inyo National Forest (Muchmore 1997). The cave is gated and locked.

Ecological conditions for this species (see above additional details)

The species is only known to live in this Poleta Cave.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The cave is gated and the microconditions of the cave are not well known.

The projected status of those ecological conditions relative to the species considered:

The cave was gated previous to the 1988 discovery of this species. If environmental conditions change in the cave, then ecological conditions may be impacted.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Recreation or potential mining use could impact this species.

A summary of the overall at-risk status along with a conclusion as to whether or No**t the species was considered at risk for persistence on the planning unit:**

Tuberochernes aalbui is a local rare endemic only known from one cave thus there is substantial concern about the species' capability to persist over the long term in the plan area.

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Aqautic Insects

Owens Valley springsnail - *Pygulopsis owensensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Groundwater pumping, water diversion, livestock grazing, climate change, and habitat specificity.

Rationale for Owens Valley springsnail

NatureServe Global and Taxa (subspecies) Rank, if applicable: G1

NatureServe State Rank: S1S2 (CA)

CA State Status: None

Other Designations: Forest Service sensitive

Little specific information is available about the Owens Valley springsnail. It was described in 1989 based on specimens collected in the Owens Valley, California. The springsnail is known from ten localities according to CNDDB (2017), including two localities on the Inyo National Forest. It is very closely associated with springs with relatively high conductivity water supplied by the Owens Valley aquifer (USGS 1998). Little is known about population size changes in the Owens Valley springsnail, but the habitats have likely remained stable over the short-term. One surveyed spring had snail densities

approaching 1 snail per square centimeter (USFWS 1998); however, the area of the spring occupied by snails was not stated and a total population size could not be estimated. Springsnails can also occur in very high abundances where found making slight changes in population size difficult to detect (Sada and Herbst 2001).

Given the lack of information regarding *P. owensensis*, there is a considerable amount of information known about snails in the genus *Pyrgulopsis* which allows for an adequate synthesis of information applicable to *P. owensensis*. Springsnails, including the Owens Valley springsnail, are in the family Hydrobiidae and are also known as "microsnails" due to their extremely small size (usually only 1-8 millimeters long). The genus was comprised of relatively few species prior to the 1980's, but field examinations began to reveal an exceedingly diverse level of speciation. Since that time, there are descriptions of well over 100 species in the western US, mainly in the Great Basin with many as yet unrecognized species (Hershler 1998, Liu, et al. 2003). Spring habitats in the Great Basin, one of the driest places in North America, provide very unique aquatic habitats, especially because they are relatively isolated from each other by large areas of unsuitable habitats for snail dispersal (Hershler 1998, Hershler and Pratt 1990, Sada and Herbst 2001, Liu, et al. 2003). As such, many species of *Pyrgulopsis* are restricted to very few, if not a single, springs though some species show a much broader distribution (Hershler 1998). Springs are typically low diversity ecosystems at an individual scale, but are quite diverse when combined as habitats on a broader scale (Sada and Herbst 2001). Springs generally have consistent flow and temperature because they have a more integral connection with groundwater. As a result, they serve as refugia during periods of climatic drying especially as demonstrated in the Owens Valley/Death Valley area over the last 10,000 to 15,000 years (Hershler 1989, Hershler and Pratt 1990, Sada and Herbst 2001).

The aquifer of the Owens Valley is primarily supplied by runoff from the Sierra Nevada snowpack (USGS 1998). Springs and seeps in the Owens Valley are typically found near the toes of alluvial fans from the east slope of the Sierra Nevada, along the edges of volcanic deposits, and in areas of geologic faulting (USGS 1998). Groundwater withdrawals are perhaps the greatest threat to spring flows (Sada and Herbst 2001). Most of the flow leading into the area that used to be Owens Lake is now diverted for domestic use to the Los Angeles area. The diversion of water makes the aquifer that supplies the springs more vulnerable to excessive withdrawal (USGS 1998). USGS (1998) discussed the extent of past spring flow reductions during periods of high groundwater extraction, and modeled the potential impact to groundwater levels under different future extraction scenarios. In general, the effects of reduced discharge on springs are primarily observed when in close proximity to the groundwater wells and there are few wells on the east side of the Owens Valley where most of the occupied *P. owensensis* springs occur. However, the modeled drop in groundwater on the east side of the valley suggests that spring flow is vulnerable to change.

Water diversion from springs is also a threat to the Owens Valley springsnail (Sada and Vinyard 2002). Any changes in streamflow, particularly if water is extracted from the point of emergence or a constructed springbox can reduce the amount and extent of downstream suitable habitat (including thermal characteristics) and possibly habitat heterogeneity (Sada and Herbst 2001). Springsnails are frequently concentrated near spring sources with declining density downstream (Hershler and Sada 2002); therefore, changes in flow at the spring source could have greater consequences than diversions lower down in a spring system. Livestock grazing has been observed at many sites occupied by springsnails (Sada and Herbst 2001, Sada and Vinyard 2002). However, there is little information available that suggests livestock use of springs adversely impacts springsnail habitat with the exceptions of diversion of water that is not returned to the spring run and the construction of spring boxes at the head of the spring for diversion purposes (Sada and Herbst 2001). Hershler and Sada (2002) indicate springsnails require hard

substrates for egg deposition and foraging, so if excessive grazing, or any other factor, creates conditions where hard substrates are inundated by soft sediments, suitable habitat could be detrimentally impacted.

As noted, the underlying hydrology of the springs occupied by the Owens Valley springsnail is driven largely by the aquifer in the Owens Valley, including significant contributions from snowmelt in the Sierra Nevada. If climate change results in reduced snowpack or changes in runoff that affect groundwater recharge, there could be a reduction in water available for spring flow from the aquifer.

The Owens Valley springsnail has a very limited distribution in the Owens Valley, California where it is known from very few localities. These localities are springs that are sensitive to disturbance, especially impacts at the point of origin. The known threats are relevant to the continued persistence of the species in many locations, with the same impacts resulting in extirpations of entire species in other locations. Populations are apparently stable presently and the known distribution of the species has not changed.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

The Owens Valley springsnail is known from only ten localities according to CNDDB (2017), including two localities on the Inyo National Forest. It is very closely associated with springs with relatively high conductivity water supplied by the Owens Valley aquifer (USGS 1998). The species is found along escarpments of the White and Inyo mountains on the east side of the Owens Valley.

This species is considered very small and categorized as a micro-snail (1mm to 8mm in shell width), thus, detection can be extremely difficult. For this particular species, individuals can more readily detected due to their nature of piling up on to one another or can also be found in clusters.

Ecological conditions for this species (see above additional details):

This species occurs in small springs and spring runs, on watercress (*Rorippa*), travertine deposits or stones in the foothills of the eastern Sierra Nevada Mountains. This species co-occurs with Wong's springsnail (*P. wongi*) at Batchelder Springs (Krueger 2016).

Key ecological conditions for springsnails typically include cold spring water sources with perennial flow.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

Water quality on the Inyo National Forest is generally good, due to low population and levels of development. Aquatic habitat integrity within the Inyo National Forest is generally highest in the higher elevation portions of the analysis area and within existing protected areas on public lands. The primary factors contributing to the lowest aquatic integrity scores are road densities and riparian road networks, grazing, mining lands, and canals and diversions.

Each population of snail is endemic to the spring it inhabits, and since these snails are obligatory aquatic throughout their entire life, they cannot disperse to other springs, nor can springs where snails have been extirpated be re-colonized.

The projected status of those ecological conditions relative to the species considered

Projected status of these ecological conditions relies on maintaining the micros-site conditions at the perennial water source. Activities such as grazing or water diversion projects may degrade or eliminate the habitat.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Not applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Historically, there were major impacts to habitats occupied by this species from grazing, and water diversions for mining operations. Water impoundments degrade habitats because this snail requires perennial water. Excessive sedimentation from a variety of activities such as logging, mining, road and railroad grade construction, and grazing may smother substrates causing death by preventing feeding and movement, and obstructing gills (Hovingh 2004, Vannote and Minshall 1982, Webb et al. 2008, Bettaso and Goodman 2010).

Additionally, water quality (temperature) and climate change are considered key risk factors for this species.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

The Owens Valley springsnail is a restricted endemic, with only two known locations on the forest. There is substantial concern for the species persistence due to its rarity and restriction to cold perennial seeps and springs. As a result of this rarity and its limited distribution, this species is also highly susceptible to stochastic events and drying conditions resulting from increasing temperatures and events related to climate change. Activities that reduce water flow can greatly impact this species. In addition, extremely limited dispersal ability of this species and isolated populations put it at further risk for localized extinctions.

The best available scientific information about the Owens Valley springsnail indicates substantial concern about the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the Owens Valley springsnail meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Western pearlshell - *Margaritifera falcata*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Habitat modification, water quality degradation, and climate change.

Rationale for Western pearlshell

NatureServe Global and Taxa (subspecies) Rank, if applicable: G4G5

NatureServe State Rank: S1S2 (CA), Nevada (SNR);

Xerces Red List Rank: Vulnerable

CA State Status: Species of Greatest Conservation Need (SGCN)

The western pearlshell has a broad geographic distribution extending from California north to Alaska and inland to Idaho, Montana, Nevada, and Wyoming. They are most abundant in Idaho, Oregon, Washington, and British Columbia, Canada (Jepsen, et al. 2012). The pearlshell most commonly inhabits cool to cold rivers, but can also be found in smaller, cold headwater streams. They typically occupy areas with low velocities, low shear stress, low gradients, and stable substrates (Vannote and Minshall 1982, Toy 1998, Howard and Cuffey 2003, Stone, et al. 2004). Spatial distribution of the mussel reflects these habitat requirements and is non-uniform and aggregated in occupied streams with aggregations, also known as mussel beds, consisting of hundreds of individuals per square meter (Murphy 1942, Toy 1998).

Reproduction in freshwater mussels typically involves the female siphoning water containing sperm into the body where the eggs are fertilized. The eggs are moved into specialized structures called marsupia where they develop into tiny immature mussels called glochidia. In *M. falcata*, glochidia are released *en masse* in thousands of glochidial "packets" (called conglutinates) during a short period time, usually when the water is warming in late spring (March to July). Conglutinates resemble decaying fish tissue (O'Brien, et al. 2013) which is apparently consumed by fish which serve as an intermediate host for the development of the glochidia. All freshwater mussels require a fish host to reproduce and disperse, and salmonids (trout and salmon) are the primary species which serve this role for the western pearlshell (Jepsen, et al. 2012). The glochidia prefer to attach themselves to the gills of the host fish where the blood of the host allows for rapid growth and development. Once the glochidia develop into a juvenile mussel, they drop off of the host and begin an independent life in the streambed; however, mortality at this stage is exceedingly high. Once an individual is successfully dropped onto the substrate, it exists by siphoning water into the body to extract suspended materials which serve as a food source. Under certain circumstances, females can produce glochidia hermaphroditically which likely allows them to persist in newly colonized areas or when population density is so low that there is limited viable sperm in the water column.

Individuals can live up to 100 years (Toy 1998). Many populations of the western pearlshell appear to be stable, based on the continued presence of individuals in historic locations. However, many of these populations are no longer recruiting new individuals or the recruitment levels are very low and, in some cases, die offs have been observed (Howard and Cuffey 2006, Hastie and Toy 2008, Howard 2008, Jepsen, et al. 2012). NatureServe (2017) has a comprehensive description of the range-wide declines that have been documented. With the exception of few coastal streams that are not impaired by impoundments, population declines have occurred extensively in California (Howard and Cuffey 2006, Howard 2008, Howard 2010, NatureServe 2017).

Because the western pearlshell is a long-lived animal, it is an excellent indicator of habitat quality over long periods of time. They are sensitive to changes in habitat, including changes in water temperature, substrate stability, sedimentation, presence of fish host, and possibly bioaccumulation of contaminants (Brim Box and Mossa 1999, Vannote and Minshall 1982, Helmstetler and Cowles 2008, Jepsen, et al.

2012, Meyer, et al. 2016). Impoundments have probably had the greatest impact on *M. falcata* populations because hydropeaking water releases interrupt streamflow patterns (including timing, volume and temperature), channel morphology, and influence the presence and density of host fish species. Many types of channel alteration can affect the stability of the streambed where mussels occur including suction dredge mining, gravel extraction, and channel dredging. If these activities occur in or in close proximity to pearlshell beds, the streambed may become unstable and detrimental changes to the channel can occur with effects to water velocity, water depth, and protection from increased shear stress. Availability of the host fish species is also critical for the long-term survival of the pearlshell. Howard and Cuffey (2006) suggested the decline in mussel reproduction in the Navarro River, California corresponds to the collapse of the anadromous salmon fishery in the river. Because clear, cold water is a key habitat element required by the pearlshell, climatological changes that result in reduced streamflow, increased water temperatures, or both, may result in a further reduction in suitable habitats for the mussel or appropriate fish hosts. California Department of Fish and Wildlife cited vulnerability to climate change as the reason for listing as a SGCN.

Other changes in habitat quality include the presence of contaminants, including excessive sediment. Naturally occurring and gold mining related mercury are biological contaminants that occur within *M. falcata's* range in California. Bettaso and Goodman (2010) and Helmstetler and Cowles (2008) found elevated levels of mercury in western pearlshell tissues; however, those levels were an order of magnitude lower than a toxicity threshold (no observable effects concentration) for the mussel. The western pearlshell is also known to bioaccumulate other toxins, including those associated with past and present day pesticide applications (Helmstetler and Cowles 2008, Meyer, et al. 2016). Pesticide use in California's Great Central Valley has been associated with amphibian declines and some chemicals used have been found in sediments and animal tissue (Datta, et al. 1998, Davidson and Knapp 2007, Bradford, et al. 2011). Excessive sediment is also a contaminant to habitat quality and has been associated with freshwater mussel declines. Vannote and Minshall (1982) and Howard and Cuffey (2006) attributed increased sediment with declines in *M. falcata*, implicating in-channel dredging, logging, and livestock use in the affected watersheds.

The western pearlshell has a broad distribution; however, it is in decline in most of its range and has been extirpated from many known localities. The causes for these declines are unclear, but have been associated with anthropogenic changes to habitats that either influence physical habitat features or the fish hosts that the mussels rely upon for successful reproduction. Reproduction is limited or absent in many populations and substantial die-offs have been recorded, often without any obvious cause. The species appears to be vulnerable to climate change if water temperatures, induced by reduced streamflow and/or increased air temperatures, increase to stressful or lethal levels.

The best available scientific information about the western pearlshell indicates substantial concern about the species' capability to persist over the long term in the plan area.

Based upon the evidence and supporting best available science, the **western pearlshell meets** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Despite the broad distribution of this species throughout the western states, its decline has led to limited localities on the Inyo National Forest. On the Inyo National Forest, these ecological conditions can be found in the South Fork Kern River and similar river systems, especially where the host fish species may occur. Although, the South Fork Kern River provides habitat for the western pearlshell, there is little information on actual population trends or density.

A single CNDDB record for this species was located on the forest along the South Fork Kern River in Monache Meadows; however, the record dates to 1948. Shells of this species were found on the Forest at two locations in the South Fork Kern River in 2006, but no current documentation of an extant population was found.

Ecological conditions for this species (see above additional details)

Western pearlshell occurs in habitats ranging in size from small creeks, 1 to 2 meters wide, up to large rivers, where ever substrates are primarily composed of clean, coarse gravel, cobble and boulders. Optimal habitats for western pearlshell are low gradient (i.e., less than 4 percent, Howard 2010) pools with velocities ranging from about 25 to 30 centimeters per second and depths from 20 to 60 centimeters (Howard and Cuffey 2003, Stone et al. 2004).

Key ecological conditions include cold creeks and rivers with clean water and where sea-run salmon or native trout persist. Documented host fishes for *M. falcata* include: cutthroat trout, rainbow/steelhead trout, Chinook salmon, and brown trout, and a number of other fish are considered potential hosts.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Water quality on the Inyo National Forest is generally good, due to low population and levels of development. Aquatic habitat integrity within the Inyo National Forest is generally highest in the higher elevation portions of the analysis area and within existing protected areas on public lands. The primary factors contributing to the lowest aquatic integrity scores are road densities and riparian road networks, grazing, mining lands, and canals and diversions.

Approximately 72.5 miles of the upper South Fork Kern River was designated as wild and scenic. The Inyo National Forest administers the upper 28 miles of the river corridor, which is divided into four segments, starting at the headwaters and continuing downstream. The resource setting is characterized by a primitive recreation opportunity class. The managerial setting is characterized by maintaining natural conditions and primitive recreation opportunities (USDA 2013a).

Properly functioning conditions (PFC) assessments conducted in the river segments found that the Monache Meadows area, where the historic site of *M. falcata* is located, generally has the lowest proportion of sites meeting desired condition due to slow recovery from a recent stream-incision event in 1983. Scenic values continue to be protected within the river corridor by the CMP visual quality objective of preservation (USDA 2013a, Chapter 2 – Water).

The projected status of those ecological conditions relative to the species considered

Improvements in grazing management and a decision to rest two grazing allotments (USFS 2001) have improved stream habitat conditions throughout the South Fork Kern River watershed. The Monache Meadows is likely the only reach on the Kern Plateau where habitat improvement is questionable. An extensive channel downcutting event occurred in the 1980s and habitat conditions will likely remain poor in this reach for some time. Overall, land use practices, including more appropriate grazing strategies aimed at improving fish habitat and streambank conditions, will continue to be implemented, allowing for

an upward trend in California golden trout habitat, which will in turn, may allow for improved conditions for *M. falcata*.

In addition, climate change may have enhanced drying effects on smaller ephemeral ponds and meadows, changing the timing and intensity of snow melt and spring precipitation, and will also continue to put forests at risk for stand replacing fire which can cause sedimentation and negative changes to water quality and flow.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities

Impacts to the western pearlshell from human-caused activities include eutrophication due to agricultural runoff and urbanization, sedimentation that smothers mussel beds, water diversions that reduce and alter instream flow regimes, mining, including suction dredge operations, introduction of exotic species, grazing, and water impoundments that reduce current velocities and allow for sediment deposition (Hovingh 2004, Lydeard et al. 2004, Strayer et al. 2004, Strayer and Downing 2006, Krueger et al. 2007).

This mussel species depends on salmonid fish hosts to sustain and disperse larval clams. Since many salmonid species such as rainbow trout and salmon have experienced severe declines, western pearlshell mussels have declined as well (Krueger 2016).

Stream habitat degradation caused by historical grazing practices may have reduced the suitability of existing habitat, specifically in the Monache Meadows area, where this species is historically known to have occurred.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The western pearlshell (*Margaritifera falcata*) has been documented widely in western North America. *M. falcata* has been extirpated from northern Nevada, from most areas in northern Utah, and numerous examples exist documenting the decline of this species in particular streams and rivers throughout its range. In addition, there are reports of populations of *M. falcata* are reported to have not reproduced for decades; populations of such a long lived species may appear stable, when in fact they are not reproducing. There is a need to document the current distribution and abundance of this species, so that if *M. falcata* populations decline in the future, those declines can be documented and protection for vulnerable populations can be provided.

Margaritifera falcata is a vulnerable species, but whether a risk of extinction is imminent cannot be determined. Numerous examples exist of *M. falcata*'s decline or extirpation from streams and rivers across its range, especially in the more arid areas of Utah and Nevada, although it is still widespread and abundant in other locations. In general, there is a lack of historic abundance data for freshwater mussels in western North America. Without historic abundance data, it is difficult to assess decline across this species' range. NatureServe has assigned *M. falcata* a rounded global status of G4 – apparently secure. NatureServe also notes that *M. falcata* is declining in terms of area occupied and number of sites and individuals, and that populations showing repeated reproduction, evidenced by multiple age classes, are now rare (NatureServe Explorer 2008, Xerces 2016). *There is substantial concern for this species' ability to persist on the planning unit.*

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Wong's springsnail - *Pyrgulopsis wongi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

Yes

Relevant threats to species

Groundwater pumping, water diversion, livestock grazing, climate change, and habitat specificity.

Rationale for Wong's springsnail

NatureServe Global and Taxa (subspecies) Rank, if applicable: G2

NatureServe State Rank: S2 (CA); S1 (NV)

CA State Status: None

Other Designations: Forest Service Sensitive

Relatively little literature specific to the life history of Wong's springsnail is available. It is represented by 50 occurrence records in CNDDB, including 20 or so from the Inyo National Forest. The species typically inhabits cold water springs (Sada and Vinyard 2002) and can be relatively common where found (Sada and Herbst 2001). Distribution of Wong's springsnail includes two of the seven regions of endemism described by Hershler and Sada, including the Death Valley (includes the Owens Valley) and Lahontan hydrographic regions (Hershler and Sada 2002). Proportionally, more occupied sites are in the Owens Valley according to CNDDB (2017). This pattern of distribution likely reflects a longer history of hydrologic connectivity between the two hydrologic regions (Hershler and Pratt 1990, Hershler and Sada 2002).

Given the lack of specific information regarding *P. wongi*, there is a considerable amount of information known about snails in the genus *Pyrgulopsis* which allows for an adequate synthesis of information applicable to *P. wongi*. Springsnails, including Wong's springsnail, are in the family Hydrobiidae and are

also known as “microsnails” due to their extremely small size (usually only 1-8 millimeters long). The genus was comprised of relatively few species prior to the 1980’s, but field examinations began to reveal an exceedingly diverse level of speciation. Since that time, there are descriptions of well over 100 species in the western US, mainly in the Great Basin with many as yet unrecognized species (Hershler 1998, Liu, et al. 2003). Spring habitats in the Great Basin, one of the driest places in North America, provide very unique aquatic habitats, especially because they are relatively isolated from each other by large areas of unsuitable habitats for snail dispersal (Hershler 1998, Hershler and Pratt 1990, Sada and Herbst 2001, Liu, et al. 2003). As such, many species of *Pyrgulopsis* are restricted to very few, if not a single, springs though some species show a much broader distribution (Hershler 1998). Springs are typically low diversity ecosystems at an individual scale, but are quite diverse when combined as habitats on a broader scale (Sada and Herbst 2001). Springs generally have consistent flow and temperature because they have a more integral connection with groundwater. As a result, they serve as refugia during periods of climatic drying especially as demonstrated in the Owens Valley/Death Valley area over the last 10,000 to 15,000 years (Hershler 1989, Hershler and Pratt 1990, Sada and Herbst 2001).

The aquifer of the Owens Valley is primarily supplied by runoff from the Sierra Nevada snowpack (USGS 1998). Springs and seeps in the Owens Valley are typically found near the toes of alluvial fans from the east slope of the Sierra Nevada, along the edges of volcanic deposits, and in areas of geologic faulting (USGS 1998). Groundwater withdrawals are perhaps the greatest threat to spring flows (Sada and Herbst 2001). Most of the flow leading into the area that used to be Owens Lake is now diverted for domestic use to the Los Angeles area. This diversion of water makes the aquifer that supplies the springs more vulnerable to excessive withdrawal or other groundwater extractions (USGS 1998). USGS (1998) discussed the extent of past spring flow reductions during periods of high groundwater extraction, and modeled the potential impact to groundwater levels under different future extraction scenarios. In general, the effect of reduced discharge on springs is primarily observed when in close proximity to the groundwater wells and there are more wells on the west side of the Owens Valley where most of the occupied *P. wongi* springs occur. This scenario of reduced spring flow due to groundwater pumping suggests these populations of Wong’s springsnail are vulnerable to changes in habitat that would occur with increased pumping. Anticipated changes in habitat include a reduced volume of cold water discharged from the springs which would result in a reduced stream length occupied by the snails mainly caused by water being warmed by the air. Very little information is available about the hydrology of the upper portion of the Lahontan drainage where other *P. wongi* populations occur.

Water diversions from springs is also a threat to the Wong’s springsnail (Sada and Vinyard 2002). Any changes in streamflow, particularly if water is extracted from the point of emergence or a spring box is constructed can reduce the amount and extent of downstream suitable habitat (including thermal characteristics) and possibly habitat heterogeneity (Sada and Herbst 2001). Springsnails are frequently concentrated near spring sources with declining density downstream (Hershler and Sada 2002); therefore, changes in flow at the spring source could have greater consequences than diversions lower down in a spring system. Water velocity seems to be a key habitat component for some springsnails and spring boxes at the head of the spring would greatly reduce the preferred velocity (USFWS 1998). Livestock grazing has been observed at many sites occupied by springsnails and has been associated with habitat degradation (Sada and Herbst 2001, Sada and Vinyard 2002). However, there is little information available that suggests livestock use of springs adversely impacts springsnail habitat with the exceptions of diversion of water to troughs that is not returned to the spring run and the construction of spring boxes at the head of the spring for diversion purposes (Sada and Herbst 2001). Hershler and Sada (2002) indicate springsnails require hard substrates for egg deposition and foraging, so if excessive grazing, or any other factor, creates conditions where hard substrates are inundated by soft sediments, suitable habitat could be detrimentally impacted.

As noted, the underlying hydrology of many springs occupied by the Wong's springsnail is driven largely by the aquifer in the Owens Valley, including significant contributions from snowmelt in the Sierra Nevada. If climate change results in reduced snowpack or changes in runoff that affect groundwater recharge, there could be a reduction in water available for spring flow from the aquifer.

The Wong's springsnail has a distribution limited mainly to the Owens Valley and southern Lahontan basin (California) where it is known from approximately 50 localities. These localities are springs that are sensitive to disturbance, especially to impacts occurring at the point of origin. The known threats are relevant to the continued persistence of the species in many locations, with the same impacts resulting in extirpations of entire species in other locations. Populations are apparently stable presently and the known distribution of the species has not recently changed.

The best available scientific information about the Wong's springsnail indicates substantial concern about the species' capability to persist over the long term in the plan area.

*Based upon the evidence and supporting best available science, the **Wong's springsnail meets** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.*

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

This species is known primarily from the Inyo National Forest and Wong's has a restricted distribution in the Owens Valley along the eastern escarpment of the Sierra Nevada Mountains. It ranges from Pine Creek south to Little Lake, and along the eastern side of the valley from French Spring to Marble Creek in the Inyo Mountains. It is also found in a few sites in Long, Adobe and Deep Springs Valleys.

Approximately 20 CNDDB records for this species were located on the forest, within six relative sites due to proximity of records. This species is considered very small and categorized as a micro-snail (1mm to 8mm in shell width), thus, detection can be extremely difficult.

Ecological conditions for this species (see above additional details):

This species occurs in seeps and spring-fed streams of small to moderate size. It can occur on watercress (*Rorippa*), travertine deposits or stones. This species co-occurs with Owens Valley springsnail (*P. wongi*) at Batchelder Springs (Krueger 2016).

Key ecological conditions for springsnails typically include cold spring water sources with perennial flow.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

Water quality on the Inyo National Forest is generally good, due to low population and levels of development. Aquatic habitat integrity within the Inyo National Forest is generally highest in the higher elevation portions of the analysis area and within existing protected areas on public lands. The primary factors contributing to the lowest aquatic integrity scores are road densities and riparian road networks, grazing, mining lands, and canals and diversions.

Each population of snail is endemic to the spring it inhabits, and since these snails are obligatory aquatic throughout their entire life, they cannot disperse to other springs, nor can springs where snails have been extirpated be re-colonized.

The projected status of those ecological conditions relative to the species considered:

Projected status of these ecological conditions rely on maintaining the micros-site conditions at the perennial water source. Activities such as grazing or water diversion projects for mining operations may degrade or eliminate the habitat.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Historically, there were major impacts to habitats occupied by this species from grazing, and water diversions for mining operations. Water impoundments degrade habitats because this snail requires perennial water. Excessive sedimentation from a variety of activities such as logging, mining, road and railroad grade construction, and grazing may smother substrates causing death by preventing feeding and movement, and obstructing gills (Hovingh 2004, Vannote and Minshall 1982, Webb et al. 2008, Bettaso and Goodman 2010).

Additionally, water quality (temperature) and climate change are considered key risk factors for this species.

A summary of the overall at-risk status along with a conclusion as to whether or No**t the species was considered at risk for persistence on the planning unit:**

The Wong's springsnail is a restricted endemic, with limited locations on the forest. There is substantial concern for the species persistence due to its rarity and restriction to cold perennial seeps and springs. As a result of this rarity and its limited distribution, this species is also highly susceptible to stochastic events and drying conditions resulting from increasing temperatures and events related to climate change. Activities that reduce water flow can greatly impact this species. In addition, extremely limited dispersal ability of this species and isolated populations put it at further risk for localized extinctions.

There is substantial concern for this species ability to persist on the planning unit.

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Chapter 2 – Rationale for Animal Species Not Meeting Criteria of Species of Conservation Concern

Mammals

American badger - *Taxidea taxus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

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American pika[1] - *Ochotona princeps, Ochotona princeps schisticeps*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

[1] Mt. Whitney pika was also used as the common name in 2016 rationale document.

Proposed Species of Conservation Concern

No

Relevant threats to species

Climate change, grazing, proximity of roads to suitable habitat.

Rationale for American pika

The pika subspecies in the Sierra Nevada, *Ochotona princeps schisticeps* (Hefner & Smith 2010), has a global rank of G5 (Secure) and a subspecies rank of T4 (Apparently Secure) (NatureServe 2015). *O. princeps* is recognized as a species of greatest conservation need by California Department of Fish and Wildlife. *O. p. schisticeps* has a California State rank of S2S4 and is recognized as a species of special concern by California Department of Fish and Wildlife. *O. princeps* has a Nevada State rank of S2.

Population estimates are not available; however, distribution is assumed to be patchy but widespread within the plan area. Despite the uncertainty in trends and the fact that some populations are being extirpated and moving upslope in elevation, populations throughout the range of this subspecies appear to be stable (Beever et al. 2003, USFWS 2010).

O. p. schisticeps are restricted to higher elevation (7,000-12,750 feet) sub-alpine to alpine zones where rock and talus slopes are adjacent to meadows, grassland, or forest edges with herbaceous understories (Smith and Weston 1990, Grayson 2005, CDFW 2016). Habitat trends suggest there is less alpine meadow habitat available when compared to pre-European times (Barbour et al. 1991); however, the vegetation types required by this subspecies are not considered a limiting factor in the plan area.

Threats identified for pikas include climate change, grazing, and proximity of roads to suitable habitat (McDonald 1992, Beever et al. 2003, Stewart et al. 2015, Beever et al. 2016).

There is evidence of upslope movement of pikas presumably in response to warming temperatures at lower elevation sites (McDonald 1992, Beever et al. 2016). Prediction models estimating effects of climate change and the interpretation of such models on pika populations and persistence is mixed. U.S. Fish and Wildlife Service (2010) concluded that pika populations at mid to high elevations in the Sierra Nevada should not be at risk of extirpation by the year 2050 based on cooler projected temperatures at higher elevations. USFWS (2010) also concluded that lower elevation populations may be at higher risk based on projected warmer temperatures. Stewart et al (2015) modeled future climate change scenarios, projecting the number of occupied sites in the Sierra Nevada may decline from 39 to 88 percent by the year 2070. Millar and Westfall (2010) found pika populations in the Sierra Nevada and southwestern Great Basin are; thriving, able to persist in a wide range of thermal environments, and are showing little evidence of extirpation or decline. While there is uncertainty related to climate change effects and pika persistence, it is generally agreed upon that extirpation in mainland areas, such as the Sierra Nevada, have exhibited lower rates of extirpation than more isolated or insular areas (Beever et al. 2016). Therefore, climate change and habitat availability are not considered limiting factors to the persistence of pikas within the plan area in the long-term.

Anthropogenic influences, such as cattle or horse grazing and proximity of roads to habitat may negatively influence pikas (Beever et al. 2003). Beever and others (2003) suggest livestock grazing within 164 feet of cover (e.g., talus habitat) may increase energetic costs and predation risk to individual pikas; but caution further research is needed to determine impacts to populations. USFWS (2010) concluded the potential competition for forage between pikas and livestock is low and is not considered a significant threat to *O. p. schisticeps* throughout its range. Beever and others (2003) suggest the proximity of roads to suitable pika habitat may increase disturbance, remove or isolate remaining habitat, or inhibit dispersal

activity; however, the results of human influence on pikas persistence was established at only 3 of 7 unoccupied sites.

Inyo National Forest Rationale

On Inyo National Forest, pika occurs in the Sierra Nevada, primarily in wilderness at over 6000 ft elevation. USFS Pacific Southwest Research Station scientists monitor this species in the Sierra Nevada. In an online video Science Perspective - Climate Change and the American Pika, they indicate the species occupies every available habitat type and a wider range than once thought.

Based on our review, pika populations throughout the range of this subspecies appear to be stable and while there is evidence of upslope movement of pikas, they have demonstrated an ability to persist in a wide range of thermal environments. The best available scientific information about the pika does not indicate substantial concern about the species' capability to persist over the long-term in the plan area. Based upon the lack of evidence and supporting best available science, the pika does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Fisher - *Pekania pennanti*

Type of Animal: Mammal

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern:

No, it is proposed for listing as Threatened under the Endangered Species Act

Relevant threats to species:

Loss or degradation of habitat due to uncharacteristic wildfire, vegetation management (e.g., fuels reduction, timber harvest), insect and disease outbreaks, habitat fragmentation, climate change, poisoning from rodenticides, predation, and vehicle strikes.

Rationale for fisher

The fisher has a global rank of G5 and the West Coast Distinct Population (WCDP) has a subspecies global rank of T2T3Q (Imperiled to Vulnerable; Q indicates the taxonomic distinctiveness of this entity at the current level is questionable and resolution may affect the current ranking). The WCDP has a California state rank of S2S3 (Imperiled to Vulnerable) and is designated as a Species of Special Concern and a Species of Greatest Conservation Need by CDFW. The California Fish and Game Commission released a Notice of Findings that stated the Pacific fisher southern Sierra ESU (defined as California south of the Merced River) is determined to be listed as Threatened under the California Endangered Species Act (CESA) on April 20, 2016. The final date of legislation pending as of January 2017 (CDFW 2017). This species is also a Region 5 Forest Service Sensitive species.

Population estimates for the southern Sierra Nevada range from 100-600 individuals and the population in northern California through southwest Oregon is estimated at about 4,600 individuals. While trends are not available, fishers occupy less than 50% of their historic range.

Fishers are most commonly found in low to mid elevation conifer, mixed conifer, and conifer hardwood forests with dense canopy cover. They are solitary animals, have large home ranges, and require large decadent trees (live and dead) and large downed logs used for denning and resting.

Threats to the persistence of fishers have been identified to include loss or degradation of habitat due to uncharacteristic wildfire, vegetation management (e.g., fuels reduction, timber harvest), insect and disease outbreaks, habitat fragmentation, climate change, poisoning from rodenticides, predation, and vehicle strikes.

Vegetation treatments have been identified as a primary threat to fisher persistence; however, these treatments may prevent more adverse effects associated with drought and wildfire. Vegetation management and prescribed fire that result in the degradation of habitat or loss of key ecosystem components such as dense canopy cover, snags, downed logs, and understory vegetation can result in

negative short term impacts to fishers and fisher habitat (Truex and Zielinski 2013, Zielinski et al. 2013a, Sweitzer et al. 2016).

Truex and Zielinski (2013) documented significant negative predicted effects to resting habitat suitability from vegetation treatments that included both mechanical and fire activities. The greatest impact to resting habitat suitability was from the reduction in canopy closure. On the other hand, Truex and Zielinski (2013) found no significant effects of either solely mechanical or solely prescribed fire treatments on predicted resting habitat value, and no effects of any treatment type or combination on predicted foraging habitat.

Zielinski and others (2013a) sampled fisher home range-size areas (14 km2) for fisher scats, using scat detector dogs, and found that the areas with the most abundant scats had an average of 2.6% of their area disturbed per year (equivalent to 13% over a 5-year period) by a combination of vegetation management treatments. The degree of disturbance within sample units varied widely, suggesting fishers may in some circumstances tolerate higher rates of disturbance. In 1 of 5 high-use units and 1 of 3 moderate-use units, ~6.5% of the area was disturbed annually on average (equivalent to ~ 30% over a 5-year period; Zielinski et al. 2013a). Zielinski et al. (2013a) found no statistically significant difference in the mean area of treatment per year across 3 fisher use categories (high, medium, and low), indicating that vegetation disturbance is only 1 of many factors affecting fisher habitat quality.

Sweitzer and others (2016) found local persistence decreased in areas when hazardous fuels reduction treatments or prescribed fire increased. Specifically, annual disturbance and fuels reduction on 3.2% (single season) and 3.7% (multi-season) of an area 1 km2 in size resulted in reduced use by fishers. There was no evidence that timber removal between 2002 and 2013 resulted in reduced occupancy or persistence on the Sierra National Forest (Sweitzer et al. 2016). The author states this was likely due to several factors including: the extent of extraction was much reduced compared to extraction rates from 1860-2000; delay in implementation may have limited their ability to detect an adverse response; estimates of annual disturbance from extraction for single and multi-season surveys were equivalent to levels tolerated by fishers elsewhere on the forest (Zielinski et al. 2013a), thus the low level of extraction did not impinge fisher use of these habitats.

Garner (2013) found that, although fishers avoid using areas treated for fuel reduction (including mechanical thinning and prescribed fire), their home ranges tend to include larger proportions of treated areas than in the landscape as a whole, and they do not shift home ranges in response to treatments. Garner (2013) concluded that treatments do not render the habitat unsuitable and may, in fact, increase fire resiliency, provided management focuses on surface and ladder fuels.

Habitat fragmentation and loss of connectivity between areas of suitable habitat can pose a risk to the persistence of fishers across the landscape. High severity fire, timber harvest, fuels reduction treatments, road presence and construction, and recreational activities may result in the loss of habitat connectivity resulting in a negative impact on fisher distribution and abundance. Key linkage areas important to maintain or create connectivity between larger core areas of fisher habitat across the Sierra Nevada and Cascade Ranges in California have been identified (Spencer and Rustigan-Ramsos 2012).

Recommendations regarding spreading out treatments both spatially and temporally can be in direct contradiction with creating effective fuels treatments that alter fire behavior on the landscape. However, short-term negative localized effects to fisher from active vegetation management designed to reduce high severity wildfire in and near suitable habitat would out-weigh the positive long-term effects of protecting suitable fisher habitat (Spencer et al. 2008).

Loss of habitat from high severity wildfires is considered one of the most significant threats to the persistence of fishers (Spencer et al. 2008, USFWS 2012). High severity wildfires have been increasing over the past several decades and this trend is predicted to continue (Westerling et al. 2006, Miller et al. 2009). Many fires within the current range of the fisher have resulted in the loss of important denning, resting, and foraging habitat. There is no research available regarding fisher use of high severity fire in the first few years after fire. While fisher occupancy was lower in extensively burned forest, they remained present suggesting foraging opportunities remains (Sweitzer et al. 2016). The late seral forested conditions required by fishers could take centuries to return to fire areas that burn at high severity. Wildfire can also result in the loss of connectivity between suitable habitat patches. Maintaining habitat connectivity has been identified as integral in fisher conservation (Spencer et al. 2016).

The potential effects of climate change are complex and not certain. (Solomon et al. 2007) predicted increased risk of extreme weather events such as heat waves, droughts, and floods. Northern California is predicted to have increased winter precipitation and most of California will experience decreased precipitation in the summer months (Lofroth et al. 2010). A warming climate is projected to extend fire seasons and increase total area burned (McKenzie et al. 2004), potentially resulting in direct habitat removal or loss. Less precipitation has resulted in an increase in insect infestations and large scale tree mortality (Taylor and Carroll 2003), resulting in additional loss of habitat and an increased risk of catastrophic wildfire. It is projected that vegetative shifts in response to a warming climate may result in elevational or latitudinal changes in mammal distribution (Kerr and Packer 1998). Potential benefits may include an increase in habitat availability from the predicted reduction in snow pack.

Predation has been documented as the primary cause of mortality of fishers (Lofroth et al. 2010, Sweitzer et al. 2016a). Most likely predators include cougar, bobcat, and coyote. Anthropogenic activities, such as vegetation management that removes hiding cover, can contribute to fisher exposure to predation (Lofroth et al. 2010). Roads may also increase the number of lethal interactions between fishers and larger predators.

Rodenticide and insecticide poisoning, most likely in association with illegal marijuana cultivation, has been documented in 85% of fisher carcasses across two project areas in the southern Sierra Nevada (Thompson et al. 2013). Survival of a female was found to be related to the number of marijuana cultivation sites the animal was likely to encounter (Thompson et al. 2013). Although more research is needed, it is likely that exposure to rodenticides may predispose an animal to dying from other causes. Effects to fisher populations are unknown at this time.

Vehicle strikes are documented as another source of mortality (Sweitzer et al. 2016a) and road density and construction may contribute to this source of mortality. 24 roadkill deaths in the fisher West Coast population segment have been documented between 1992 and 2014. From what is known, vehicle strikes are not a major source of mortality; however, this source of mortality could be underestimated (Sweitzer et al. 2016a).

Inyo National Forest-Specific Rationale

Information from this section is derived from information as noted.

Information on current distribution of the species on the planning unit

Spencer et al. (2015) and Spencer et al. (2016) describe 7 fisher population core areas in the Southern Sierra Nevada, five of which are occupied, and two of which are currently unoccupied. Fishers on the Inyo National Forest make up a small part of the Core 1 population – or the population on the Kern Plateau. This core is mostly on the Kern Plateau in the southeastern portion of the fisher assessment area and is the only core not on the west slope of the Sierra Nevada. It is largely within Sequoia National

Forest, with a small portion on the Inyo National Forest (only 54.5 km2 of the 429.5 km2 are on the Inyo).

Core 1 is the smallest occupied core area, has the lowest predicted habitat value of any core, and appears to lack potential suitable resting and denning habitat (Spencer et al. 2015). Further, Spencer et al. (2016) model the core as containing no currently suitable fisher cells. Fisher occupancy in Core 1 suggests that the current habitat models are unable to capture both the breadth of habitat that fisher will use, as well as the factors determining habitat selection in the Kern Plateau area, an area that is ecologically distinct from the rest of the fisher range in the Southern Sierra Nevada. Additional research and monitoring are warranted in Core 1 to better understand fisher habitat selection and population characteristics. Spencer et al. (2016) note that "In the meantime, all [habitat] predictions for Core 1 should be considered unreliable."

Occupancy modeling shows this core area to have the lowest occupancy rates in the region (Zielinski et al. 2013b), suggesting lower population densities here than elsewhere. The Sierra Nevada bioregional carnivore monitoring program includes 26 sample units on the Inyo National Forest. Of these 26 sample units, four have detected fisher at various times over the last fifteen years (Tucker 2018). While reproduction has not been confirmed in this area, genetic analysis of hair samples have detected females multiple times, and in 2012 surveyors detected multiple individuals with genotypes consistent with a mother and 2 offspring (Tucker 2018).

Ecological conditions for this species

The Kern Plateau has unique environmental conditions, due to differences in climate, geology, and vegetation, compared to the west-slope cores (Miles and Goudey 1998). It receives less annual precipitation (~25-76 cm or ~10-30 in.) than forests in other cores (~102-152 cm or ~40-60 in.), and the vegetation is somewhat more open. Pinyon-juniper woodlands, canyon oak woodlands, and birch-leaf mountain mahogany are a greater component of the vegetation of the Kern Plateau than other portions of the Fisher Assessment Area, and California black oak, an important component of fisher habitat where it occurs, is rare or absent. The lesser accumulation of snow in this core may explain why fishers occupy higher elevations here than elsewhere in the assessment area and why martens (which are more snow-adapted than fishers) are absent (Spencer et al. 2015). Elsewhere in their range, fishers select for forests containing old growth characteristics (e.g. dense vegetation/canopy cover, snags, cavities, larger trees and large down woody debris) in coniferous and mixed pine-oak forests.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Fisher Core Area 1 has experienced frequent fires in recent decades, including some large, severe fires, and some mosaic fires within the natural range of variation that were managed for resource values (Spencer et al. 2015). The resulting vegetation is a patchy mosaic of forest stand ages and sizes intermixed with open areas and shrublands. Elsewhere, tree densities and canopy cover likely exceed the natural range of variability (NRV) where decades of fire suppression and commercial timber harvesting have resulted in forest conditions greatly altered from pre-European settlement times (before 1860). A lack of low-intensity surface fires which would have occurred historically in drier forests have led to increases in surface and ladder fuels which has led to several high intensity fires on the Inyo National Forest. In general, the forest contains higher densities of small-to-medium-sized trees while there is a deficit of open-canopy mature and old forests in most of the planning area (Safford 2013).

The projected status of those ecological conditions relative to the species considered

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar; trending towards higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Any activities or events such as fuel reduction/vegetation management treatments, high severity fire, and climate change that negatively affect/remove mature forest and or key structural elements such as large live and dead trees (e.g. large diameter snags), logs and coarse woody debris and or cause losses canopy cover. Key structural elements are important for resting and predator avoidance, as well as for denning and raising young. Higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate and related increases in drought and insect outbreaks can cause significant changes in forest structure, function and composition (Meyer 2013).

A summary of the overall at-risk status along with a conclusion as to whether or not the species was considered at-risk for persistence on the planning unit

Very few fishers currently occur, in a very limited location, on the Inyo National Forest. Connectivity is high between the Inyo and Sequoia National Forests, and between Fisher Core Areas 1 and 2, providing some protection against risks associated with small population numbers. However, the very localized fisher occurrence, combined with loss of larger trees and heterogeneity in pine forests, increased risk to upper montane forest from uncharacteristic stand replacing fire, and insect outbreaks and warming temperatures creates substantial concern about this species ability to persist on the planning unit. However, since fisher is proposed for listing as threatened under the Endangered Species Act, it meets the at-risk species criteria under that criteria and not as a species of conservation concern.

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Fringed myotis, *Myotis thysanodes*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Reduction in available roost sites through the removal of conifer and hardwood snags, loss of roost sites through improper closure of abandoned mines or caves.

Rationale for fringed myotis

The fringed myotis (*Myotis thysanodes*) has a global rank of G4 (Apparently Secure) and a California State rank of S3 (Vulnerable). The subspecies *Myotis thysanodes vespertinus*, which is believed to occur in Siskiyou, Shasta, Humboldt, and possibly Trinity Counties, has a subspecies rank of T2. The subspecies *Myotis thysanodes thysanodes*, which occupies the remainder of California does not have a subspecies rank. The fringed myotis bat is recognized as a Species of Greatest Conservation Need by California Department of Fish and Wildlife. This species has been assigned a High Priority designation by the Western Bat Working Group (2016), indicating this species should be considered one of the highest priority for funding, planning, and conservation actions as it is considered imperiled or are at high risk of imperilment. The fringed-myotis is also a Region 5 Forest Service Sensitive species.

Population size is unknown; however, they are thought to be widely distributed but rare everywhere they are found (CBWG 2016). While population trends are unknown, the limited data available suggests serious population declines (CBWG 2016). Many historically occupied sites are no longer occupied for a variety of reasons including human disturbance, modification of surrounding habitat, and exclusion from sites for health and safety reasons (CBWG 2016).

Fringed myotis are often found in oak woodland, pinyon juniper, mixed conifer forests, and mesic old growth forests in California (O'Farrell and Studier 1980, Weller and Zabel 2001). Fringed myotis roost colonially and are known to be highly sensitive to disturbance at roost sites (O'Farrrell and Studier 1973, O'Farrell and Studier 1980). They use a variety of roosting structures, but are most often associated with rock crevices, conifer snags, abandoned mines, caves and buildings (Baker 1962, O'Farrell and Studier 1980, Cryan 1997). In forests, they are reliant mainly on snag habitat for roosts. Snags documented to be used by fringed myotis for roosting in California are the tallest or second tallest pine or fir snag, have

loose or sloughing bark, are greater than 58.5 cm diameter (23 inches), and are often in groups of 5 (Weller and Zabel 2001). They have also been documented to use giant sequoia basal hollows as maternity roosts in Yosemite's Merced Grove (Pierson et al. 2006). Fringed myotis forage along streams in fairly cluttered habitat as well as meadows.

Threats to the persistence of fringed myotis include reduction in availability or loss of roost sites. Removal or exclusion from anthropogenic roost sites such as buildings is most prevalent in urban areas and results from: restoration of historic structures, human disturbance, or extermination/exclusion for human health and safety reasons. Loss of roost sites in urban environments is not considered a limiting factor within the plan area.

Removal or loss of large snags and damaged trees ≥ 58 cm dbh (23 inches) during timber harvest or prescribed or wildland fire may result in a reduction of roost site availability on National Forest System lands (CBWG 2016). Like most forest dwelling bat species, fringed-myotis are documented to mainly use snags as roosting structures in forested habitat (Weller and Zabel 2001). Retention and recruitment of adequate snags in number, size, configuration, and decay class throughout the plan area is considered a potential limiting factor based on the ephemeral nature of these structures and the potential for loss during harvest operations and prescribed and wildland fires.

Recreational mining and closure of abandoned mine sites may have resulted in displacement of bats and reduction in roost site availability (Belwood and Waugh 1991). Several of the mine closures in the plan area have been accomplished by installing bat friendly gates that are designed to allow entry by bats but not humans. White nose syndrome (a cold-loving fungus that afflicts bats hibernating in caves and mines) is a potential threat that has not yet been detected in California, but has recently been documented in Washington State (Lorch et al. 2016, Sleeman 2016). Fringed myotis are not known to be affected by white-nose syndrome; however, they are known to use mines (O'Farrell and Studier 1980) and populations may be negatively impacted if this disease becomes established in the plan area.

Inyo National Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (chapters 1,3,5,8,10), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

There are currently no known location records in the NRIS database for fringed myotis on the Inyo National Forest. Historical records show few scattered detections on the forest in Mono and Inyo County (Pierson and Rainey 1998), however comprehensive bat surveys in the White-Inyo Mountain Range (Szewczak 1998) failed to detect this species. Ongoing surveys of hibernacula in a specific subset of 60 abandoned mines (primarily adits) on the Inyo-White Mountain Range (2013-2016) have focused on Townsend's bats, however, fringed myotis have not been detected during these surveys (M. Morrison unpublished data). The current level of abundance and distribution of this species on the Inyo National Forest is unknown. It is unclear how much of the forest is occupied and used by this species, if at all.

Ecological conditions for this species

On the Inyo National Forest, foraging habitat and roosting habitat likely occur within mixed conifer forest-dominated montane zone (mid-elevation mixed conifer and hardwood mixed con forests) which include mixtures of ponderosa pine or Jeffrey pine, black oak, sugar pine, incense cedar, and white fir. Additional habitat likely occurs within riparian corridors (foraging), and pinyon juniper and sagebrush assessment types.

The mixed conifer assessment type is primarily found along the escarpment of the Sierra, typically at the lower edge of the subalpine conifer forest and/or red fir assessment types, and the upper edge of the pinyon-juniper assessment type. It occupies roughly the same elevation band as the mountain mahogany assessment type along the Sierra escarpment, but is restricted to the cooler, moister environments, often in deep drainages or on steep slopes. On the Inyo National Forest, it is most prevalent on the Kern Plateau. The mixed conifer assessment type includes various combinations of white fir, red fir, and/or one or more pine species, typically with a very sparse understory.

There are approximately 45,671 acres (2 percent) of mixed conifer, 561,022 acres (28 percent) of pinyon-juniper and 308,410 acres (15 percent) of the sagebrush assessment types on the forest.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Snags are ephemeral features on the landscape with presence or absence dependent on both natural and human induced patterns of disturbance. The forest assessment for the Inyo notes the following densities for snags greater than 15 inches dbh (similar patterns can be seen for large trees by forest type). Median trees per acre (coefficient of variation in parentheses) with the potential for use as roosting trees: 1.2 (158 percent) in aspen; less than 0.1 (277 percent) in Jeffrey pine; 1.8 (109 percent) in red fir and 0.3 (85 percent) in mixed conifer. It is unknown how these levels differ with historic levels prior to fire suppression and logging, which primarily affected the Jeffrey pine forest.

Stands of mixed conifer forest occur within the mixed conifer assessment type, and also within the red fir, Jeffrey pine, and subalpine conifer assessment types. The mixed conifer assessment type (which does not necessarily include all mixed conifer stands) found within the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately ¾ of the mixed conifer assessment type is within wilderness, though stands of mixed conifer forest do occur in other areas of the Inyo National Forest.

Limestone and dolomite formations occur in the Sierra Nevada, White and Inyo Mountains. Although caves may be naturally limited in the White-Inyo Mountain range (Szewczak 1998). Inventories of abandoned mine features by the Inyo National Forest are ongoing with roughly sixty percent inventoried to date years (USDA FS unpublished data, C. Garcia pers comm.). In addition, out of 256 abandoned mines surveyed in 2009 two had bats present and suitable habitat, 15 were ranked as having potential bat habitat, 230 did not have any potential bat habitat, and nine did not have information on bat habitat. Of those ranked as having potential bat habitat, seven of those were listed as occupied sites in the 1990s (See the Forest Assessment Topic Paper Chapter 10- Minerals, for more info).

A survey of 100 mines in the Benton Range/Casa Diablo Mountain area in the winter of 1999 found less hibernating bats than in the White Mountains to the east, likely a result of less suitable habitat (drier and less riparian habitat for foraging). In addition mines in that area likely provided moderate sub-surface temperatures; only four mines in the range had temperatures that were below fifty degrees Fahrenheit, the preferred temperature for roosting. Fringed myotis were not noted during those surveys. (Sweczack 2000).

The projected status of those ecological conditions relative to the species considered

Anticipated trends include higher fuel loading and changes in forest structure and composition associated with fire suppression and changing climate related events (e.g., drought, insect outbreaks). These changes may have both negative and positive effects on forest dwelling species that rely on snags. There may be increased opportunities for roosting sites; however recruitment into larger tree size classes could become an issue in the long-term. However, The Sierra Nevada Framework Environmental Impact Statement

(2001) habitat projections for old forest habitat (containing large trees greater than 50 inches in diameter and large snags) found those features to increase significantly over a 140-year time scale.

The amount of cliffs, small rock depressions and small cave (i.e., grottos) habitat is not expected to change; although outside factors (below) could negatively affect their status.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Number of rock crevices, grottos, or caves. The Inyo does not have a Significant Cave List, but there is one limestone cave. The approximate status and number of cave resources is not known.

Key risk factors arising from non-ecosystem conditions and/or management activities

Fire suppression has led to increased tree densities and changes in forest structure and composition on the Forest. Historic timber harvest practices removed large snags or trees bearing cavities (18 to 26 inches diameter at breast height), conifer snags or large numbers of tall snags in early to medium stages of decay. (Chung-MacCoubrey 1996; Lacki and Baker 2007). It is important to note however, that present timber removal practices (post-1990) on the Inyo National Forest have shifted emphasis toward a restoration based approach aimed at reducing stand density to improve overall forest health or resilience. The primary trees removed as a result of this effort are small to medium diameter trees. This focus helps to reduce tree densities and improve overall resilience in the face of drought, insects and disease, and uncharacteristic high intensity wildfire which can destroy entire forest stands as well as older, bigger trees which may provide roosting habitat for bats. Vegetation management is ongoing and contributes to ecological restoration; vegetation treatments largely occur in Jeffrey pine, mixed conifer, and subalpine forest assessment types in the Glass Mountain, Mammoth, and Upper Owens River areas.

On the Inyo National Forest there are approximately 3,814 acres of conifer (about 6 percent) in the Mammoth Lakes – June Lake Core Timber management area which largely provides for personal and commercial fuel woods. The majority of Inyo National Forest mixed conifer forest is in Wilderness.

Mining claims have the potential to increase in the future which could create additional adits and shafts for bat use, however fringed myotis do not appear to exploit mines as readily as Townsends big eared bats do (Szewczak 1998).

Disturbance of secondary roosting sites such as rock crevices via recreational climbing could be a potential risk. Climbing does appear to be increasing on the forest; however this is during the summer months when bats are at lower risk.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

The Fringed myotis has a global rank of G4 (Apparently Secure) and a California State rank of S3 (Vulnerable), has been given a High Priority designation by the Western Bat Working Group (2016), and is a Region 5 Forest Service Sensitive species. The Inyo National Forest is within the species' range, and potential habitat exists for it on the forest, however, no occurrences were detected during comprehensive bat surveys in the White-Inyo Mountain Range and there are no known documented losses and/or reductions in maternity colonies on the forest. It is unknown how widespread this species is within suitable habitat, if at all, on the Inyo National Forest. The biggest threat on the planning unit appears to be loss of habitat through fire and climate related disturbance events, though it is difficult to predict what effect this would have on the species population in the long term. The potential for maternity roost disturbance by recreational rock climbers is currently unknown. There is currently insufficient information to determine if this species is at risk for persistence on the planning unit. Based upon the

evidence and supporting best available science, the **fringed myotis** does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Little brown myotis - *Myotis lucifugus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

General threats include wind turbines, deforestation, cyanide in mining operations, and pesticides. Potential future risk from white-nose syndrome but too speculative at this time to result in SCC status.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: None

State Rank: S2S3 (CA); S3 (NV)

Other Designations: None

Widespread in North America from Alaska-Canada boreal forest south through most of the contiguous United States to central Mexico; now subject to a severe decline in abundance in eastern North America as a result of high mortality caused by white-nose syndrome; conservation status of this species should be reviewed frequently as new information on the impact of white-nose syndrome and wind energy becomes available. Occurs at mid-montane to higher elevations in the plan area. There are no substantial threats or local concerns for the species in the Inyo plan area.

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Lodgepole chipmunk - *Neotamias speciosus speciosus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Loss of habitat.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: T3T4

State Rank: S2S3 (CA)

Other Designations: None

Discontinuous range in mountains of southern California; trend not well documented, but not of immediate conservation concern.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Long-eared myotis - *Myotis evotis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Disturbance to roost sites. Potential future risk from white-nose syndrome (WNS) exist.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S3 (CA); S4 (NV)

Other Designations: CA Species of Special Concern; CA Species of Greatest Conservation Need

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Long-legged myotis - *Myotis volans*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Disturbance to roost sites. Potential future risk from white-nose syndrome (WNS) exist.

Rationale for Species

NatureServe Global Rank: G4G5

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA SSC; CA SGCN; WBWG-H

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Owens Valley vole - *Microtus californicus vallicola*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No threats identified other than potentialfor loss of cover and drought. Nelson (2004) found this subspecies was still present in moist mesic vegetation communities despite drought.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T3

State Rank: S3 (CA)

Other Designations: CA-SSC

Small range in the Owens Valley with potential to occur on Inyo National Forest based on museum records from the nearby vicinity. While listed as a CA species of special concern, ranks suggest the risks to this species are moderate. There are no major threats and there is no evidence to support a conclusion of substantial concern for persistence on the Inyo National Forest.

Literature Cited

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Pallid bat - *Antrozous pallidus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Reduction in available roost sites through the removal of conifer and hardwood trees (dead and dying) during timber harvest or fires. Sensitivity to disturbance at roost sites.

Rationale for pallid bat

The pallid bat has a global rank of G4 (Apparently Secure) and a California State rank of S3 (Vulnerable). The pallid bat is currently a Region 5 Forest Service sensitive species and is recognized as a Species of Special Concern and a Species of Greatest Conservation Need by California Department of Fish and Wildlife. This species has been assigned a High Priority designation by the Western Bat Working Group (2016), indicating this species should be considered one of the highest priority for funding, planning, and conservation actions as it is considered imperiled or are at high risk of imperilment. The pallid bat is also a Region 5 Forest Service Sensitive species.

Population size is unknown; however, pallid bats are thought to be well distributed throughout California. Short and long-term population trends are considered either stable or slightly declining to an uncertain degree (NatureServe 2017). In urban areas, including Santa Clara and San Diego Counties where urbanization and land conversion have occurred, there is evidence of population declines (Johnston and Stokes 2007 *in* CBWG 2016).

Pallid bats use a wide range of habitats including desert scrub, grassland, oak woodland, and mixed hardwood and coniferous forest (Baker et al. 2008). They are gregarious, roosting in small to large groups, using many different types of roosts including rock crevices, trees basal hollows and cavities, buildings, bridges, and occasionally caves and mines (Barbour and Davis 1969, Hermanson and O'Shea 1983, Rabe et al. 1998, Baker et al. 2008). Pallid bats use both live and dead trees, roosting in cavities, basal hollows, under loose bark, and even an underground root cavity, (Orr 1954, Rainey et al. 1992 , Lewis 1994, Pierson et al. 1996, Rabe et al. 1998, Johnston and Gworek 2006, Baker et al. 2008). They use a variety of tree species for roost sites including oaks, cedar, pine, and even giant sequoia. Similar to roosting, pallid bats forage in a variety of habitat types including open grassland, oak woodland, in forested areas with open understories (Hermanson and O'Shea 1983), and even logging roads (Baker et al. 2008).

The greatest threats to the persistence of pallid bats are those most closely associated with the Central Valley and urban areas, not National Forest System lands. Threats include habitat conversion to agriculture, destruction, removal, restoration/retrofitting, or exclusion from anthropogenic roost sites including buildings and bridges, and to a lesser extent, urban development or forest management resulting in the removal of large hardwood and conifer trees (CBWG 2016). Urban threats including habitat conversion and loss of available bridge and building roost sites are not considered limiting factors to pallid bat persistence within the plan area. Removal of large snags and damaged trees ≥ 61 cm dbh (26 inches) during timber harvest or fires may result in a reduction of roost site availability on National Forest System lands (Rabe et al. 1998, Baker et al. 2008). Because pallid bats are eclectic in their use of a wide variety of roosting structures, the potential loss of some tree roosting sites are not considered a limiting factor within the plan area

White nose syndrome (a cold-loving fungus that afflicts bats hibernating in caves and mines) is a potential threat that has not yet been detected in California. Pallid bats are not known to be affected by white-nose syndrome (USFWS 2014). Pallid bats have been documented to use caves and mines for roosting (Hermanson and O'Shea 1983, van Zyll de Jong 1985). Pallid bats are more often documented using other structures for roosting sites such as trees, rock crevices, and bridges (Hermanson and O'Shea 1983). Based on what is known, white nose syndrome is not considered a limiting factor for pallid bats in the plan area.

Inyo National Forest-specific Rationale

There are few studies on bat detections on the Inyo National Forest. Szewczak et al. (1998) observed pallid bats in scrub habitat, less 6,000 feet elevation, scattered throughout the Inyo Mountains and at

lower Cottonwood Creek in the White Mountains. The single maternity roost they observed was at Deep Springs College, outside the plan area. Likewise, NRIS Wildlife database has occurrences in two areas on the east side. Buchalski et. al. (2013) observed many bat species, including pallid bats, foraging in mixed severity burned areas following the 2002 McNally Fire, which burned on the Sequoia and Inyo National Forests in the Sierra Nevada. In the Biodiversity Information Serving Our Nation (BISON) database, pallid bat is found from many records in the Owens Valley, including museum records, but mostly outside of the plan area. The best available scientific information about the pallid bat does not indicate substantial concern about the species' capability to persist over the long-term in the plan area. Based upon the lack of evidence and supporting best available science, the **pallid bat** doesn't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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van Zyll de Jong, C. G. 1985. Handbook of Canadian Mammals. Volume 2.National Museums of Canada, Ottawa, Canada.

Pronghorn - *Antilocapra americana*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Pygmy rabbit - *Brachylagus idahoensis*

Is there scientific information to determine if there is substantial concern about species capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Loss and degradation of habitat, specifically Great Basin big sagebrush growing on relatively deep soils that allow for burrow excavation.

Rationale for pygmy rabbit

This rationale references the information in the Species Account for the pygmy rabbit. Please see the Species Account for additional information.
The pygmy rabbit has a global ranking of G4, indicating it is Apparently Secure, which is defined as "uncommon but not rare; some cause for long-term concern due to declines or other factors." (NatureServe 2015). The State ranking of S3 indicating it is Vulnerable in California (NatureServe 2015). The California Department of Fish and Wildlife included the pygmy rabbit on the list of "Species of Greatest Conservation Need". The State ranking in Nevada is also a S3.
Because of the close association between the pygmy rabbit and its specific habitat requirements, threats to the species closely parallel the threats to its habitat, namely the loss and degradation of tall sagebrush. The availability of sagebrush, particularly on floodplains and where high water tables allow growth of tall, dense stands, is vital to the survival of pygmy rabbits. Populations have declined in Washington, Oregon, and California, where sagebrush habitat has been burned, converted to agriculture, or cleared from large areas and replaced with bunch grasses to improve livestock forage (USDI 2005). Additional threats include any activities that eliminate or alter sagebrush habitat such as irrigation projects, mining, energy development, military developments and other developments.

An additional threat to sagebrush habitat includes the introduction and spread of non-native invasive species (primarily cheatgrass). Potential sources of introduction include livestock, recreation (especially OHV's), vehicles, and others (USDI 2005). Altered fire regimes can also eliminate or reduce sagebrush habitat. Altered fire regimes are facilitated by cheatgrass invasion (Coates et al. 2016). Climate-change is expected to lead to further invasion by cheatgrass into sagebrush habitat, as is invasion by woody species. Wildfires are expected to increase in frequency as well as in severity and size. Climate change is likely to exacerbate the existing primary threats such as frequent wildfire and invasive nonnative plants, particularly cheatgrass (Coates et al. 2016).

Unmanaged or poorly managed livestock grazing is a threat, especially over-stocking and over-use which may lead to permanent reduction in sagebrush cover, trampling of burrows and loss of forage and cover (Camp et al. 2012, Camp et al. 2014).

After initial declines, pygmy rabbit populations may not have the same capacity for rapid increases in numbers in response to favorable environmental conditions compared to other rabbit species. This may be due to their close association with specific components of sagebrush ecosystems and the relatively limited availability of their preferred habitats (Green and Flinders 1980, USDI 2005). Small and isolated populations can lead to local extinctions (USDI 2005).

Inyo National Forest Rationale

The pygmy rabbit's range on the Inyo National Forest is primarily in Nevada but does include a slight portion of California at NE corner of the Mono Lake RD border with Nevada. An assessment of the status of the pygmy rabbit and threats to its persistence on the Inyo National Forest, determined there is no available scientific information that indicates populations are in decline. There is a potential loss of habitat by wildfire. The sagebrush habitat on the Inyo National Forest occurs on sandy soils; based on knowledge of local fire behavior, fires on the Inyo National Forest that occur in sagebrush on sandy soils do not tend to result in high intensity burns or loss of large sections of intact sagebrush. The best available scientific information about pygmy rabbit does not indicate substantial concern about the species' capability to persist over the long-term in the plan area. Based on the best available science and the site specific conditions on the Inyo National Forest, the pygmy rabbit does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

Literature Cited

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Sierra Nevada mountain beaver - *Aplodontia rufa californica*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Habitat degradation or loss due to anthropogenic factors, narrow habitat requirements, limited dispersal capability, low population densities, low genetic diversity, limited gene flow between subpopulations, water withdrawal, and climate change.

Rationale for Sierra Nevada mountain beaver

The subspecies Sierra Nevada mountain beaver (*Aplodontia rufa californica*) has a limited distribution, occurring only within the Sierra Nevada, in small, somewhat isolated or disjunct areas. The Sierra Nevada mountain beaver has a global rank of G5 (secure), a subspecies rank of T3T4 (vulnerable to apparently secure), and a California state rank of S2S3 (imperiled to vulnerable). This subspecies is also recognized by California Department of Fish and Wildlife as a species of special concern and a species of greatest conservation need. This subspecies has a Nevada state rank of S1 (critically imperiled).

A. r. californica has the greatest distribution of mountain beaver subspecies, ranging from at least Mount Shasta in the north to Sequoia National Park in the southern Sierra Nevada. It has been collected from at least forty different sites where populations appear to be small and disjunct. Population estimates are not

available for the Sierra Nevada; however, a decline in *A. r. californica* populations has apparently occurred in some areas of the subspecies' range due to habitat alteration. Estimates in the Sierra Nevada indicate occupied sites support small numbers of individuals ranging from 1-30 (Steele 1989, Todd 1990, Piaggio and Jeffers 2013). Monitoring of this subspecies indicates fluctuating low numbers and periodic disappearance from sites (Steele 1989). During a study of previously described populations, Steele (1989) discovered previously undescribed populations in Mono County, occupying habitat considered atypical for the species.

Available genetic information suggests that there is some degree of gene flow between populations, but there is increasing evidence of isolation between neighboring populations (Piaggio and Jeffers 2013). Piaggio and Jeffers (2013) confirmed low genetic diversity and evidence of population bottleneck amongst sampled populations.

A. r. californica requires cool, moist, high elevation riparian or wet/boggy or spring areas with free flowing water and succulent vegetation (Lovejoy et al. 1978, Beier 1989, Carraway and Verts 1993, Piaggio et al. 2013). Suitable habitat areas are often geographically and topographically isolated from one another, which suggests that habitat for this species has always been marginal and patchy (Beier 1989, Steele 1989). They have very limited dispersal capability due to their fossorial lifestyle, reliance on free water and cool moist habitats, and an inability to disperse across unsuitable habitat in search of mates or unoccupied suitable habitat.

Degradation and loss of habitat has been identified as a threat to Sierra Nevada mountain beavers and has been documented as a source of population declines. The Los Angeles Aqueduct in Mono County and California, utility water storage projects throughout the Sierra Nevada resulted in a reduction (i.e., loss) of suitable streamside habitat required by mountain beavers (Steele 1989). Developments such as ski resorts at Mammoth and June Lakes and urban-recreation developments at Lake Tahoe appear to have negatively affected this subspecies. Negative effects such as habitat degradation and loss described above are evidenced by the apparent loss of known populations (Steele 1989).

Beier (1989) suggests that other management activities such as road construction, livestock grazing, and herbicide applications can influence habitat suitability by reducing soil drainage, altering vegetative species composition and reducing vegetative cover density (Williams and Kilburn 1984). Reduced soil drainage could result in the inability of mountain beavers to dig and maintain the extensive burrow systems they require as primarily fossorial animals. Reducing vegetative composition and cover could negatively affect Sierra Nevada mountain beavers by reducing or removing desired forage species such as alder, aspen, and willow and reducing cover which provides protection from predators.

Inyo National Forest Rationale

Sierra Nevada mountain beaver has been considered a “common” species and due to its inference of being common, Sierra Nevada mountain beaver is not surveyed nor well documented. In 2016, the Inyo National Forest queried the public on Facebook for information on their favorite beaver ponds on the forest. Beaver dams are found in numerous locations throughout the Inyo National Forest, including Convict Lake and Rock Creek Lake, and along Bishop Creek, Rock Creek and McGee Creek. In the Biodiversity Information Serving Our Nation (BISON) database, there are many museum records from the forest with the majority from the early 1900s. On the Inyo National Forest, and similar to the ability for pika to move through some of the same areas, there should be an equal risk and ability for the mountain beaver to disperse between high alpine meadow areas within the Sierra Nevada range. The greatest threat is climate change; there could be a decrease in snowpack, thus a change in water availabily to its moist meadow habitat.

On the Inyo National Forest, potential habitat can be found in the riparian meadow and riparian non-meadow ecological assessment types. The largest riparian meadow systems on the Inyo occur on the Kern Plateau (approximately 10 percent) while about 1.5 percent of the land area in the Ansel Adams and John Muir Wildernesses is meadow. For a description of riparian conditions on the Inyo National Forest, see the section "The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics" in the rationale for Sierra Nevada willow flycatcher.

Limiting factors identified as threats to persistence for Sierra Nevada mountain beavers include narrow habitat requirements, low population densities, limited dispersal capability, low reproductive rate that limits resilience to disturbance, and habitat degradation or loss. In addition, genetic diversity of sampled populations is low, and gene flow between individual colonies is limited.

Based on habitat conditions, mountain meadows within the plan area have been stable. The best available scientific information about the Sierra Nevada mountain beaver does not indicates substantial concern about the species' capability to persist over the long-term in the plan area. Based upon the evidence and supporting best available science, the **Sierra Nevada mountain beaver** does not meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Sierra Nevada Snowshoe Hare - *Lepus americanus tahoensis*, Oregon Snowshoe Hare - *Lepus americanus klamathensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Loss of forested habitat from management activities, climate change, or fire. Reduction in understory vegetative cover or coarse woody debris.

Rationale for snowshoe hare

The Sierra Nevada snowshoe hare (*L. a. tahoensis*) has a global rank of G5 (secure) and a subspecies rank of T3T4Q (vulnerable to apparently secure) (NatureServe 2015). The Oregon snowshoe hare (*L. a. klamathensis*) has a global rank of G5 (secure) and a subspecies rank of T3T4Q (Vulnerable to apparently secure). These ranks were updated in 1993 and are based on Hall (1981 in NatureServe 2015). These two subspecies are no longer considered valid subspecies and are now grouped with *L. a. oregonus* under the valid subspecies *L. a. cascadensis* (Wilson and Reeder 2005). Thus, the Sierra Nevada and Oregon snowshoe hare have a wider geographic distribution than was considered for the current NatureServe rankings. However, the Sierra Nevada and Oregon snowshoe hare are still considered two distinct subspecies by California Department of Fish and Wildlife and both are ranked by California state as S2 (imperiled). They are recognized as species of special concern and species of greatest conservation need. In Nevada, snowshoe hare is an S3. Little research exists on snowshoe hares in California; therefore, most information considered in making this determination is attributed at the species level snowshoe hare (*Lepus americanus*).

Population estimates and trends are not available; however, distribution is considered patchy with populations common in some areas. The patchy distribution is attributed to habitat patchiness (Collins 1998, Ellsworth and Reynolds 2006). Populations are considered weakly cyclic, irruptive, yet largely stable at the species level (Murray 2000).

Snowshoe hares are most often found at mid-high elevations in dense cover of montane riparian habitats with thickets of alders and willows and are also found in stands of young conifers interspersed with chaparral (Zeiner et al. 1990, Ellsworth and Reynolds 2006).

Declines in the abundance of forest types used by snowshoe hares could decrease habitat connectivity potentially resulting in isolation of sub-populations and reducing colonization rates (Ellsworth and Reynolds 2006). Primary landscape-wide threats that could bring about such changes are climate change and forest management practices (e.g., fire suppression, wildland or prescribed fire, vegetation treatments including timber harvest); however, research quantifying the effect of these threats to the persistence of this species are not available.

Climate change could result in the range restriction of sub-alpine forest habitat as other drought tolerant species migrate upslope, possibly resulting in a reduction of habitat availability. Fire suppression can result in the loss of young conifer/sub alpine forest habitat. Wildland and prescribed fire or logging practices that result in removal of understory vegetation and coarse woody debris could reduce habitat

suitability for snowshoe hares. Bull and others (2005) investigated effects of pre-commercial thinning on snowshoe hare habitat use in northeastern Oregon and snowshoe hare abundance was higher in unthinned stands and in stands that were patch cuts (10-meter-wide cuts interspersed with unthinned patches 10 to 30 m wide). They report snowshoe hare use was higher in open stands during the winter months and higher in dense stands during the summer, suggesting seasonal variation in habitat use. Retention of vegetation and coarse woody debris within 1 -2.5 meters of the ground is associated with snowshoe hare habitat use, providing important forage and hiding cover (Wolfe et al. 1982, Bull et al. 2005, Lewis et al. 2011). Habitat connectivity is needed for dispersal, colonization, and genetic exchange between populations (Ellsworth and Reynolds 2006).

Other potential but less widespread threats include recreation development, snowmobile trails, grazing, and hunting. Recreational development that results in the direct removal of habitat is likely to negatively affect snowshoe hares. Creation and maintenance of snowmobile trails can increase exposure to predation by improving access for predators such as coyotes. Grazing pressure that results in a reduction in shrub cover may reduce habitat suitability for snowshoe hares (Collins 1998). Although considered imperiled with some uncertainty in California by CDFW, snowshoe hares are classified as a small game species with a daily bag limit of 5 with up to 10 in possession (CDFW 2016). The effect of these threats on snowshoe hare populations is unknown (Collins 1998, Ellsworth and Reynolds 2006).

In the Biodiversity Information Serving Our Nation (BISON) database, there are no snowshoe hare on the Inyo National Forest that are georeferenced, nor for any of these subspecies. There are no records of snowshoe hare georeferenced south of the Stanislaus NF-Humboldt-Toiyabe NF area. The Oregon Snowshoe hare does not occur on the Inyo National Forest, yet the Sierra Nevada Snowshoe Hare does. In Collins (1998), 1 record occurs within Mono County near the borders with Fresno and Madera Counties. Collins (1998) further defines the southern boundary of snowshoe hare is north of Mammoth. Considering the range wide distribution of the species, across North America and at higher elevations in the Rocky Mountains and Sierra Nevada Range, there is less of a concern for these subspecies.

The best available scientific information about the snowshoe hare regarding species distribution, abundance, population and habitat trends, relevant threats or limiting factors does not indicate substantial concern for the species' capability to persist over the long-term in the plan area. Based upon the lack of evidence and supporting best available science, the Sierra Nevada and the Oregon snowshoe hare don't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Silver-haired bat - *Lasionycteris noctivagans*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Reduction in available roost sites through the removal of conifer and hardwood trees (dead and dying) during timber harvest or fires.

Rationale for silver-haired bat

The silver-haired bat (*L. noctivagans)* has a global rank of G4 (Apparently Secure) and a California State rank of S3S4 (Vulnerable to Apparently Secure). The silver-haired bat has been assigned a Medium Priority designation by the Western Bat Working Group, indicating a level of concern that warrants closer evaluation, more research, and conservation actions of both the species and possible threats.

Population estimates are not available; however, they are considered locally common where abundance has been reported (Kunz 1982). Reported short and long-term population declines related to historical deforestation, consequent changes in forest structure, and fatalities at wind energy facilities, but the degree of decline is uncertain (NatureServe 2015).

Silver-haired bats are primarily forest bats, associated with conifer and mixed-conifer hardwood forests. They almost exclusively roost in tree cavities, under loose bark, or in cracks/crevices of dead trees (Kunz 1982, Barclay et al. 1988, Campbell et al. 1996, Mattson et al. 1996, Vonhof and Barclay 1996, Betts 1998). They use dead and dying trees (coniferous and hardwood) for roosting that range from 20-74 cm

(8-30 inches) (Barclay et al. 1988, Campbell et al. 1996). They utilize pine, fir, cedar, aspen, willow, and oaks for roosting structures (Barclay et al. 1988, Campbell et al. 1996, Mattson et al. 1996). They forage above the tree canopy, over open meadows, in riparian zones along watercourses, and over ponds (Kunz 1982). Habitat trends are unknown; however, based on their use of smaller trees for roosting structures and their use of a variety of foraging habitats, these are not considered limiting factors in the plan area.

The greatest threats to the persistence of silver-haired bats throughout their range include deforestation and reductions in roost site availability (Kunz 1982, Campbell et al. 1996) as well as direct mortality associated with wind energy facilities (Johnson et al. 2003, Arnett et al. 2008, Baerwald and Barclay 2011, Ellison 2012). The loss of roost trees reported by (Campbell et al. 1996) was specific to northeastern Washington where trees ≥ 30cm (12 inches) are rare. Trees (dead, dying, and live) this size and larger are abundant and available throughout the plan area. Wind energy facilities area a major source of direct mortality for silver-haired bats and are cited as being responsible for up to 18 percent of total fatalities (Arnett and Baerwald 2013 *in* NatureServe 2015).

White nose syndrome (a cold-loving fungus that afflicts bats hibernating in caves and mines) is a potential threat that has not yet been detected in California. Isolated records have documented silver-haired bat use of caves and mines for hibernating in winter (Kunz 1982). *Pseudogymnoascus destructans* (the cold loving fungus that causes the disease known as white nose syndrome) has been detected on silver-haired bats outside of California, but they were not confirmed to have the disease indicating they may be a carrier of the pathogen (USFWS 2014, Sleeman 2016). Based on what is known about silver-haired bats and white nose syndrome, this threat is not considered a limiting factor within the plan area.

Inyo National Forest Rationale

For the Inyo National Forest, populations and trends are not known. In a study in the White and Inyo Mountains of California and Nevada, two individual silver-haired bats were observed out of 2668 bat observations (Szewczak et al. 1998). *There is currently insufficient information to determine if this species is at risk for persistence on the planning unit*. Based upon the lack of evidence and supporting best available science, the **silver-haired bat** doesn't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Spotted bat - *Euderma maculatum*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Human disturbance at roost sites, loss or degradation of foraging habitat, loss of roost habitat, use of pesticides.

Rationale for spotted bat

The spotted bat has a global rank of G4 (apparently secure) and a California state rank of S3 (vulnerable). The spotted bat is recognized as a species of special concern by California Department of Fish and Wildlife. This species has been assigned a high priority designation by the Western Bat Working Group, indicating this species should be considered one of the highest priority for funding, planning, and conservation actions. This species is imperiled or are at high risk of imperilment. According to the Western Bat Working Group, the spotted bat has been listed as a species of concern because of limited information available, and uncertainty as to life history and population trends.

Population size is unknown but this species is not as rare as previously believed and population trend uncertain but probably relatively stable or slowly declining (NatureServe 2015). Distribution of spotted bats appears to be patchy and limited to areas with suitable roosting habitat, predominately high cliff faces (Easterla 1973, Wai-Ping and Fenton 1989, Navo et al. 1992, Pierson and Rainey 1998). They forage in a variety of habitats including riparian corridors, forest edges, oak woodlands meadows, ponds, and agricultural fields (Findley and Jones 1965, Berna 1990, Pierson and Rainey 1998). Foraging habitat is not considered a limiting factor due to the extensive habitats used and their ability to travel one-way

distances of up to 25 miles from their roost sites to forage (Wai-Ping and Fenton 1989, Chambers et al. 2004, NatureServe 2015).

Little is known about possible threats to spotted bats because of lack of knowledge of this species. Because the spotted bat roosts in remote locations, threats to roosts seem unlikely; however, recreational rock climbing may cause impacts in some areas (NatureServe 2015). Additional threats include; loss or degradation of forage habitat (meadows and grassland open areas) from grazing or other disturbances that result in a loss of native vegetative species and consequently prey species reliant on that vegetation (Pierson and Rainey 1998), dam construction that inundates high cliffs and canyons that may result in the removal of roost habitat (Snow 1974), and use of pesticides that may bio accumulate in bats or kill prey species. The magnitude of these threats is considered negligible in the plan area. White nose syndrome (a cold-loving fungus that afflicts bats hibernating in caves and mines) is a potential threat that has not yet been detected in California, but has recently been documented in Washington State (Sleeman 2016). Spotted bats are not known to be affected by white-nose syndrome. Isolated records have documented spotted bat use of caves and mines for roosting during summer months (Mead and Mikesic 2001, Sherwin and Gannon 2005), but they are most closely associated with cliff faces for roosting habitat (Pierson and Rainey 1998, Priday and Luce 1999). Based on what is known about spotted bats, these threats are not considered limiting factors within the plan area.

Limestone and dolomite formations occur in the Sierra Nevada, White and Inyo Mountains. Although caves may be naturally limited in the White-Inyo Mountain range (Szewczak 1998). Inventories of abandoned mine features by the Inyo National Forest are ongoing with roughly sixty percent inventoried to date years (USDA FS unpublished data, C. Garcia pers comm.). In addition, out of 256 abandoned mines surveyed in 2009 two had bats present and suitable habitat, 15 were ranked as having potential bat habitat, 230 did not have any potential bat habitat, and nine did not have information on bat habitat. Of those ranked as having potential bat habitat, seven of those were listed as occupied sites in the 1990s (See the Forest Assessment Topic Paper Chapter 10- Minerals, for more info).

A survey of 100 mines in the Benton Range/Casa Diablo Mountain area in the winter of 1999 found less hibernating bats than in the White Mountains to the east, likely a result of less suitable habitat (drier and less riparian habitat for foraging). In addition mines in that area likely provided moderate sub-surface temperatures; only four mines in the range had temperatures that were below fifty degrees Fahrenheit, the preferred temperature for roosting.

Population trend is unknown though suspected to be stable or only slightly declining. Spotted bats are not as rare as previously believed, they roost in remote locations away from most disturbance sources and have an exceptional foraging range using a wide variety of habitat types. The best available scientific information about the spotted bat regarding relevant threats or other limiting factors does not indicate substantial concern about the species' capability to persist over the long-term in the plan area. Based upon the lack of evidence and supporting best available science, the **spotted bat** doesn't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Townsend's big-eared bat - *Corynorhinus townsendii*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? **Yes**

Proposed Species of Conservation Concern

No

Relevant threats to species

Threats include human disturbance, improper mine/cave closure, white nose syndrome, low fecundity or high first-year mortality.

Rationale for Townsend's big-eared bat

The Townsend's big-eared bat has a global rank of G4 (apparently secure) and California state rank of S2 (imperiled). There are five known subspecies and phylogenetic evaluation concluded that *Corynorhinus townsendii townsendii* is the only subspecies occurring in California (Piaggio and Perkins 2005, Piaggio et al. 2009). This evaluation considers the Townsend's big-eared bat at the species level and acknowledges that the subspecies present within the plan area is *Corynorhinus townsendii townsendii.*

The subspecies Townsend's Western big-eared bat (*Corynorhinus townsendii townsendii*) occurs throughout California and has a global rank of G3G4 (vulnerable to apparently secure) a subspecies rank of T3T4 (vulnerable to apparently secure) and California state rank of S2 (imperiled).The Townsend's big-eared bat is classified as a sensitive species by Region 5 of the Forest Service and the Bureau of Land Management; the California Department of Fish and Wildlife classifies it as Candidate Threatened, Species of special concern and species of greatest conservation need; and the Western Bat Working Group considers it a high priority species. This species is vulnerable due to high sensitivity to disturbance of roosting sites and strong affinity for specific cave habitat requirements.

Caves and cave-like roosting structures and hibernacula comprise its most critical habitat features; roost zones are in cooler air near the cave or mine entrance (Barbour and Davis 1969, Kunz and Martin 1982). Historically, the Townsend's big-eared bat was found throughout California as a scarce, but widespread species (Barbour and Davis 1969). Research suggests substantial declines throughout California over the past 40 to 60 years, including an estimated 54 percent decline in individuals, 52 percent decline in maternity colonies, and a 45 percent decline in available roosts (Pierson and Rainey 1998). The most marked declines occurred in the central Sierra Nevada (Pierson and Rainey 1998).

The species is highly vulnerable to human disturbance in or adjacent to caves, in particular hibernacula and nursery sites (Zeiner et al. 1990, Piaggio and Perkins 2005, Gruver and Keinath 2006). The species is particularly vulnerable during the maternity season, when females are aggregated and rearing defenseless young (Pierson and Rainey 1998); In fact, a single visit may result in abandonment of the entire roost (Barbour and Davis 1969, Zeiner et al. 1990). Townsend's big-eared bats have low fecundity and high first-year mortality; therefore, populations are slow to recover (Pierson et al. 1999). Improper closure of caves or mines can eliminate access to roosting habitat and potentially trap bats if timing is not appropriate (Pierson and Rainey 1998, Gruver and Keinath 2006).

In addition to the existing, known threats, an emerging threat is white-nose syndrome. White-nose syndrome is a highly-contagious infection of hibernating bats and it has been associated with massive mortality of cave-hibernating bat species in the northeastern United States (Blehart et al. 2009). This disease has rapidly spread throughout the eastern United States and Canada since its discovery in 2006 and was recently discovered in Washington State in March of 2016 (Lorch et al. 2016, Sleeman 2016). Townsend's big-eared bats (*Corynorhinus townsendii townsendii*) are not known to be affected by white nose syndrome. *Pseudogymnoascus destructans,* the fungus that causes the disease known as white nose syndrome, has been detected on a close relative, the Virginia big-eared bat (*Corynorhinus townsendii virginianus*) but they have not been documented to have the disease (Coleman 2014). Additionally, another close relative in the affected area, Ozark big-eared bat (*Corynorhinus townsendii ingens*) has not yet been confirmed to have white nose syndrome or the fungus (Coleman 2014). Although unknown at this time, white-nose syndrome could have significant negative impacts to Townsend's big-eared bats if it becomes established in the plan area.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (chapters 1, 3, 5, 8, 10), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

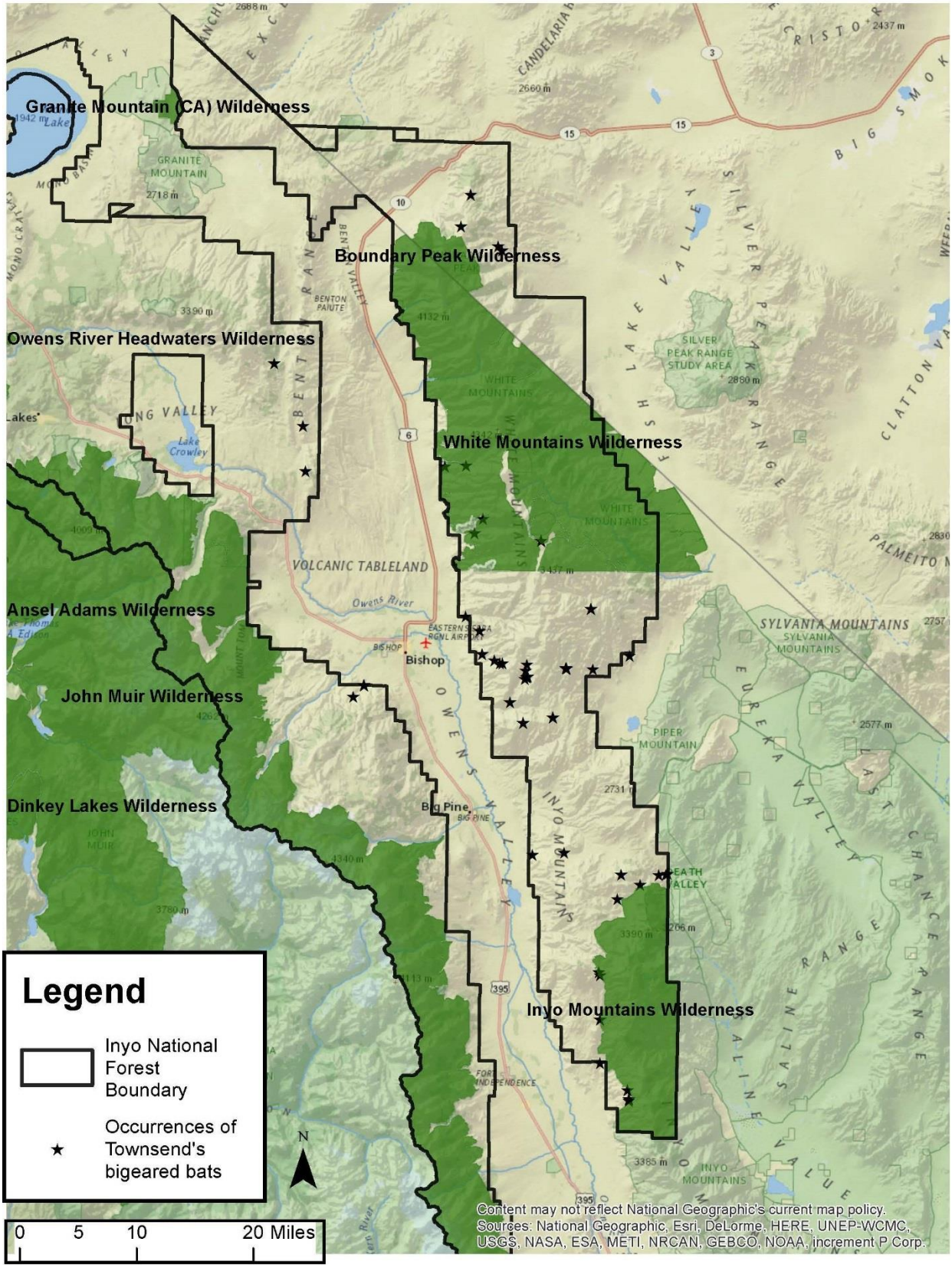

Figure 3. The Inyo National Forest has 802 records at 66 unique site occurrences for Townsend's bigeared bats on the eastern portion of the White Mountain and Mount Whitney Ranger Districts. Data from NRIS database.

Information on current distribution of the species on the planning unit

The species is found from sea level along the coast to 6,000 feet in the Sierra Nevada (Dalquest 1947, Pearson et al. 1952, Pierson and Rainey 1996). In the White Mountains, summer records for males extend up to 7,900 feet, and hibernating groups have been found in mines as high as 10,460 feet (Szewczak et al. 1998). Maternity colonies are more frequently found below 6,560 feet (Pierson and Fellers 1998, Szewczak et al. 1998). In the NRIS database, the Inyo National Forest has 802 records (at 66 unique sites) occurring on the eastern portion of the White Mountain and Mount Whitney RDs (Figure 3).

Ongoing surveys of hibernacula in a specific subset of 60 abandoned mines (primarily adits) on the Inyo-White Mountain Range (2013-2016) have found no discernable trend over the past 3 winters in the number of hibernating bats encountered. In general, bat numbers appear stable to increasing at most sites. Over three hundred Townsend's bats have been detected annually across BLM and FS lands during that effort: 2013-14 (311 bats), 2014-2015 (310 bats), and 2015-16 (320 bats) (Morrison 2016, unpublished data). On the Inyo National Forest in particular, there have been as few as 1 and as many as 35 bats observed at approximately 29 features (of 59 features surveyed) over that same time frame. Note: this number may reflect multiple adits (entrances) for the same mine; not all mines are surveyed every year as part of this effort. Occurrence data extracted from the NRIS database, displayed as specific sites surveyed by year as part of the hibernacula surveys mentioned above, are displayed in Figure 4, Figure 5 and Figure 6; they show whether each feature was surveyed, and any positive or negative detections. While the Inyo National Forest does provide important hibernacula for winter use, it is likely not suitable for maternity roosts because of its high elevation. The only known maternity colony is relatively newly discovered, and occurs in lava fields above Tinemaha Reservoir. Detailed information for this site is still forthcoming (M. Morison pers. comm).

Ecological conditions for this species (see above for additional information)

This species uses multiple ecosystem types for foraging and uses habitat which contains rocks (canyons, caves, mines, ledges, talus slopes, and cliffs), and or manmade habitat (buildings, bridges) as well as large trees and snags for roosting. The primary limiting factor for this species is adequate roosting substrate/hibernacula especially in caves and mines (Krueger 2016). Most known detections of Townsends bat have occurred in Pinyon juniper/sagebrush and desert habitat in the White Mountains.

Foraging habitat and secondary roost sites may also occur in mixed conifer forest-dominated montane zone (mid-elevation mixed conifer and hardwood mixed con forests) which include mixtures of ponderosa pine or Jeffrey pine, black oak, sugar pine, incense cedar, and white fir. There are approximately 45,671 acres (2 percent) of the mixed conifer assessment type on the Inyo National Forest. Additional habitat also occurs in riparian corridors (foraging) and desert scrub (roosting sites).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Limestone and dolomite formations occur in the Sierra Nevada, White and Inyo Mountains. Although caves may be naturally limited in the White-Inyo Mountain range (Szewczak 1998), the presence of potential hibernacula sites for Townsend's bat is likely at or above reference conditions due to mining activity in the area. Active mining claims are present within the Inyo National Forest and include lode, placer, and mill site claims. The Inyo National Forest assessment notes that groupings of mining claims are found in the areas of Mazourka Canyon, Pine Creek, Mammoth Lakes Basin, Little Hot Creek, Black Point, Truman Meadows, and Sugarloaf. Active mining claims are also scattered along the lower elevations of the west side of the White Mountains in California and east side in Nevada, the western slopes of the Inyo Mountains, and the eastern slopes of the Sierra Nevada near Big Pine and north to Lee Vining. There are an estimated 1500 abandoned mines on the forest.

Several survey efforts have documented hibernacula. The Forest conducted an abandoned mine survey in 2009 which provided information on the type and condition of previously mined areas. This survey also ranked the potential of bat presence at a site, from bat present to no habitat. Out of the 256 sites surveyed during that effort, 2 had bats present and were considered suitable habitat, 15 were ranked as having potential bat habitat, 230 did not have any potential bat habitat, and 9 did not have information on bat habitat. Of those ranked as having potential bat habitat, 7 of those were listed as occupied sites in the 1990s (See the Inyo National Forest Assessment-Chapter 5). Inventories of abandoned mine features are ongoing across the forest with roughly 60 percent inventoried within the last five years (USDA FS unpublished data, C. Garcia pers comm.). A survey of 100 mines in the Benton Range/Casa Diablo Mountain area in the winter of 1999 found less hibernating bats than in the White Mountains to the east, likely a result of less suitable habitat (drier and less riparian habitat for foraging). In addition mines in that area likely provided moderate sub-surface temperatures; only four mines in the range had temperatures that were below fifty degrees Fahrenheit, the preferred temperature for roosting (Sweczack 2000).

Stands of mixed conifer forest occur not only within the mixed conifer assessment type, but within the red fir, Jeffrey pine, and subalpine conifer assessment types as well. The mixed conifer assessment type (which does not necessarily include all mixed conifer stands) found within the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately ¾ of the mixed conifer assessment type is within wilderness, though stands of mixed conifer forest do occur in other areas of the Inyo National Forest.

Snags are ephemeral feature on the landscape with presence or absence dependent on both natural and human induced patterns of disturbance. The forest assessment for the Inyo notes the following densities for snags greater than 15 inches dbh (similar patterns can be seen for large trees by forest type). Median trees per acre (coefficient of variation in parentheses) with the potential for roosting trees were 1.2 (158 percent) in aspen, less than 0.1 (277 percent) in Jeffrey pine, 1.8 (109 percent) in red fir, and 0.3 (85 percent) in mixed conifer. It is unknown how these levels differ with historic levels prior to fire suppression and logging, which primarily affect the Jeffrey pine forest.

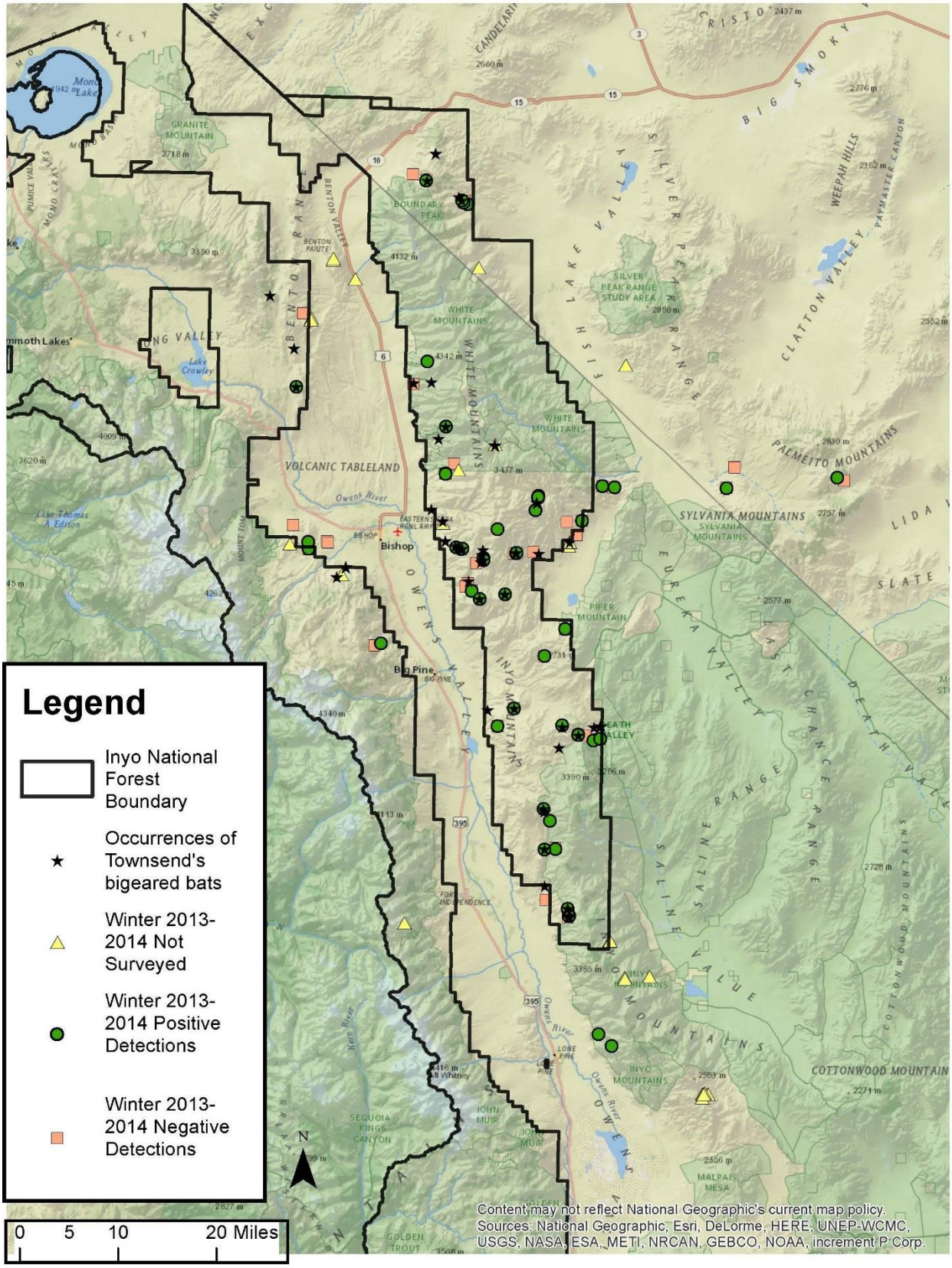

Figure 4. Winter 2013-2014 surveys of hibernacula in a specific subset of 60 abandoned mines (primarily adits) on the Inyo-White Mountain Range.

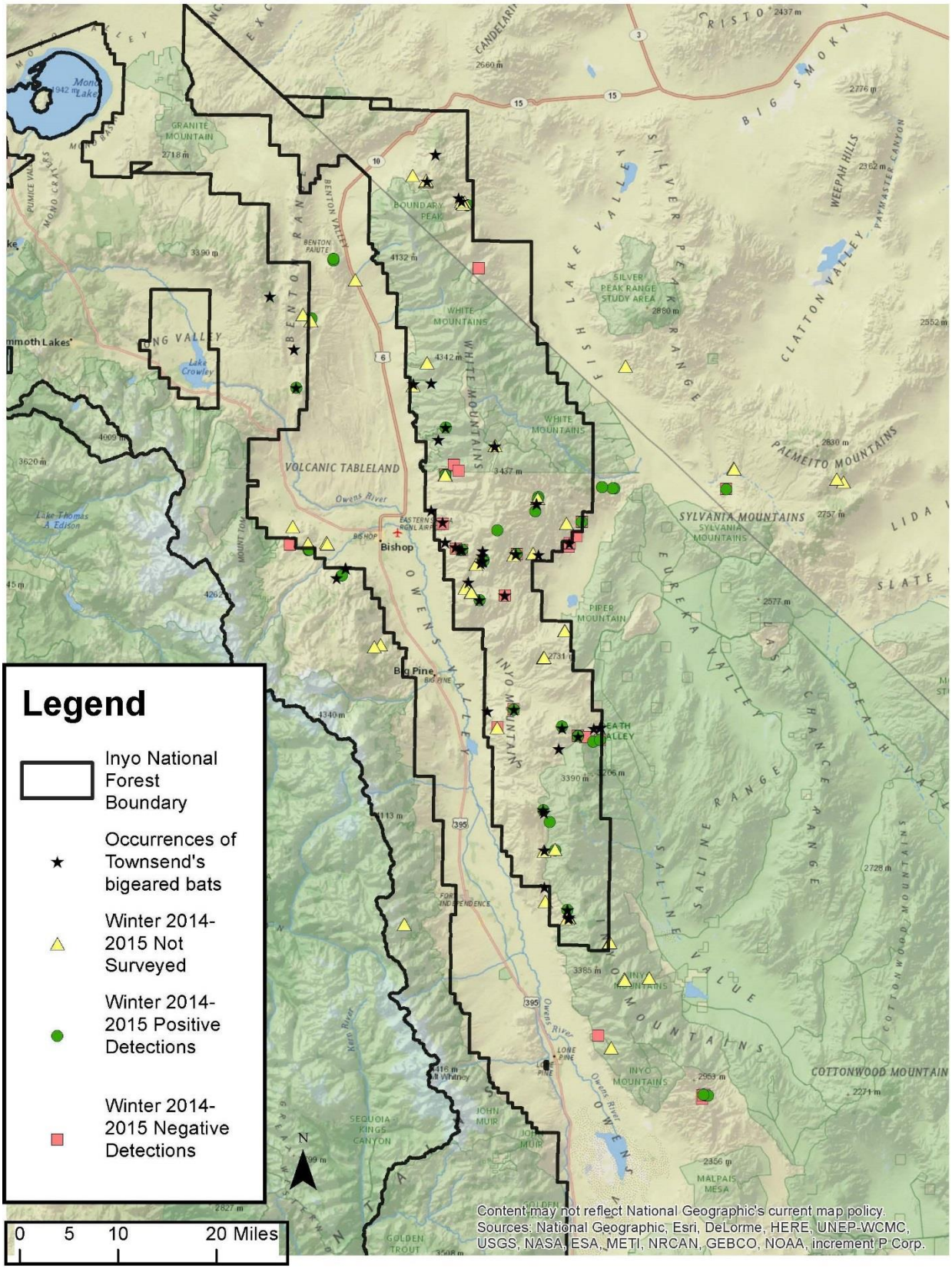

Figure 5. Winter 2014-2015 surveys of hibernacula in a specific subset of 60 abandoned mines (primarily adits) on the Inyo-White Mountain Range.

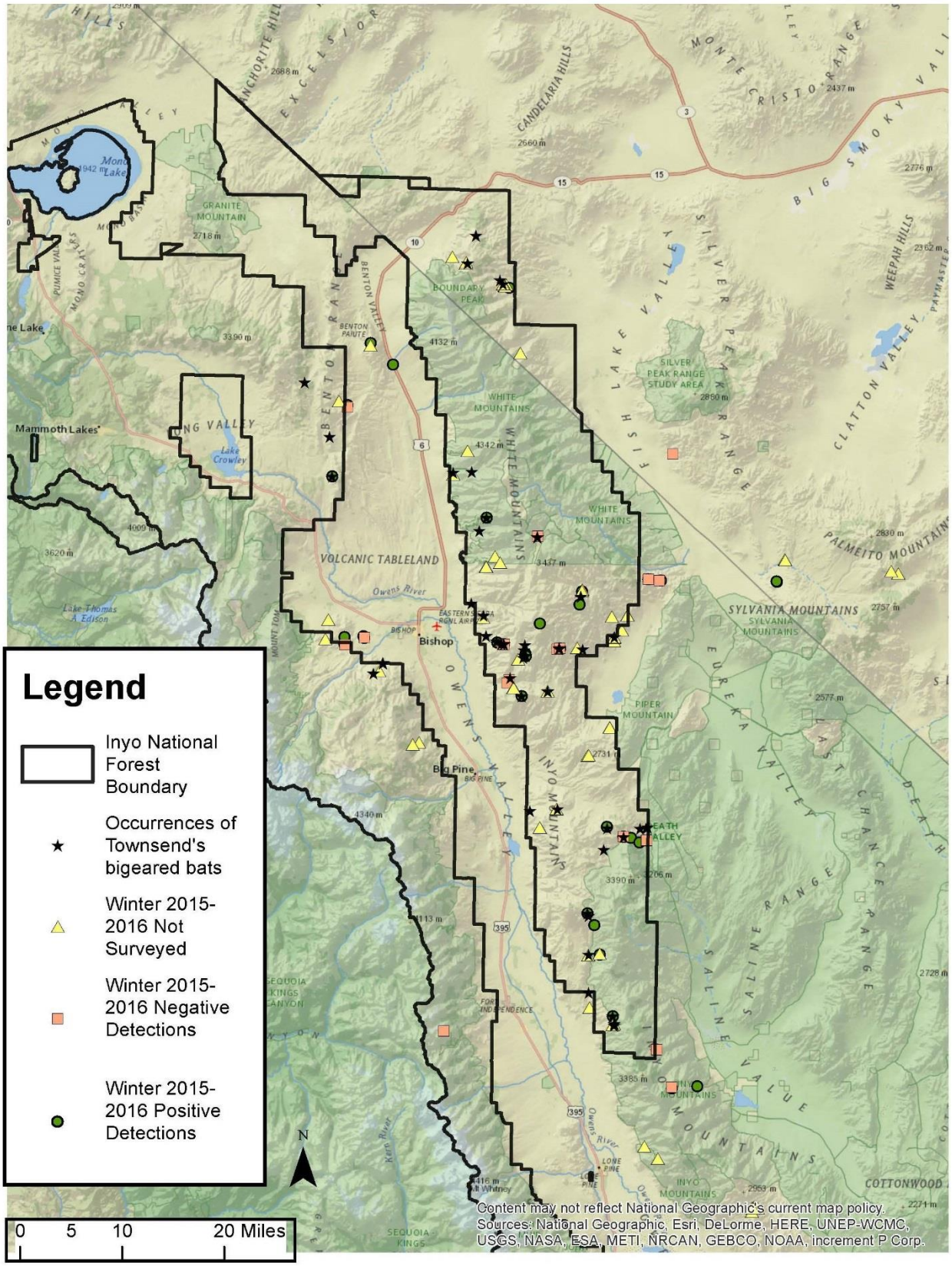

Figure 6. Winter 2015-2016 surveys of hibernacula in a specific subset of 60 abandoned mines (primarily adits) on the Inyo-White Mountain Range.

The projected status of those ecological conditions relative to the species considered

The amount of cliff, cave, and cave-like habitat is not expected to change; management activities would not substantially affect cliff, cave, or cave-like structures, although outside factors (below) could negatively affect their status. Mine closures if adequately gated can provide increased roosting habitat. Mining claims have the potential to increase in the future which could create additional adits and shafts for bat use.

Anticipated trends to forested habitat include higher fuel loading and changes in forest structure and composition associated with historic fire suppression and changing climate related events (e.g., drought and insect outbreaks).

The ecological conditions not assessed by the assessment of key ecosystem characteristics

The Inyo does not have a Significant Cave List, but there is one limestone cave. The approximate status and number of cave resources is not known.

Key risk factors arising from non-ecosystem conditions and/or management activities

Structures such as adits or buildings that support cave-associated species could be altered or removed, closed and or gated improperly. The forest is actively working to survey abandoned mines or caves that may be hazardous and has been gradually installing bat/wildlife friendly gates at these sites. Pierson and Rainey (1994) noted relatively high densities of C. townsendii in the mining districts of Inyo County, but a lack of historic distribution records precluded assessment of population trends. They noted that several of those populations were under threat from renewed mining operations but did not reference the Inyo National Forest as being specifically at risk.

Disturbance of cave hibernacula by recreationists is another potential threat, however popular spelunking sites do not receive heavy use during winter months and any sites with active maternity colonies for bat species are gated to provide protection in summer when recreation returns to the plan area. There have been no known disruptions to maternity colonies. Overall disturbance during winter is low, but there are some hibernacula that do get disturbed at the beginning of the season as bats just start to arrive (M. Morrison pers. comm). The forest is actively working to manage those areas by installing gates as needed.

Due to the cave roosting nature of Townsend's big ear bat, White Nose Syndrome (WNS) is a potential future threat. However, with the exception of one case in Washington State, there are no documented cases of this disease in the west (Bat Conservation International 2017). In addition, bat species which have been hardest hit by WNS are characterizes by colonies with large clustering behavior and caves with higher humidity levels (Marroquin et al. 2017). Townsend's bat tend to roost alone or in small clusters which may put it less at risk from the potential threat of WNS, should it makes its way to California. In addition, the generally arid habitat of the Inyo and White Mountains may provide less than ideal environmental conditions for *Pseudogymnoascus destructans* (Pd), the fungus that causes WNS, to thrive.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

Townsend's big-eared bat has a ranking of G4 (apparently secure) in NatureServe and a California state rank of S2 (imperiled). The majority of the mixed conifer and Jeffrey pine assessment types which contribute to the suitable timber base on the forest has minimal overlap with known Townsend's bat detection sites. The primary roosting habitat (i.e., caves and mines) this species uses is at or above reference conditions. There is one known maternity colony on the forest and habitat for maternal roosts may be naturally limited and suboptimal based on the Inyo National Forest's high elevation. There have been no documented disruptions or reductions to maternity colonies. Bat usage at monitored roosting sites

appears to at least be stable across the forest and adjacent BLM lands. The Inyo National Forest is actively installing bat friendly gates which provide protection for known hibernacula for all bat species. This effort may also increase potential roosting habitat by way of retired and or new mining adits. The best available scientific information about this species does not indicate substantial concern about the species' capability to persist over the long-term in the plan area. *Based on the consideration of all these factors there is insufficient information to demonstrate substantial concern for long-term persistence in the plan area.*

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Western white-tailed jack rabbit - *Lepus townsendii townsendii*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Habitat loss and degradation from livestock grazing, fire, or development. Predation and hunting may be factors but aren't thought to have significant impacts on populations.

Rationale for Species

The western white-tailed jackrabbit has a global rank of G5 (secure), a subspecies rank of T5 (Secure), and a California state rank of S3? (vulnerable with some uncertainty). This subspecies is also recognized by CDFW as a Species of Special Concern.

Population estimates and trends are unknown but populations are thought to be declining. Loss of habitat from grazing and developments are considered probable factors in the decline of populations (Williams 1986).

White-tailed jackrabbits prefer sagebrush, subalpine conifer, juniper, alpine dwarf-shrub, and perennial grassland habitats but also utilize low sagebrush, wet meadows, and early successional stages of various conifer habitats (Zeiner et al. 1990).

Little information is available regarding threats to the persistence of white-tailed jackrabbits. Livestock grazing that results in a loss of bunch grasses and an increase in exotic grasses such as cheatgrass has been cited as a factor in population declines (Williams 1986, Simes et al. 2015). Increases in exotic grasses have altered fire severity in sagebrush habitats resulting in a direct loss of habitat (Simes et al. 2015). Conversely, Donoho (1971) found no correlation between the number of hare locations and the intensity of grazed pastures in Colorado. Anthropogenic habitat alterations have led to the exclusion of white-tailed jackrabbits and the expansion of black-tailed jackrabbits; however, this is primarily attributed to agricultural development does not explain declines in the Sierra Nevada (Lim 1987). Predation is also thought to influence populations of white-tailed jackrabbits because they are a principal food source of canids and raptors (Lim 1987).

Although considered a vulnerable species with some uncertainty in California, the white-tailed jackrabbit is classified as a small game species with no closed season and no bag limit (CDFW 2016). Oregon and Nevada have curtailed hunting this species based on documented declines. The effects of hunting on populations is unknown.

Inyo National Forest-specific Rationale

Mono County is at the western and southern most limits of the known distribution for western white-tailed jackrabbit. There are about a dozen historic records in the BISON database in or near the plan area, with the most recent reported in 1955. No recent sightings have been reported within the vicinity of the plan area. The best available scientific information about the white-tailed jackrabbit regarding species distribution, abundance, population and habitat trends, and relevant threats or limiting factors does not indicate the white-tailed jackrabbit meets the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Yuma myotis - *Myotis yumanensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: BLM-SS

There are a few BISON records of the species occurring within the Inyo National Forest plan area, and other occurences known in surrounding area (Szewczak et al. 1998). There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

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Birds

American peregrine falcon - *Falco peregrinus anatum*

Is there scientific information to conclude that there is substantial concern about species capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

American peregrine falcon individuals may face threats primarily from environmental toxins, habitat loss, human disturbance, and illegal take (NatureServe 2015).

Rationale for American peregrine falcon

The peregrine falcon has a global ranking of G4, and the American peregrine falcon subspecies has a ranking of T4 indicating it is Apparently Secure, which is defined as "uncommon but not rare; some cause for long-term concern due to declines or other factors." (NatureServe 2015). The California State ranking of S3S4 indicates a range of uncertainty about its status in the State which lies between Vulnerable and Apparently Secure (NatureServe 2015). The Nevada state ranking is an S2.

Peregrine Falcons breed throughout North America and the world (White et al. 2002). Three subspecies occur in California. Two subspecies migrate through or winter in California: Peale's peregrine falcon (*F. p. pealei*) breeds along the Pacific Northwestern coast from Alaska to Washington and winters south to Baja California, and the Arctic peregrine falcon (*F.p. tundrius*) breeds in the Arctic tundra and winters from Mexico to South America (White et al. 2002). The American peregrine falcon (*F. p. anatum*) is the focus of this rationale, and is the only subspecies that breeds in California. The American peregrine falcon, while mainly a resident, may also experience short-range migrations and dispersal in response to seasonal availability of prey resources (primarily waterfowl and other waterbirds) (Earnheart-Gold and Pyle 2001, White et al. 2002, NatureServe 2015).

American peregrine falcon populations declined drastically during the 1950s through the mid-1970s as a result of poisoning, mainly from organochlorine insecticides such as DDT (USFWS 1999). Following the ban on these pesticides and assisted by peregrine falcon reintroduction efforts, peregrine populations have recovered significantly (NatureServe 2015). Breeding Bird Survey data for California indicate a non-significant increase from 1966-2013 (+2.98 percent per year), and from 2003-2013 (+3.80 percent per year) (Sauer et al. 2014). Christmas Bird Count data from across North America show a significant increase from 1966-2013 (+4.4 percent per year) (Soykan et al. 2016). A population viability analysis found that the Peregrine Falcon population in California was increasing, with an estimated 210 individuals in 1992 and 350 in 2012 (Wooten and Bell 2014).

Peregrine Falcons breed across a wide range of biomes in the Americas, though no habitat type appears to be preferred (White el al. 2002). Peregrine falcons typically nest on remote cliff-faces. Since recovery from its pesticide-related population crash, they have also begun nesting in urban areas, and on man-made structures including power-line towers, buoys, tall buildings and large bridges (White et al. 2002). They winter primarily along the coast and in wetland areas inhabited by large numbers of waterfowl. Peregrines prey almost entirely on other bird species, although mammalian and other prey are occasionally taken (White et al. 2002). Peregrine falcons breed and forage across a wide range of habitats in California, including hardwood or conifer forests, chaparral or other shrublands, grasslands, and urban areas, though no habitat type appears to be preferred (White et al. 2002, NatureServe 2015).

There are currently relatively few threats to peregrine falcons or their habitats. The opportunistic use of widespread habitats for nesting helps mitigate against effects of disturbance or anthropogenic changes to remote nesting sites, although low-level disturbance from rock-climbing activities has been documented (White et al. 2002). Peregrines living in urban areas of California are vulnerable to accumulation of polybrominated diphenyl ethers (PBDEs) (Newsome et al. 2010). PBDEs are flame retardants that are used on consumer goods, and have largely been phased out of products due to their detrimental effects on humans and wildlife (Newsome et al. 2010). The PBDEs present in the environment and wildlife have significantly declined in the San Francisco Bay area due to prohibition of specific fire retardants in consumer goods; likely reducing the threat of PBDEs to peregrine falcon populations in California (Sutton et al. 2014). Shooting of adults was a problem during the first half of the 1900s, but this activity has almost completely ceased. Primary causes for concern currently include illegal raiding of nests for chicks by falconers and collisions with man-made structures, including wind turbines (White et al. 2002). In contrast to other raptors which are at high risk, falcons are ranked as moderately at risk of negative

population level effects from collisions with wind turbines (Beston et al. 2016). The predicted effects of climate change on Peregrine Falcon population sizes are mixed. Peregrine falcons in the Sierra Nevada are considered moderately vulnerable to climate change (Siegel et al. 2014).

Inyo National Forest Rationale

Information on current distribution of the species on the planning unit

The Inyo National Forest is within the year-long range for the peregrine falcon (Zeiner et al. 1990). Historical data include two territories in the vicinity of Hot Creek and Mono Lake; both have very limited detection information. Historic peregrine falcon nesting activity was periodically documented in and adjacent to the Mono Basin, including a nesting pair of peregrine falcons at Negit Island (summarized from McCarthy et al. 1986). Following listing, peregrine falcons were released three years in a row (i.e., 1988, 1989, and 1990) at 2 locations on Inyo National Forest, "Lake Crowley Hack Site 1" and "Lake Crowley Hack Site 2", with the goal to release young into suitable habitat where peregrines were absent (Santa Cruz Predatory Bird Research Group 1991). Releases continued on the Inyo National Forest after delisting. Recently, a single bird release was reported informally to Inyo National Forest in 2016 and a single young female was relocated in 2017 from Oceano Dunes State Vehicular Recreation Area due to preying on snowy plover. Both releases were apparently around Whitney Portal Road. The extent of releases is being investigated because this action may pose a concern to current conservation efforts for at-risk species such as the bi-state greater sage-grouse.

In the early 2000s, peregrine falcons were occasionally seen on the northwest shore of Mono Lake and at the DeChambeau Ponds and DeChambeau Ranch vicinity. Nesting is pretty rare; a nesting attempt was reported in 2005 when fledged young were seen in the vicinity of Tom's Place in Mono County, and a nesting attempt on Negrit Island was reported in 2016 (Nelson 2016). At present, there are no known occupied eyries on the Inyo National Forest.

In eBird, there are 187 records of 196 individuals within the forest boundary; within 5 miles of the forest boundary and including the plan area, there are 498 records within 546 individuals. In CNDDB, there are no records within the forest boundary or within 5 miles of the forest boundary. Surveys in the area to the north in the Long Valley, near the Inyo National Forest, indicate 24 peregrine chicks fledged at Crowley Lake (Audubon 2017). Based upon records, it appears the important nesting areas are near but not within the Inyo National Forest.

Key ecological conditions for this species (see above section for additional details)

This species occupies multiple ecosystem types containing rocks (canyons, caves, mines, ledges, talus slopes, and cliffs), and or manmade habitat (buildings, bridges). The primary limiting factor for the peregrine falcon is cliffs.

It is not currently known how many acres of suitable cliff habitat are located on the forest, although presumably this number remains unchanged from the reference condition. Anecdotal information from forest biologists suggests that cliff habitat is abundant, however cliff nesting habitat within close proximity to high quality foraging habitat (e.g. waterfowl rich lakes and streams) appears to be limited. Hot Creek and the Gorge are suitable year round, however, much of the cliff habitat is still covered in snow during nesting season creating a temporal mismatch between the breeding season and habitat suitability.

The projected status of those ecological conditions relative to the species considered

Large cliffs, caves, and cave-like habitats should remain stable; however increased pressure from recreational rock climbing could affect peregrines if any do indeed start nesting regularly on the forest in the future.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Disturbance of nests from recreational rock-climbing activities can be a risk factor. Some key recreation sites or areas on the Inyo National Forest include Mt. Whitney, Mammoth Mountain Ski Area, Mammoth Lakes Basin, Mono Lake, June Lake, Coyote Flat, Bishop Creek, Whitney Portal, Papoose Flat, the Ancient Bristlecone Pine Forest, Reds Meadow, the Buttermilk climbing area, the Kern Plateau, Ansel Adams and John Muir Wildernesses, and Rock Creek. Many of these key recreation sites or areas occur within the hub recreation settings, which are comprised of well-known attractions that receive high amount of concentrated recreation use. Rock climbing and mountaineering are popular recreation activities on the Inyo National Forest, particularly in the Buttermilk area (USDA 2013). No disturbance or encounters with peregrine falcon have been observed or reported, including any known nesting areas.

Pesticides/chemicals and wind turbines are potential risks for this species, however there have been no documented cases of poisoning for this species on the forest. There are no windfarms in close proximity to the forest and no mortalities resulting from collisions have been reported or observed. However, as renewable energy demands increase, windfarms may become more relevant to the plan area, particularly on the southern end of the forest.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit.**

American peregrine falcon is globally secure; however under the California State ranking some uncertainty exists as to whether it is secure or vulnerable. The primary threats to peregrine falcon (e.g. pesticides and wind turbines) for this species have not been observed on the Inyo National Forest: no disturbance or encounters with peregrine falcon have been observed or reported, including in any known nesting areas; there have been no documented cases of poisoning for this species on the forest; and there are no windfarms in close proximity to the forest and no mortalities resulting from collisions have been reported or observed. Infrequent nesting does occur on the forest, with nesting more common adjacent to the forest where habitat appears more suitable. Existing habitat is expected to remain stable for this species. *There is insufficient information to suggest this species is at risk for persistence on the planning unit at this time.*

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American white pelican - *Pelecanus erythrorhynchos*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Loss of foraging by human disturbance: habitat loss and bioaccumulation of agricultural and industrial chemicals; climate change resulting in reduced water levels on foraging grounds, which may negatively affect prey availability. Mortality from inclement weather events.

Rationale for American white pelican

The American white pelican has a global rank of G4 (Apparently Secure) and a California State rank of S2 (Imperiled). This species is also recognized as a Species of Special Concern and a Species of Greatest Conservation Need by CDFW.

American white pelicans are not known to breed on National Forest System lands but may be found within the plan area during migration, foraging bouts, or the non-breeding seasons. While nesting colonies within California have declined, several data sources indicate that California populations (includes overwintering populations) have increased at a rate of about 4 percent per year between 1966 and 2013 (Sauer et al. 2013). An earlier study concluded populations in California have changed little since 1950 (Shuford 2005).

American white pelicans generally breed on islands in freshwater lakes and forage away from nesting colonies, using a broad range of wetland habitats including streams, marshes, lakes, and reservoirs. They primarily feed on small fish and crayfish that they scoop out of the water.

Threats to the persistence of American white pelicans include habitat loss and bioaccumulation of agricultural and industrial chemicals, but these threats have been reduced in recent history. Climate change effects including decreased water levels on nesting or foraging grounds could result in an increased vulnerability to predation and may negatively affect prey availability. Other threats identified include human disturbance and infectious disease spread at nesting colonies, which can result in direct mortality and nest abandonment. These threats are primarily related to breeding habitat and are not considered limiting factors within the plan area.

Inyo Forest Rationale

Owens Valley is a fly way for many birds; it offers many popular “birding hotspots” that include numerous sightings of American white pelican by hundreds of visitors and local birders. Crowley and Mono Lake, around Bishop, as well as numerous ponds and waterways along Hwy 395(that parallels Inyo National Forest) garnish hundreds of eBird sightings every year when these birds migrate through. The American white pelican is such a large white bird with a distinct bill that it is unlikely to be misidentified, which when combined with eBird provides a “citizen-type” monitoring over time.

In eBird, there are 168 records with 2375 individuals within the forest boundary, and within 5 miles and including the forests, there are 1669 records of 72,065 individuals. There are no records in CNDDB within 5 miles of the forest.

There are no known relevant threats to the American white pelican within or near the plan area. The best available scientific information about the American white pelican does not indicate substantial concern about the species’ capability to persist over the long term in the plan area.

Based upon the lack of evidence and supporting best available science, the American white pelican doesn’t meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Bank swallow - *Riparia riparia*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Loss of breeding habitat caused by bank stabilization projects. Extirpation from portions of its range.

Rationale for bank swallow

The bank swallow has a global ranking of G5, Secure which is defined as "common; widespread and abundant". The ranking of S2 in California indicates the bank swallow is Imperiled: "imperiled in the state because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from the state (NatureServe 2015). This species is listed as Threatened under the California Endangered Species Act and is considered a Species of Greatest Conservation Need by CDFW.

Since the 1940's, bank swallow populations in California have greatly decreased, and the species has been extirpated from southern California (Grinnell and Miller 1944, Garrett and Dunn 1981, Small 1994, CDFG 1995, Bezener and Fix 2000). Breeding Bird Survey data from between 1966 and 2013 show steep declines both within California and continent-wide (Sauer et al. 2014). Populations have decreased in California by 5.94 percent per year and by 5.83 percent across the whole of the BBS survey area between 1966 and 2013. BBS count data is limited by the fact it can be greatly affected by losses or gains of a colony at a single survey location (Garrison 1999). However, annual colony surveys and monitoring focused on bank swallows have also indicated population declines in California, especially in the Central Valley along the Sacramento River, due to river-bank stabilization projects for flood control (Garrison et al. 1987, Small 1994).

Bank swallows have a limited breeding range in northern California and the Central Valley. Northern breeding birds from along the west coast, Canada and Alaska also migrate through California on their way to winter grounds located from southern Mexico through Central and South America. There is a general

lack of identified threats during migration. Conservation concern in California is based on loss of their unique and limited breeding habitats.

Bank swallow is a highly migratory species. All individuals breeding in the United States and Canada migrate into the neotropics (Garrison 1999). Bank swallows have high breeding-site fidelity and a majority of both juvenile and adult birds return to the same nest colony each year as the site remains viable (Stoner 1941, Freer 1979). However, banded bank swallows have been recorded moving to new colonies over 100km away (Freer 1979, Garrison 1999).

Bank swallows generally nest in colonies and excavate nest burrows in vertical banks, consisting of soft soils or sand, along rivers, streams, lakes, and ocean coasts. Burrows are generally dug into the bank to a depth of 46-90 cm (18-36 in). Colonies are often near water, but this proximity is due to the alluvial soils and the role of water as the erosive force required to create vertical banks. Colonies tend to be located along larger rivers, streams, and lakes because birds also require relatively large open areas for vertical flying space around nesting burrows (Garrison 1998).

The most significant management issue affecting the bank swallow in California is the direct loss of suitable colony sites through bank protection and flood control projects, particularly on the lower Sacramento and Feather Rivers, where an estimated 75 percent of California's bank swallow population occurs (Garrison et al. 1987, Garrison 1998). These projects destroy suitable nesting habitat by re-sloping the bank and placing riprap rock on the bank. Erosion is stopped and nesting habitat is destroyed. These stabilization actions are cited as the primary cause of the bank swallow's extirpation from southern California, as rivers and streams have been systematically paved and armored until virtually no free flowing rivers remain (Laymon et al. 1988).

Artificial water regimes caused by dams and flood control structures that reduce variation in river discharge can also negatively impact bank swallow colonies by preventing the creation new habitat (Moffatt et al. 2005). However, most populations in California including the largest along the lower Sacramento and Feather Rivers occur on rivers with dams that regulate river flows. Additionally, climate change is predicted to result in drier conditions in California, which could reduce river flow and water availability which may in turn prevent the natural erosion of streams and riverbeds (Franco et al. 2006, Bunn et al. 2007, Diffenbaugh et al. 2015). The impact that climate change may have on riverine habitats in the future is unclear. It is also unclear what if any effect climate change would have on bank swallow populations.

The "imperiled" status of the bank swallow in California is due to its extirpation from southern California and continued threats of river bank stabilization projects in the Central Valley, for example, along the Lower Feather and Sacramento Rivers. Breeding populations in the national forests of northern California do not face the same threats as those in the Central Valley and southern California. Populations in northern California have much more in common with populations in Oregon where they are ranked S5 (secure).

Within eBird, there are 63 records of 308 individuals within the Inyo forest boundary; however, within 5 miles of and including the Inyo National Forest, there are 948 records of 10046 individuals. This confirms that the detections at Mono Lake and the Owens Valley Floor are abundant. Within CNDDB, there is 1 record within the Forest boundary, but 5 records within 5 miles of and including the Inyo National Forest.

Bank swallows are highly migratory species that are known to fly through the Owens River Valley and through Mono Lake. The most popular birding hotspot is Crowley Lake with bank soils popular for nesting; this area is not located on the Inyo National Forest. There is no known breeding colony nor limiting factor that the bank swallow would use on the Inyo National Forest.

The best available scientific information about the bank swallow does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, bank swallow does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Barrow's goldeneye - *Bucephala islandica*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S1 (CA)

Other Designations: CA-SSC/Extirpated (breeding); CA-SGCN

The California wintering population migrates to breeding grounds in Oregon, Washington, western Canada, and Alaska, and is mostly absent from April to September. A very uncommon winter resident (October to March) along the central California coast, mainly in San Francisco Bay and vicinity, and in Marin and Sonoma counties. Considered rare in northwestern California south through Mendocino County; found regularly in southern California only along the Colorado River. Rare and local inland in winter on lacustrine and riverine waters.

Historically Barrow's goldeneyes were observed breeding in the Sierra but there are no recent nesting records despite extensive systematic and incidental surveys in formerly documented nesting areas. This species is considered mostly accidental on the east side of the southern Sierras and further south. On the Inyo National Forest, found in places like Mammoth Lakes and other water bodies, where it is considered secure.

The best available scientific information about the bank swallow does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, Barrow's goldeneye does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Bell's sage sparrow - *Artemisiospiza belli belli*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Primary threat is loss of shrub habitat due to urbanization, agricultural practices, and development.

Rationale for Bell's sage sparrow

The Bell's sage sparrow has a global ranking of G5, indicating that the species is "secure: common, widespread and abundant", and has a subspecies rank of T2T4 indicating there is a range of uncertainty in this rating. Its status is between Imperiled "at high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors." and Apparently Secure "uncommon but not rare; some cause for long-term concern due to declines or other factors" (NatureServe 2015). Bell's sage sparrow has a California State rank of S3 (Vulnerable).

Bell's sparrow was designated a unique species in 2013, when sage sparrow was split into Bell's sparrow and sagebrush sparrow. Data from eBird have been updated to reflect this change, but censuses such as the Breeding Bird Survey (BBS) and Christmas Bird Count (CBC) do not differentiate these two species in historical data. However, the majority of the records of sage sparrow within California represent individuals of what were once considered to be the subspecies Bell's sage sparrow (*A. t. belli*) or Mojave sage sparrow (*A. t. canescens*) which are now both considered Bell's sparrows. For this reason, the information for sage sparrows in California generally applies to Bell's sparrow. See Johnson and Marten (1992) for a range map of the species and subspecies in California.

Based on observation records the Bell's sage sparrow occurs on eight national forests in California: the Angeles, Cleveland, Los Padres, Mendocino, San Bernardino, Shasta-Trinity, Six Rivers and Stanislaus (Johnson and Marten 1992, CNDDB 2016, eBird 2016, NRIS 2016).

The sage sparrow was considered "fairly common" to "common" across its range (Grinnell and Miller 1944). However some have considered Bell's sage sparrow populations to be rare in certain regions of California. Gaines (1992) considered them "extremely rare" in the Yosemite Region and Mono County and they have been reported to be "possibly extirpated" in San Bernardino County (Gaines 1992, NatureServe 2015). Coastal populations have been considered "rare" in the north and "uncommon" in the southern part of the range (Garrett and Dunn 1981, Small 1994). Based on eBird data, however, Bell's sage sparrow is still observed regularly (though not commonly) across much of California (eBird 2016).

Available surveys indicate that populations in California are generally stable. BBS data show no clear population trend in what had been considered sage sparrows. There was a non-significant increase in sage sparrow in California from 1966-2013 (+0.79 percent per year, 95 percent CI [-1.17, 2.89]) and from 2003-2013 (+1.00 percent per year, 95 percent CI [-4.71, 7.65]) (Sauer et al. 2014). Nationally, BBS data show a non-significant decrease in numbers between 1966 and 2013 (-0.67 percent per year, 97.5 percent

CI [-2.02, 0.55]) Similarly, Christmas Bird Count data from California showed no clear trends in sage sparrow numbers, with a non-significant increase observed from 1966-2013 (+4.08 percent per year, 95 percent CI [-2.20, 11.89]) (NAS 2010).

Based on Breeding Bird Survey data, the population size of what were formerly considered to be sage sparrows in California is estimated at 300,000 individuals (PIF 2014). In the coastal portion of the Bell's sage sparrow range, breeding densities have been estimated at 94-111 pairs/km² (243-287 pairs/mi²) in unburned sagebrush scrub (Martin and Carlson 1998).

Bell's sage sparrows are year-round residents in scrubby semi-open habitats, typically dominated by sagebrush and chaparral. They occur in coastal scrub dunes, inland valleys, and the Sierra foothills (Martin and Carlson 1998). Coastal populations typically select undisturbed areas with high densities of black sage and native forbs with bare ground rather than leaf litter and will avoid areas dominated by exotic species (Misenhelter and Rotenberry 2000). Inland populations have been found to be present both in areas with a high density of tall, mature shrubs of high species diversity, as well as in areas with shorter, sparcer vegetation and lower species diversity, which are less commonly used by other sparrow species (Wiens and Rotenberry 1981).

Urbanization, agricultural practices, and development in coastal areas have reduced the habitat available to Bell's sage sparrows in coastal southern California (Garrett and Dunn 1981, Unitt 1984, Minnich and Dezzani 1998, Stephenson and Calcarone 1999, Bolger 2002). They generally will not establish territories in highly disturbed areas, and their nesting success is negatively impacted by the amount of nearby disturbance and prevalence of exotic plant species (Misenhelter and Rotenberry 2000). Little information is available about the status of habitat occupied by populations in the Sierra Nevada or in Northern California, however, in the Sierra Nevada, dense chaparral appears to be less disturbed by anthropogenic factors. Long-term fire suppression may reduce habitat quality for this species by allowing vegetation to grow into stands that are too dense (Burridge 1995). Bell's Sparrows may respond favorably to the more frequent (once/30 year) fire cycle that has been evident in recent years (Akçakaya et al. 2005). Increased predation by feral cats has been suggested as a negative effect of urbanization on the low-nesting Bell's Sparrow in southern California, but more information is needed (Martin and Carlson 1998). Management recommendations include managing fire frequency and other disturbances to maintain a semi-open shrub structure in shrub and chaparral habitats (Chase and Carlson 2002).

In summary, the Bell's sage sparrow is considered rare in some portions of its range and populations in certain regions of southern California may have been extirpated due to loss of habitat caused by urbanization and other human caused factors. However, available data shows Bell's sage sparrows are still observed regularly (though not commonly) across much of California and populations in California have remained generally stable over the last fifty years. They breed in a wide range of shrub habitat types with a variety of shrub species and shrub densities. There is no indication that populations on national forests have declined and suitable shrub habitat is expected to persist on the national forests.

Forest-specific Rationale

On the Inyo National Forest, there are no records in CNDDB within the forest boundary, or within 5 miles of the forest boundary. Due to the separation of the species of sage sparrow into Bell's sparrow and sagebrush sparrow, the Breeding Bird Survey (BBS) and Christmas Bird Count (CBC), as well as some of the species name changes in eBird, makes the records not reliable to determine the abundance. Within Biodiversity Information Serving Our Nation (BASIN) database (includes eBird), the Inyo National Forest has a large number of records fairly evenly distributed but excluding the high elevations.

Annually, birders report this bird at Mono Lake and across the forest, while the greatest detections occur on Owens Valley floor where sage communities are abundant. The best available scientific information about the Bell's sage sparrow does not indicate substantial concern about the species' capability to persist long term in the plan area.

Based upon the lack of evidence and supporting best available science, Bell's sage sparrow does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Bi-State sage grouse - *Centrocercus urophasianus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? Yes

Proposed Species of Conservation Concern

No, this species is proposed for ESA listing as threatened

Relevant threats to species

The greater sage-grouse has experienced range and population contractions and is threatened by loss and degradation of sagebrush habitats. Specific threats include infrastructure (fences, powerlines and roads), mining, grazing, invasive species, pinyon-juniper encroachment, recreation, wildfire, and climate change.

Rationale for Greater sage-grouse

The greater sage-grouse has a global ranking of G3G4, indicating there is a range of uncertainty, and its status is between vulnerable "at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors" and apparently secure "uncommon but not rare; some cause for long-term concern due to declines or other factors." The ranking of S2S3 in California and S3 in Nevada also indicates a range of uncertainty between imperiled and vulnerable (NatureServe 2017). The greater sage-grouse is a California bird species of special concern and a California bird species of greatest conservation need. It is also listed as a California Bureau of Land Management sensitive species.

Greater sage-grouse are found from Washington and Saskatchewan south to central-eastern California and New Mexico (AOU 1998, Schroeder et al. 1999). They are found throughout the Great Basin area. Within its range, this species is restricted to sagebrush habitat types and therefore has a patchy distribution (Grinnell and Miller 1944, Small 1994, Schroeder et al. 1999). The greater sage-grouse has undergone substantial range contraction and declines in abundance during the past 100 years, both throughout North America and specifically in California (Schroeder et al. 1999, Floyd 2007, Hall et al. 2008, Sauer et al. 2014).

Based on eBird, CNDDB, and NRIS records, greater sage-grouse are known to occur on two national forests in California: the Modoc and Inyo National Forests (CNDDB 2016, eBird 2016, NRIS 2016). Greater sage-grouse occurring on the Inyo National Forest are considered the Bi-State greater sage grouse population.

The population size of greater sage-grouse based on Breeding Bird Survey data from 1998-2007 cannot be estimated for California, though it is estimated that 2.9 percent of the global population occurs within the state (PIF 2013). Population size, represented by the average number of males per lek, declined in three geographic regions that include portions of California between the periods of 1985-1989 and 2000-2007: 35 percent for the Mono Lake region, 49 percent for the South Mono Lake region, and 42 percent for the western Great Basin region (Garton et al. 2011). These geographic regions all include portions of other states so inferences about the California population should be evaluated carefully (Garton et al. 2011).

Analyses of lek count data for 1965-2007 indicate that the species has experienced a long-term, range-wide population decline (USFWS 2010). The average annual rate of decline has lessened since 1985 (from 3.1 to 1.4 percent), but population declines continue, and populations are now at much lower levels than in the early 1980s (USFWS 2010). Currently, greater sage-grouse occupy approximately 56 percent of their historical range (USFWS 2010).

West Nile Virus during the 2000s has affected this species to some extent. In northeastern Nevada and south-central Idaho, common ravens and badgers were the two most common nest predators.

Greater sage-grouse in California are dependent on sagebrush habitats that include a diversity of sagebrush mixed with native forbs and grasses (Schroeder et al. 1999, Hall et al. 2008). Lekking, nesting, molting and wintering all require different configurations of sagebrush habitat, which increases the species' vulnerability (Hall et al. 2008) and warrant area specific habitat guidelines (Stringham and Snyder 2017).

Because sage-grouse are sagebrush obligates, they are threatened by actions and processes that reduce the extent and integrity of this habitat (Hall et al. 2008). Western juniper expansion is a major threat to sage grouse occupation in northeastern California and to a lesser extent in Mono and Inyo counties. Encroaching juniper displaces sagebrush and other shrubs (Crawford et al. 2004). Juniper also provides additional perches for aerial predators and cover for terrestrial predators. Sage-grouse avoid areas with abundant juniper (SGCT 2004, Hall et al. 2008).

Both prescribed fires and wildfires have the capacity to degrade sage-grouse habitat significantly. Sagebrush is typically slow to reestablish following fire, has poor seed dispersal, and has little ability to naturally reestablish in sites dominated by annual grassland (Shaw et al. 2005). Fire also facilitates the invasion of cheatgrass, which commonly occupies sites following disturbance, especially burning (Connelly et al. 2000). Frequent (less than 20-30 year interval) or late-summer burning favors cheatgrass invasion and may be a major cause of cheatgrass expansion in sagebrush habitats.

Structures such as overhead lines, towers, and fences pose a hazard to sage-grouse as perch and nesting sites for raptors and ravens or as objects for potential collisions (Hall et al. 2008). In Wyoming, the risk of brood failure decreased by 38.1 percent for every 1 kilometer (.62 mile) increase in distance away from the nearest wind turbine (LeBeau et al. 2014), which suggests that future wind development in California may be detrimental to greater sage-grouse populations.

Grazing can degrade the herbaceous layer, reducing available cover for sage-grouse, their nests and chicks, and increase their vulnerability to predation. However, maintenance of late-season brood-rearing meadows is often accompanied by moderate livestock grazing, which may be beneficial (Hall et al. 2008). Grazing depresses grass components that otherwise could displace more desirable forbs eaten by sage-grouse. Fencing meadows to exclude all livestock can reduce sage-grouse use by reducing forbs and creating dense grass cover (Hall et al. 2008).

In sage-grouse habitat, grazing regimes that promote the growth of native grasses and forbs in the understory will benefit grouse. Some additional steps, such as protecting nest sites from trampling and grazing during nesting season, maintaining adequate grass height to provide nesting cover, and leaving at least 50 percent of the annual growth as residual cover, should be considered (Beck and Mitchell 2000). Springs, wet meadows and riparian areas should be protected from overgrazing by fencing or herding management to protect vulnerable forbs and grasses, especially during summer brood-rearing months (Beck and Mitchell 2000). In general, grazing should be managed to promote optimum growth of forbs, grasses and sagebrush.

In 2017, the California Fish and Game Commission (June 22, 2017) adopted zero quotas for all four sage-grouse hunting zones. The closures were recommended by the California Department of Fish and Wildlife due to declining population estimates, which are based on annual lek counts.

Forest-specific Rationale

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1, 3, 5, 8 and 15), the draft Biological Evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia, and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Bi-State sage-grouse occur on the Inyo National Forest within designated population management units (PMUs) which are areas delineated around the sub-population of Bi-State sage-grouse. Part or all of the following population management units are contained within the Inyo National Forest: Bodie, South Mono and White Mountains.

In eBird, there are 68 records of 280 individuals within the Inyo National Forest boundary; within 5 miles and including the Inyo National Forest there are 392 records with 6,993 individuals. In CNDDB, there is one record within the forest and two records within 5 miles and including the Inyo National Forest.

While specific population estimates for sage grouse on the forest are unknown, three leks are known to occur on Inyo National Forest. Telemetry work conducted in March through May of 2017 identified a total of 42 nests across the Bodie Hills, Long Valley and Parker Meadows study areas, which occur on or near the Inyo National Forest (see figure 1 in USGS 2017).

The following general population trends have been observed on population management units which include the Inyo National Forest: Bodie population management unit – increasing since 1995, and Long Valley – stable to increasing. In 2016, a mark-recapture study of eight individuals was initiated to assess population trends for the White Mountain population management unit.

Ecological conditions for this species (see above for additional details)

On the Inyo National Forest, the ecological conditions for greater sage grouse occur in the sagebrush shrub assessment type that occupies approximately 300,000 acres on the forest. This acreage does not include those areas currently occupied by pinyon-juniper, which could potentially be a sagebrush shrub type. The sagebrush shrub assessment type includes all subspecies of big sagebrush (*Artemisia tridentata*), as well as the other woody sagebrush species found on the forest, and shrub communities where sagebrush is dominant but other species co-occur, for example, low sagebrush, sagebrush-bitterbrush, black sagebrush, silver sagebrush, etc. Sagebrush shrub communities occur from the floor of the Owens Valley on LADWP lands, in disjointed bands all the way up to and including subalpine areas in the Sierra Nevada, and the White, Inyo and Glass Mountains. Research natural areas that include the sagebrush shrub assessment type include White Mountain, McAfee Meadow, and Indiana Summit; small areas of the sagebrush shrub vegetation type are within the Whippoorwill Flat and Sentinel Meadow research natural areas. Approximately 30 percent (89,894 acres) of the sagebrush assessment type on the Inyo National Forest is located within designated wilderness.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Suitable habitat has been previously identified by the Bi-State Sage-Grouse Technical Advisory Committee (TAC). The Inyo National Forest management emphasis on restoration of sagebrush ecosystems is ongoing and is increasing suitable habitat acres for the benefit of this species. The Forest

manages approximately 213,670 acres (20 percent) of a total of 1,075,730 acres of priority habitat for the sage-grouse. Primary management units and acreages that occur on the forest are as follows:

Table 2. Population management unit (PMU), total number of acres and number of acres of priority habitat versus acres of the population management unit (PMU) and acres of priority habitat on the Inyo National Forest

Population Management Unit	Total Acres in PMU	Acres of Priority Habitat	Total Acres on Inyo National Forest	Acres of Priority Habitat
Bodie	349,620	197,850	63,425	9,740
South Mono	440,460	179,510	327,860	106,400
White Mountains	1,753,875	132,080	450,960	94,620
Total	**2,543,955**	**509,440**	**842,245**	**210,760**

Jeffery pine and pinyon/juniper expansion is occurring in the sagebrush shrub assessment type possibly the result of fire suppression, livestock grazing and changing climate. In the upper Owens River area, the forest has treated approximately 600 acres of Jeffery pine removal to improve the condition of sagebrush ecosystems.

Pinyon-juniper expansion has been observed throughout the Bi-State area (Bi-State Action Plan 2012) and an estimated 25,261 acres of sagebrush shrublands are undergoing active encroachment by pinyon and juniper trees on the Inyo National Forest, as determined from aerial photography interpretation.

The White Mountains sage-grouse population may be the most affected by pinyon-juniper expansion, but there is little information on the areas sage-grouse use in this mountain range to allow managers to begin treatments of pinyon expansion.

Cheatgrass also threatens sagebrush ecosystems due to type conversions after wildfires. The forest has experienced recent wildfires within sagebrush ecosystems that have led to some cheatgrass expansion. However, these wildfires have not led to complete type conversions or reduced the suitability of these areas for sage-grouse. In the last sixteen years, wildfires that have burned at least partially within the sagebrush assessment type include the Mono (2010, 1,204 acres), Oak (2007, 27,073 acres), Sage (2007, 6,462 acres), Fuller (2002, 6,432 acres) and McLaughlin (2001, 2,714 acres) fires.

More than 11,000 acres of the sagebrush assessment type on the Inyo National Forest currently have a record of at least one non-native plant species.

The projected status of those ecological conditions relative to the species considered

Overall, there has not been a decrease in sage-grouse habitat on the forest, and habitat conditions appear stable across the species' range. However, the continued expansion of pinyon-juniper into sagebrush ecosystems may lead to changes in the amount of suitable sagebrush habitat as well as its placement across the landscape by increasing habitat fragmentation and restricting movement corridors. Cheatgrass invasion will continue to threaten ecosystem integrity by altering the fire regime.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Predation by predators and ravens has the potential to negatively affect sage grouse (Coates et al. 2016). There are some areas documented on the forest that have low understory and shrub cover that could leave nests exposed, however, these areas are within the natural range of variability for the forest.

Another potential risk factor is development; however, this is currently limited on the forest, with most development occurring on private lands adjacent to the forest. Areas where development may have impacted sage-grouse use or movements include the Chiatovich Creek area on the eastside of the White Mountains in Nevada. Development of wind, solar and geothermal energy can be expected to increase in the coming years, potentially resulting in additional impacts to sagebrush ecosystems in the future. Expansion of existing geothermal production is currently proposed with potential impacts to the sagebrush shrub and Jeffrey pine assessment types. The risk is an increase of infrastructure (e.g., roads, fences and transmission lines) that can negatively affect the sage-grouse.

Although livestock grazing is not identified as a key threat in the Bi-State Action Plan (2012), it can cause disturbance and trampling of nest sites. There are 49 cattle and horse and sheep and goat allotments identified on the Inyo National Forest. Of these, 30 occur within priority sage-grouse habitat, with 20 of those being active. Reissuance of grazing permits since 2009 includes design features to reduce impacts to sage-grouse.

Bouldering has become increasingly popular over the past couple of decades, bringing more recreationists to the area during the "shoulder seasons," resulting in an increase in dispersed camping in the sagebrush, xeric shrub, and pinyon-juniper types. Much of this activity occurs on adjacent Bureau of Land Management lands, but does not appear to be a high risk factor for the Inyo National Forest.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

There is sufficient information on the Bi-state greater sage-grouse's extirpation from a significant portion of its former range, with documentation of population declines, habitat specificity, and threats to its habitat from juniper expansion, fire, and invasive species, which demonstrate substantial concern for long-term persistence in the plan area. However, since the bi-state population of this species is proposed for listing as threatened under the Endangered Species Act, it meets the at-risk species criteria under that criteria and not as a species of conservation concern.

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Black-backed woodpecker - *Picoides arcticus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Potential threats to the black-backed woodpecker include habitat removal (including post-fire timber harvest), climate change, and lack of habitat due to changing fire regimes or fire suppression (California Fish and Game Commission 2013).

Rationale for Black-backed woodpecker

The black-backed woodpecker has a global rank of G5 (Secure), a California State rank of S2 (Imperiled) (see additional information below regarding the California State rank; CNNDB 2016; 2018), and a Nevada State rank of S1 (ranked for Douglas and Washoe Counties and not on the Inyo National Forest). This species is a Region 5 Forest Service Management Indicator Species (MIS), representing snags in burned forest.

Black-backed woodpeckers are endemic to North America and occur in boreal regions from south-central Alaska across Canada to Newfoundland and Nova Scotia, and south in the western United States in

Montana and Washington through east-central California (AOU 1998, Dixon and Saab 2000). Occasional irruptions occur in eastern North America, south to Illinois, West Virginia, and Delaware (AOU 1998, Dixon and Saab 2000). There are no described subspecies of the black-backed woodpecker, and their morphology does not notably vary throughout their range (Dixon and Saab 2000). However, populations of black-backed woodpeckers in the Cascade and Sierra Nevada Mountains are found to be genetically distinct from those in the Rocky Mountains, Black Hills of South Dakota, and boreal regions of North America (Pierson et al. 2010).

Based on Breeding Bird Survey (BBS) data, there are an estimated 800,000 black-backed woodpeckers worldwide, with an estimated 5,000 of these birds in California (PIF 2014). However, detection probabilities for this species when performing passive point counts are relatively low making abundance estimations difficult from these types of surveys difficult (Siegel et al. 2010). In 2015, management indicator species (MIS) surveys focused on black-backed woodpeckers found 31 out of 50 randomly selected post-fire areas in the Sierra Nevada Mountains were occupied by black-backed woodpeckers (Siegel et al. 2016). On eBird, they are most commonly reported on the Inyo and Tahoe National Forests (322 and 264 observations, respectively).

Breeding Bird Survey data show a positive, but non-significant increase in black-backed woodpecker abundance in the Sierra Nevada Mountains between 1966 and 2013 (+5.23, 95 percent CI [0.54, 10.22]) (Sauer et al. 2013). However, the credibility of trend estimates made using Breeding Bird Survey data is considered low because black-backed woodpecker detections are relatively infrequent with a relative abundance of 0.02 individuals encountered per survey route in the Sierra Nevada (Sauer at al. 2013). Similarly, the detection rate of black-backed woodpeckers during Christmas Bird Counts in California was too low to detect any clear population trends (0.0002 detections per party hour between 1966 and 2015; NAS 2015). Management indicator species surveys conducted between 2009 and 2015 detected no significant trend in black-backed woodpecker populations within burned forests in California. In 2013, the California Department of Fish and Wildlife deemed black-backed woodpecker populations to be stable enough to not warrant listing as a state endangered species, and there is no indication that their range within California has changed since the 1940s (Grinnell and Miller 1944, Small et al. 1994, Bonham 2013).

In January 2016 California Department of Fish and Wildlife released a Special Animals List (California Department of Fish and Wildlife, Special Animals List, January 2016: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline=1) which ranked the black-backed woodpecker as S2 (imperiled). This imperiled ranking appears to be at odds with the May 2013 Fish and Game Commission finding in California that listing the black-backed woodpecker as Threatened or Endangered under CESA was not warranted after a careful year-long review of the species (California Fish and Game Commission 2013). The ranking of the species by California Department of Fish and Wildlife as S2 was based on the records in the CNDDB database. As part of the ranking process California Department of Fish and Wildlife did not consider other data sources when updating their rankings. There were 59 CNDDB records for black-backed woodpeckers which included approximately 24 records from eBird, 19 records from Institute for Bird Populations, 9 records from NRIS (Forest Service database), and 2 records from C. Hanson; however, these are only a fraction of the sightings or records from these sources. Additionally, CNDDB did not include any records that were identified as collected by Point Blue Conservation Science (PBCS). The Forest Service is working with California Department of Fish and Wildlife to update the records for the species to include all the records from Institute for Bird Populations and Point Blue Conservation Science, as well as any other sources. Prior to the CNDDB update, the state rank for the species was S3S4 (Vulnerable to Apparently Secure). The CNDDB list was updated in August 2018 and the California state rank is still S2 (imperiled), however, Forest Service data has not yet been submitted.

In 2008, the black-backed woodpecker was considered for the California Bird Species of Special Concern (BSSC) list (Shuford and Gardali 2008), but it did not rank high enough to be included on the BSSC list. The black-backed woodpecker was petitioned for listing under the California Endangered Species Act (CESA) (Hanson and Cummings 2010). The California Fish and Game Commission reviewed the petition and found that listing the black-backed woodpecker as Threatened or Endangered under CESA was not warranted (California Fish and Game Commission 2013). The Commission's conclusion regarding their finding was summarized as follows:

- The lack of an apparent range retraction or changes in distribution within the range.
- The episodic cycles of high density occurrences (i.e., prey invasion, high woodpecker productivity, prey decline, and woodpecker dispersal) and the lack of current data on the cycle's impact on the long-term viability of California's black-backed woodpecker population.
- The lack of data concerning the role of green forest on the species but its apparent use as habitat.
- The trending increase in fire frequency, size, and severity as compared to the early- and mid-20th century.
- Uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging.
- Lack of logging on approximately 80 percent of severely burnt US Forest Service (USFS) forest habitat since 2003 (i.e., 87,200 acres).
- The ongoing long-term monitoring of the species as an MIS.
- Black-backed woodpecker populations in California are not geographically isolated from populations in adjacent states.

More recently John Muir Project, Center for Biological Diversity, Blue Mountains Biodiversity Project, and others filed a petition (Hanson et al. 2012) to list the Oregon/California and Black Hills (South Dakota) populations of the black-backed woodpecker as Threatened or Endangered under the federal Endangered Species Act. The U.S. Fish and Wildlife Service prepared a 90-day finding indicating that the petitioned action may be warranted based on the information provided by the petitioners; therefore when funds become available, they will initiate a review of the status of the two populations to determine if listing the Oregon Cascades-California population and/or the Black Hills population as either subspecies or Distinct Population Segments is warranted (USFWS 2013).

In California, the species is found at middle to higher elevations in inland mountains from the Oregon border to the southern Sierra Nevada (Bond et al. 2012). The woodpecker occurs at lower abundance in most unburned forest types and is also found in beetle-killed forests, but reaches its greatest abundance in recently (1-8 year-old) burned forests with fire killed trees (Bond et al. 2012). Home range size is highly influenced by snag basal area and density (Siegel et al. 2014a, Casas 2016). "Black-backed woodpeckers occur at low densities in unburned forests, but because these areas are far more widespread than recently burned (less than10 year old) forests, woodpeckers in 'green' forest likely account for a substantial portion of the total population size" (Bond et al. 2012). Fogg and others (2014) estimated black-backed woodpecker occupancy in green forest and found occupancy was higher than previously understood (0.21). In addition the authors site colonization and extinction probability in green forest were low (0.05 and 0.19, respectively) and suggest that many of the individuals detected in green forest were not just actively dispersing across the landscape in search of burned areas, but were occupying relatively stable home ranges (Fogg et al. 2014). Black-backed woodpeckers have been documented to forage in green forest (Siegel et al. 2013, Tingley et al. 2014) and sometimes nest in live trees or excavate cavities in dead portions of live trees (Bull et al. 1986, Goggans et al. 1989, Purcell 2010, Bond et al. 2012). Some

research suggests that Black-backed woodpeckers may prefer trees with softer wood for nesting (Lorenz et al. 2015).

Population trends of black-backed woodpeckers are poorly known (Bond et al. 2012). Monitoring of the black-backed woodpecker across the 10 national forests in the Sierra Nevada has been conducted in partnership with the Institute for Bird Populations (IBP) in burned forest habitat. Collectively the monitoring data from burned forests and from unburned "green" forests show that black-backed woodpeckers are not undergoing significant population declines.

In the most recent reporting for the black-backed woodpecker monitoring project, Siegel and others (2016), report "At this time there is no significant evidence of a temporal trend in occupancy rates during the seven years (2009-2015) we have been monitoring black-backed woodpeckers on national forests in California, or of a broad-scale change in the species' distribution in California. Although there was a two-year decline in point-level occupancy from 2013-2014, resulting in a previously-reported marginal (P = 0.13) negative trend, this trend was no longer apparent in the 2015 surveys. Additionally, the proportion of occupied fires has remained largely constant"(Siegel et al. 2016). A study in the Black Hills of South Dakota (Rota et al. 2014) found population growth rates were positive only in habitat created by summer wildfire; however, population growth rates have not been calculated for California.

Roberts et al (2015) detected black-backed woodpeckers at unburned "green" forest transects on all forests in the Sierra Nevada except for Sequoia National Forest and the Lake Tahoe Basin Management Unit. In 2016 Roberts analyzed the 2011-2015 data and revised their previous black-backed woodpecker occupancy estimate from 2014. He found that "Although the occupancy estimates are largely similar to our previous analyses, the pattern among years implies a different interpretation of the trend over time which appears to be stable rather than strongly decreasing as we reported following the 2014 field season" (Roberts and Burnett 2016).

Potential threats to the black-backed woodpecker include climate change and lack of habitat due to changing fire regimes or fire suppression, and habitat removal, including post-fire timber harvest (Siegel et al. 2018).

Climate change is considered a potential threat to the persistence of black-backed woodpeckers. Audubon and Point Blue have both used species distribution models to model the projected future distribution of black-backed woodpeckers based on various future climate projections. The Audubon effort was done at the large scale of the United States and Canada using Breeding Bird Survey (BBS) records and Christmas Bird counts (Distler et al. 2015). However, BBS data from the Sierra Nevada are quite sparse. Bond and others (2012) note, "black-backed woodpecker occurrence data from the Breeding Bird Survey (BBS) are too sparse to make inferences about population trends in the Sierra Nevada. That paucity also makes it difficult to model the distribution of the species in current time or to project in the future (Wiens et al. 2009). The Point Blue modeling effort was focused on the state of California and used a larger number of records to model black-backed woodpecker distributions. Another modeling effort included the use of higher elevation conifer and subalpine conifer forest to model the current and projected future distribution of black-backed woodpeckers (Stralberg and Jongsomjit 2012). These modeling efforts produced future range maps of the species and habitat which can be compared to the current modeled distribution of the species which indicate range contractions, but they did not quantify the amount of range lost.

Gardali and others (2012) used the results of the Point Blue species distribution models, as well as other factors to rank the vulnerability of birds in California. They found that the black-backed woodpecker had a climate vulnerability of 3 which was the lowest priority level (Gardali et al. 2012). Another analysis of Sierra Nevada bird species vulnerability to climate change was conducted and found that future vulnerability of the black-backed woodpecker was "presumed stable" under both climate scenarios that

they considered (Siegel et al. 2014b). Siegel and others (2014) included results from the Point Blue species distribution models as one of the factors considered in the rankings.

Fire severity is considered higher today than under pre-settlement conditions, with the average fire in modern mixed-conifer and yellow pine forests on USFS lands supporting 5 to 7 times more area of stand-replacing fire than fires before Euro-American settlement (Miller et al. 2009, Miller and Safford 2012, Malleck et al. 2013, Safford and Stevens 2013). Fire size and fire severity have been trending up in low and mid-elevation forests on USFS lands over the last 20 to 30 years, and these trends have been linked to increasing forest fuels from historical forest management actions, fire suppression, and climate change (Miller et al. 2009, Miller and Safford 2012, Safford et al. 2012, Malleck et al. 2013). Recent fires in the Sierra Nevada have included some huge patches of stand-replacing fire, extending for thousands or even tens-of-thousands of acres. This is in direct contrast to the size of stand-replacing patches from active fire regime forests in reference landscapes of the Sierra Nevada (areas where the fire regime is minimally influenced by humans), where mean stand-replacing patch size is less than 4 ha and maximum patch size generally is less than or equal to 100 ha (Collins and Stephens 2010, Miller and Safford 2012, Safford and Stevens 2013). Thus, these trends and predictions indicate an increase in burned forest habitat availability for black-backed woodpeckers into the future (Bond et al. 2012, Malleck et al. 2013).

Post-fire snag removal treatments commonly referred to as “salvage treatments” have been identified as a potential threat to the persistence of black-backed woodpeckers (Siegel et al. 2018); however, treatments can vary substantially in their duration and intensity on the environment, therefore caution is recommended when discussing results of studies that examine the effects of salvage treatments across the US and Canada on black-backed woodpecker and their habitat (Bond et al. 2012).

A recent study by Odion and Hanson (2013) suggests that post-fire logging of one third of suitable black-backed woodpecker habitat per year over the next three decades will lead to a trend towards extinction for the species. This publication, (Odion and Hanson 2013) makes a number of flawed assumptions in their analysis methodology:

1. The authors make serious errors in determining tree mortality from stand initiation. The two are related, but are not considered a method for determining mortality of trees. The authors have made the assumption that increases or decreases in stand initiation are resulting solely from fire suppression, and any changes in stand initiation could only be caused by fire. This discounts the effects of insects, disease, stand density, wind, snow, and other variables, all of which may have significant effects on stand initiation.
2. The authors also use a different definition of high severity fire (primary habitat) than the generally accepted definition of ≥50 percent basal area mortality. They use ≥75 percent basal area mortality.
3. The authors choose a static time period of 1984-2010 to analyze all fire disturbances and thereby the current rate of formation of primary black-backed woodpecker habitat. By selecting this static time period for their analysis, the authors have drastically underestimated the annual amount of high severity fire occurring across the landscape, thereby underestimating the rate of formation of primary habitat for the black-backed woodpecker. Current science indicates that the total area of high severity burned forest in the Sierra Nevada is not lower than historic reference conditions (Miller and Safford 2012) and the size of high severity burned patches has significantly increased (Miller et al. 2009) [see also, climate change section in this narrative]. The entire western United States has experienced higher large-wildfire frequency, longer wildfire durations, and longer wildfire seasons since the mid-1980’s (Westerling et al. 2006).

4. The authors assume that 33 percent of high severity fire acreage on public lands will be harvested annually. Actual harvest rates vary dramatically from year to year depending on a variety of factors including the number, size and location of fires on NFS lands, but even with an extreme event such as the Rim fire, salvage harvest did not approach 33 percent. When focusing on the proposed treatments solely for the year 2014 (an above-average year in which several large fires were being analyzed for treatments including the Rim, American, and Aspen fires) only 8.9 percent of suitable black-backed woodpecker habitat was proposed for treatment. This is far less than the 33 percent annual treatment rate assumed by Odion and Hanson (2013).

Siegel and others (2011) conducted surveys for black-backed woodpeckers in 2009 and 2010 across recent fires on national forest lands in California. "Overall, black-backed woodpecker were detected at approximately 20 percent of unsalvaged stations and 25 percent of salvaged stations, suggesting that black-backed woodpecker occurrence might not be negatively associated with salvage logging. It is clear that some areas subject to post-fire logging do contain woodpeckers and that post-fire logging does not fully preclude woodpeckers from occupying burned areas. However, since salvage logging is inter-correlated with measures of snag basal area (since snag basal area measurements were taken at the time of survey, post logging), the capacity of the current analysis to detect the full effects of salvage logging on black-backed woodpecker occupancy may be limited" (Siegel et al. 2011). The authors go on to state: "Pilot analyses indicate that after accounting for differences in snag basal area, the status of salvage logging at a survey station may not be a significant determinant of black-backed woodpecker occupancy. Certainly, multiple areas in our study area subject to salvage logging were found to be used by black-backed woodpeckers" (Siegel et al. 2011). This is in contrast to previously published findings (Hanson and North 2008).

Results from radio-telemetry studies indicate that black-backed woodpecker avoid foraging in areas where most of the snags had been removed in post-fire forest in California (Siegel et al. 2012). A subsequent study found that while there was a general absence of foraging locations within salvaged areas, the presence of salvage logged stands within a fire area does not preclude use of adjacent remaining stands by black-backed woodpecker (Siegel et al. 2013). In fact, radio tracking data obtained from three recent fires in California documented four birds nesting and foraging adjacent to large blocks of salvage harvested areas in their home ranges, and two birds foraging almost exclusively in unburned green forest adjacent to the fire.

The Forest Service tracks the amount of black-backed woodpecker burned forest habitat, as well as the fraction of this habitat that has been removed. In April 2014, a regional analysis was conducted for black-backed woodpecker across the range of the black-backed woodpecker in California, analyzing treatment of suitable burned black-backed woodpecker habitat across all lands, including the 10 Sierra Nevada forests from 2006 to 2013. This regional analysis determined that on Forest Service lands across the Sierra Nevada bioregion, 21 percent of the acres that burned from 2006 to 2013 and are suitable for black-backed woodpeckers have been, or were proposed to be treated with post-fire timber removal. This analysis indicates that on average, only 2.6 percent of suitable black-backed woodpecker habitat was treated per year on National Forest System lands throughout the Sierra Nevada bioregion for the time period analyzed.

Salvage logging is not proposed on all fires and salvage logging is not completed on all fires where it has been proposed. These analyses confirm the spatial and temporally ephemeral nature of black-backed woodpecker burned forest habitat and indicate that burned forest habitat is available for the species. It is expected that the total amount of habitat, and fraction removed, are going to fluctuate annually; therefore, we do not consider the amount of burned forest habitat to be a limiting factor.

We do not consider climate change, changed fire regimes, and salvage treatments threats to the persistence of black-backed woodpeckers within the plan area, even when considered cumulatively based on the BASI considered. It appears that black-backed woodpeckers in the Sierra Nevada have the ability to persist sustainably in certain green forest habitats, while being adapted to opportunistically exploit ephemeral habitats that are rich in prey such as beetle killed stands and high to moderate severity fire areas. Despite the local effects of past and present fire effects and climate change (even if you include salvage treatments), the upper montane forests within the Sierra Nevada are still considered within the natural range of variability, a sound proxy for considering ecosystem health and resiliency.

Inyo National Forest-specific Rationale

On the Inyo National Forest, there have been 322 reports of 552 individuals in eBird (2016) within the National Forest boundary, or 354 reports of 593 individuals including and within 5 miles of the National Forest boundary. For CNDDB, there are only 3 records within the Inyo National Forest boundary. All of these sightings are within California and none are within the Nevada portion of the Inyo National Forest.

As part of the Sierra Nevada Forests Management Indicator Species Amendment monitoring results from 2009-2015 for this species, data from 10 fire areas that burned between 2000 and 2008 is included for the Inyo National Forest. These fires burned between 146 acres and 7,574 acres and in pre-fire habitat types that were either pinyon-juniper, Jeffery pine, ponderosa, or sierra mixed conifer. Black-backed woodpeckers were detected in the Crater fire which occurred in 2001 and included 1,118 acres of pre-fire Jeffery pine dominant habitat type (Siegel et al. 2016).

Based on several factors, including the black-backed woodpecker's range across the Sierra Nevada and Cascades; no detectable decline in California; no limiting habitat factors within the plan area; high potential for continued wildfires and burned habitat creation; and the sheer number of detections within the Inyo National Forest plan area, the best available scientific information about the black-backed woodpecker does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the black-backed woodpecker doesn't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Black rosy-finch - *Leucosticte atrata*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

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Black tern – *Chlidonias niger*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S2 (CA) S2S3B (NV)

Other Designations: CA Species of Special Concern; CA Species of Greatest conservation Need

The black tern is a rare to uncommon spring and fall migrant south of Lake Tahoe. Although it is not federally listed, the black tern has special status in many of the states within its breeding range including California. Loss of wetland habitat and water diversions affecting seasonal flooding are primary risk factors. Overall this species is widespread and abundant and its historic breeding range is outside of the plan area; no substantial or local concerns have been identified.

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Black-chinned sparrow - *Spizella atrogularis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S4 (CA); S3B (NV)

Other Designations: USFWS-BCC

Black-chinned sparrows are localized breeders in dry, rocky shrublands. G5 rank suggests this species is secure range-wide. Numbers are likely stable in California; their range has extended north in the past 50 years into chaparral habitats along the west side of the Sierra and Coast Range. There is no evidence to suggest a population decline in the planning area or any substantial concern for persistence.

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Brewer's sparrow - *Spizella breweri*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Recent surveys have shown breeding numbers of Brewer's Sparrows to be in decline throughout the species' range. As for many declining species, the causes are uncertain, but they may be related to fundamental changes in shrubland ecosystems being brought about by agriculture, grazing, and the invasion of exotic plant species.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S4 (CA); S4B (NV)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats or concerns. There is no information on population trend specific to this unit.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/

Burrowing owl - *Athene cunicularia*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats on non-forest service lands include conversion of grasslands to urban or agricultural uses.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA Species of Special Concern; CA Species of Greatest Conservation Need; CA BLM Sensitive Species

Burrowing owl habitat is considered perhipheral to the planning unit. Although burrowing owls occur across most of the Mojave and Colorado deserts of Inyo, eastern Kern, northern Los Angeles, San Bernardino, eastern Riverside, eastern San Diego, and Imperial counties (Gervais et al. 2008, Miller 2003), Garrett and Dunn (1981) described the species as "quite scarce" from Inyo County south through the eastern Mojave Desert. There is no information on population trend specific to the plan area. There is no evidence for substantial concern on the planning unit; no known local threats or concerns.

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Wilkerson, R. L. and R. B. Siegel. 2010. Assessing changes in the distribution and abundance of burrowing owls in California, 1993–2007. Bird Populations 10:1–36.

Calliope hummingbird - *Selasphorus calliope*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

Costa's hummingbird - *Calypte costae*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S4 (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

Canvasback - *Aythya valisineria*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S2 (CA)

Other Designations: None

No substantial or local concerns were identified in the Inyo National Forest plan area that would result in substantial concern for long term persistence. No trend data is available; California Department of Fish & Wildlife does not conduct waterfowl surveys in the eastern Sierra.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

Cassin's finch - *Carpodacus cassinii*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No threats identified on this planning unit

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA); S5 (NV)

Other Designations: USFWS Bird of Conservation Concern

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

eBird. 2016. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Common loon - *Gavia immer*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S1 (CA); S2 (NV)

Other Designations: CA SSC Extirpated; CA SGCN

Common loons in California are nonbreeding visitors; each year individuals appear on large lakes and reservoirs in California's interior. On west slopes of the Sierra, low populations of common loons are regular visitors to reservoirs such as Lake Almanor, Folsom Lake, Millerton Lake, and Lake Isabella, and on rare occasions, nonbreeding individuals remain through summer. In late summer and fall, migrating common loons occasionally appear at large subalpine lakes, such as at Tenaya Lake in Yosemite National Park.

On east slopes, common loons are fairly common in fall, winter, and spring at large water bodies such as Lake Tahoe, Donner Lake, Topaz Lake, Boca Reservoir, Bridgeport Lake, and Lake Crowley, but they usually abandon these lakes if substantial areas of open water freeze in winter. In April, the largest concentration of migrating common loons west of the Mississippi River gathers at Walker Lake, northeast of Mono Lake in the Great Basin, with "spillover" birds possibly accounting for many eastside records.

There is no local information available on populations and habitat conditions to conclude there is a concern about persistence of common loons within the plan area. There are no known significant threats to the populations or habitats; no declining trends in populations or habitat, or restricted habitat within the plan area.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Eared grebe - *Podiceps nigricollis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Ferruginous hawk - *Buteo regalis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S3S4 (CA); S2 (NV)

Other Designations: USFWS BCC

Ferruginous hawks occur at lower elevations around the Sierra periphery in annual grasslands and pastures and may be fairly common locally in valley locations south to Owens Valley, principally in winter. No substantial or local concerns have been identified.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Flammulated owl - *Psiloscops flammeolus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Habitat threatened by altered fire regimes, elimination of large trees/snags, and climate change.

Rationale for flammulated owl

This rationale references the information in the Species Account for the flammulated owl. Please see the Species Account for additional information.

The flammulated owl has a global ranking of G4, Apparently Secure which is defined as "uncommon but not rare; some cause for long-term concern due to declines or other factors". The ranking of S2S4 in California indicates a range of uncertainty about its status in the State which lies between Imperiled: "imperiled in the state because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from the state" and Apparently Secure (NatureServe 2015). This species is also a USFWS bird of conservation concern.

The flammulated owl breeds in montane forests throughout western North America from British Columbia south through central Mexico and migrates to winter as far south as El Salvador and Honduras (AOU 1998, McCallum 2013). Population trends are unknown, however within suitable habitat, flammulated owls are considered fairly common as a breeding species in California (Garrett and Dunn 1981, Small 1994, Bezener and Fix 2000, Floyd 2007, Steel et al. 2012). While once believed to be rare, call-response surveys revealed flammulated owls are locally common in quality habitat and among the most abundant birds of prey in some areas (McCallum 1994). Their fairly common abundance is reflected in the numerous and widespread observations of this species in the eBird database (eBird 2016).

Few detections of flammulated owl are expected as no surveys are done specific to this species. In eBird, there is only 1 record of 1 individual on the Inyo and within 5 miles and including the forest, there are 6 records of 6 individuals. In Biodiversity Information Serving Our Nation (BISON) database, there are a dozen or so museum records including records from the 2000's.

Flammulated owls use a variety of forest types during the breeding season, and prefer open to semi-open stands with larger diameter trees (greater than50 cm, 20 in) on slopes or ridges (Bull et al. 1990, Reynolds and Linkhart 1992, Linkhart and Reynolds 1997, McCallum 2013, Scholer et al. 2014). In California, flammulated owls nest in a variety of habitats including ponderosa pine, Jeffrey pine, Douglas fir and red fir forests and also black oak stands (Verner and Boss 1980). They prefer low to intermediate canopy coverage; and are particularly common in suitable ponderosa pine forests (Verner and Boss 1980). They commonly select nest sites in open forests with sparse understory, although they will persist on territories where the understory has become denser (McCallum and Gehlbach 1988, McCallum 2013).

Altered fire regimes can affect habitat suitability. Fire suppression can promote a dense understory which is unfavorable for foraging and may also increase the risk of large, high-severity fires which can eliminate mature conifer forests needed by flammulated owls (Raphael et al. 1987, McCallum 1994). Forest management activities that remove large trees and snags may also affect flammulated owl populations by eliminating suitable nest sites (Franzreb and Ohmart 1978, Raphael and White 1984). Climate change is also a threat, especially if it were to drastically alter habitat availability and forest structure through altered fire regimes, increased temperatures and more severe droughts (Lenihan et al. 2003, Franco et al. 2006, Barbero et al. 2015, Diffenbaugh et al. 2015).
In summary, the flammulated owl is fairly common throughout its widespread range. And while it does face some stressors in the form of climate change and altered fire regimes, suitable habitat is expected to persist. The impact that climate change may have on montane forested habitats in the future is unclear. It is also unclear what if any effect climate change would have on flammulated owl populations. While flammulated owls prefer open stands with large trees, they breed in a wide range of forest conditions including a range of elevations, tree species, and tree sizes. Suitable forested conditions and available snags for nesting are expected to persist even under altered fire regimes.

Inyo National Forest-specific Rationale

Flammulated owl is uncommon or rare on the Inyo National Forest. There are very few records of occurrence from eBird, California Natural Diversity Database (CNDDB) (CDFW 2016) and BISON. The best available scientific information about the flammulated owl does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the flammulated owl does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

Literature Cited

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Golden eagle - *Aquila chrysaetos*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Mortality from collisions at wind-energy facilities. Some habitat concerns especially near urban areas.

Rationale for golden eagle

This rationale references the information in the species account for the golden eagle. Please see the species account for additional biological and conservation information.

The golden eagle has a global rank of G5 (secure) and a California state rank of S3 (vulnerable) (NatureServe 2015). The golden eagle is a fully protected by California Department of Fish and Wildlife and is a U.S. Fish and Wildlife Service bird of conservation concern.

The golden eagle is a Holarctic species (found throughout all the northern continents of the world), and the North American subspecies (*Aquila chrysaetos canadensis*) breeds regularly throughout the western United States and Canada and across north-central Mexico. Breeding pairs are occasionally reported in mountainous regions of eastern North America. Golden eagles occur throughout the continent during migration, but winter primarily in the west (Kochert et al. 2002, Wheeler 2003). The golden eagle is found on all national forests in California.

Long-term population trends throughout North America indicate generally stable populations from 1968-2010 (increasing 0.40 percent per year) (Millsap et al. 2013). Populations in California have also been generally stable. Breeding Bird Survey (BBS) data from California indicate a small, non-significant decline from 1966-2013 (-0.47 percent per year, 97.5 percent CI [-1.69, 0.71]) and from 2003-2013 (-0.28 percent per year, 97.5 CI [-2.82, 2.32]) (Sauer et al. 2014). Christmas Bird Count (CBC) data indicate a slight and non-significant increase (+0.7 percent per year) in California between 1966 and 2013 (Soykan et al. 2016). However, BBS and CBC data are not the most reliable for this species. BBS routes follow roads and golden eagles generally nest in remote areas. CBC surveys may also have large variation due to the low number of golden eagles counted on each survey, inconsistencies among years in survey effort and area surveyed, and the fact that most surveys are in suburban, exurban, or rural settings where golden eagles are less likely to occur (Kochert et al. 2002).

Despite their generally stable population in California, some areas have seen declines. Population size dropped by over 50 percent in San Diego County during the 20th century, attributed to loss of habitat caused by urbanization (Kochert et al. 2002). Numbers may be declining in the northwestern portion of the state; however, numbers observed on migration counts and Christmas Bird Counts in the San Francisco Bay Area showed inter-annual fluctuation between 1987 and 2007 but no apparent trends

(GGRO 2008), and breeding occupancy remained stable in foothills near Livermore from 2000 to 2005 (Hunt and Hunt 2006).

Within eBird, there are 500 records of 632 individuals within the Forest, and within 5 miles of and including the Forest, there are 1348 records or 1658 individuals. In CNDDB, within 5 miles and including the Forest, there are 2 records.

Golden Eagles use a wide variety of habitat for breeding territories including tundra, shrubland, grassland, woodland-brushlands, coniferous forest, farmland, riparian areas, and desert at elevations ranging from near sea level to over 3,600 m (11,800 ft) (Kochert et al. 2002). Although they do nest in grasslands and agricultural areas, breeding birds have been shown to prefer foraging in scrubland over more open habitats (Marzluff et al. 1997, Domenech et al. 2015). Most nests are placed on cliffs, but eagles may also nest on any tall structure, natural or man-made (Kochert et al. 2002).

Golden eagles winter in open habitats such as prairies, shrub-steppe deserts, open grasslands, and agricultural areas (Kochert et al. 2002). In California, their main prey items are ground squirrels and jackrabbits (Carnie 1954).

Golden Eagles are a partial migrant, with both migratory and sedentary populations occurring across their range (Kochert et al. 2002). Eagles breeding in California tend to remain on their territories year-round, but in winter there is an influx of birds that breed outside of the state (Small 1994). Adults are generally faithful to both breeding and wintering sites, while juveniles have a much greater propensity for dispersal (Kochert et al. 2002). Juvenile golden eagles are observed to disperse in all directions, and to explore large areas for dispersal. Resident juvenile eagles can explore an area of between 2000 to 15000 km² (772 to 5790 mi²) and range up to 58 to 184 km (36 to 114 mi) from where they fledged during their first year (Steenhof et al. 1984).

Much of the habitat used by golden eagles is relatively remote so many populations remain unaffected by human influence (Kochert et al. 2002). However, increased urbanization and recreational activities such as rock climbing in California are likely causing disturbance in the vicinity of many nest sites, which decreases productivity (Thelander 1974, Kochert et al. 2002, USFS 2007). Human disturbance or activity may cause eagles to abandon a nest, render a nest site less productive, or prevent a suitable nest site from being used; however, direct disturbance of nests appears to be infrequent (GBBO 2010).

Wind power development also poses a threat to golden eagle populations. A study of bald and golden eagles at 32 wind energy facilities in 10 states from 1997-2012 found that golden eagles represented 92.9 percent of eagle mortalities (Pagel et al. 2013), suggesting that they may be particularly susceptible to wind turbines. Survivorship in California near one wind farm varied by age from 79 percent to 91 percent with younger birds more likely to be killed by turbines (Hunt 2002). Forty to one hundred eagles are estimated to be killed annually by wind turbines at Altamont Pass near Livermore, California (Hunt and Hunt 2006), and increased demand for wind energy will likely result in higher rates of mortality.

Fires, especially large fires affecting areas greater than40,000 ha, can adversely affect golden eagle success by reducing prey populations (Kochert et al. 1999). Fires in shrub-steppe communities that remove sagebrush and other shrubs, and replace them with predominately cheatgrass, reduce prey populations and golden eagle nesting success for up to ten years (Kochert et al. 1999). It is unclear if large fires in other habitat types result in similar effects to prey and golden eagle nesting success.

Agricultural development also has negative impacts on eagle populations (Kochert et al. 2002). Shooting, trapping, and the effects of pesticides were severe through much of the 20th century, but these stressors appear to be waning (Kochert et al. 2002, USFS 2007). Although no longer directly hunted, golden eagles

continue to be exposed to lead from ingesting lead shot and fishing tackle from the remains of carcasses left behind by hunters and fishermen (Haig et al. 2014).

In summary, the golden eagle has a broad distribution in the northern hemisphere and in California, they use a broad range of habitats, they possess excellent dispersal capabilities, and their population and habitat trends are generally stable. Remaining threats and limiting factors are largely a concern on non-Forest System lands. Effects from recreational activities and associated disturbance may be a concern at certain nest locations, yet populations have remained stable despite these activities. Effects from fire are applicable to populations in shrub-steppe communities and may be applicable to other habitat types, however effects are not permanent, and nesting success returns to pre-fire levels after approximately ten years.

Inyo National Forest-specific Rationale

Golden eagles within the Inyo National Forest plan area are uncommon but there are many observation records can be viewed on eBird the Biodiversity Information Serving Our Nation (BISON) database. The best available scientific information about the golden eagle does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the golden eagle does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Gray-crowned rosy finch - *Leucosticte tephrocotis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Green-tailed towhee - *Pipilo chlorurus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Lewis' woodpecker - *Melanerpes lewis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S4 (CA); S3 (NV)

Other Designations: USFWS BCC; CA SSC; CA SGCN

In the eastern Sierra, Lewis'woodpecker nests in snags in fairly open forests. While there is no local population data regarding trend, the NatureServe G4 rank shows that this species is considered "apparently secure", range-wide. There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

Loggerhead shrike - *Lanius ludovicianus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S4 (CA); S4 (NV)

Other Designations: USFWS BCC; CASSC; CA SGCN

The loggerhead shrike is present year round throughout most of California. Although the overall range appears stable, numbers have declined greatly. However, Global and State NatureServ rankings indicate populations of this species are apparently secure. The threats responsilbe for loggerhead shrike declines in California are poorly understood. No substantial or local concerns were identified.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

Long-billed curlew - *Numenius americanus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S2 (CA), S2S3B (NV)

Other Designations: USFWS BCC

Mono County's first breeding record confirmed near Crowley Lake in 2011 (Beedy and Pandolfino 2013); common in spring and fall migration near Owens Lake, where some occasionally winter. No substantial or local concerns have been identified in the plan area.

Literature Cited

Beedy, E. and E.R. Pandolfino. Illustrated by Keith Hansen. 2013. Birds of the Sierra Nevada: Their Natural History, Status, and Distribution. University of California Press, Berkeley, CA. 430 pp.

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Marbled godwit - *Limosa fedoa*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Mountain plover - *Charadrius montanus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: None

State Rank: S2? (CA)

Other Designations: CA SSC; CA SGCNA

Occurrence is rare or casual (transient and may not be encountered every year) with most records occurring in fall and winter in the Owens Valley. State rank "?" qualifier indicates inexact or uncertain rank and NatureServe indicates this species may be better ranked as S3. No substantial or local concerns have been identified.

Literature Cited

Beedy, E. and E.R. Pandolfino. Illustrated by Keith Hansen. 2013. Birds of the Sierra Nevada: Their Natural History, Status, and Distribution. University of California Press, Berkeley, CA. 430 pp.

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Northern harrier - *Circus cyaneus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Northern goshawk - *Accipiter gentilis atricapillus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern:

No

Relevant threats to species:

Habitat loss from high severity fire, bark beetles, and management activities such as timber harvest. Climate change also poses a serious threat due to the predicted increase in fires.

Rationale for northern goshawk:

The northern goshawk has a global ranking of G5, indicating that the species is "secure: common, widespread and abundant" at the global scale. It has a rating of S3 in California, indicating that it is "vulnerable" in California, and a rating of S2 in Nevada, indicating that it is "imperiled" in Nevada (NatureServe 2015). The northern goshawk is a California bird species of special concern and a California bird species of greatest conservation need. It is also listed as a California BLM Sensitive species. It is a Regional Forester sensitive species for every national forest in the Region except for the Cleveland National Forest.

The goshawk is a Holarctic species (found throughout all the northern continents of the world), and the North American subspecies (*Accipiter gentilis atricapillus*) breeds throughout Alaska, Canada, and mountains of the western United States and Mexico, and winters sporadically to the central-eastern United States and northern Mexico (Squires and Reynolds 1997b, AOU 1998). The range is relatively contiguous throughout North America. Six other subspecies occur in Eurasia (Squires and Reynolds 1997b). In California, the northern goshawk breeds locally in coniferous and mixed-coniferous forest regions in northwestern California (Del Norte and Humboldt counties) and across both sides of the Sierra Nevada range, generally at elevations of 1400-3000 m (4,600-10,000 ft), south to Tulare and Mono Counties (Bloom et al. 1985).

Northern goshawk is considered locally uncommon as a breeding and wintering species in California (Bloom et al. 1985, Gaines 1992, Small 1994, Woodbridge and Detrich 1994, Bezener and Fix 2000, Keane 2008). Breeding densities in the Cascades of northern California are tied to sparsely distributed forest patches (Woodbridge and Detrich 1994). Population size of northern goshawk based on Breeding Bird Survey data from 1998-2007 is estimated at 7,000 individuals in California, with 1,300 in the Sierra Nevada (PIF 2013). Based on records from eBird and CNDDB, northern goshawks are only absent from two national forests in California, the Angeles National Forest and Cleveland National Forest (CNDDB 2016, eBird 2016).

Breeding Bird Survey data throughout North America indicate essentially stable populations during 1966-2013 (-0.15 percent per year with non-significant and high variance around the mean) and 2003-2013 (+0.69 percent per year) (Sauer et al. 2014). The trend was also stable in California during 1966-2013 (+0.80 percent per year) and 2003-2013 (-1.08 percent per year) (Sauer et al. 2014). According to Christmas Bird Count (CBC) data for all of North America from 1966-2013, trends were negative (-0.5 percent per year, 95 percent CI: -3.7-0.4) (Soykan et al. 2016). Data from the Breeding Bird Survey and Christmas Bird Count have shown opposing trends for northern goshawk; however, these data sets are largely recognized as not adequate for monitoring population trends of goshawk (Keane 2008).

Northern goshawk is an irruptive migratory species, with breeding and winter distributions throughout North America. Many individuals may be resident in years when food resources are sufficient (Doyle and Smith 1994). Natal dispersal distances may also be driven in part by food availability (Kennedy and Ward 2003). Migration routes and winter range are not well known for this somewhat secretive species, but some banded individuals have been recovered up to 2,500 km (1,550 mi) from banding locations (Squires and Reynolds 1997a). Northern goshawk is known to undergo both southward and down-slope migration in California (Bloom et al. 1985, Gaines 1992, Small 1994, Keane 2008). In the Sierra Nevada, goshawks are generally year-round residents that expand home range size during the winter (Keane 1999). There is no evidence to suggest barriers to dispersal.

Northern goshawks are considered forest habitat generalists, using a variety of ages and forest ecosystem types to meet its life history requirements (USDI 1998, Squires and Reynolds 1997a). Within their breeding home ranges they tend to select mature to old-growth forest stands, or forested areas that have large diameter trees and dense canopy (Greenwald et al. 2005). The finest scale of habitat selection and the best described is nest area, typically encompassing the area that includes the main nest tree and alternate nests (Squires and Kennedy 2006). Northern goshawks nest in areas with larger diameter trees, higher canopy closure, open understory (Squires and Ruggiero 1996, Squires and Reynolds 1997a), and within a mosaic of forest ecosystem types and age classes (USDI 1998). During winter and migration, goshawks occur sporadically in other habitats, including hardwood forests. Variability of habitat selection along with the apparent lack of winter site fidelity results in less conservation concern than would be the case for habitat specialists (Garrett and Dunn 1981).

In California, goshawks typically nest in areas of high canopy cover, with large trees and old forest characteristics. However, results from goshawk nest site studies have shown geographic differences in canopy cover. In eastern California, northern goshawks nested in stands that were more open than found in northwestern or northern California (see Hargis 1994). Suitable stands occur in a broad range of conifer and conifer-hardwood types, including ponderosa, Jeffrey, and lodgepole pine, mixed conifer, white and red fir, Douglas-fir, mixed redwood–Douglas-fir–hardwood, less common in quaking aspen and in pinyon-juniper (Gaines 1992). Nest areas are often on moderate slopes or benches, and have open understories. Response to wildfire is believed to differ substantially by region and historical fire regime. While high intensity wildfire appears to have a negative influence, lower intensity burning could be beneficial to goshawks by reducing colonization of understory by shade tolerant trees, and maintaining the open understory conditions that northern goshawks prefer (Squires and Kennedy 2006).

Upper montane forests used by northern goshawks have likely been less altered by forestry practices, fire management, and exurban development than lower-elevation forests, at least in most parts of the California range (Katibah 1984, Siegel and DeSante 1999, CalPIF 2000, Robinson and Alexander 2002, RHJV 2004, Bunn et al. 2007). Fire suppression during the first part of the 20th century (Kilgore 1973) probably has had both positive and negative effects on northern goshawks, but historical timber-harvesting practices, especially clear-cutting, likely has had negative impacts on this species, and fuel-reduction by both mechanical means and by burning may be beneficial in the long run (Kotliar et al. 2002, Keane 2008).

In the southern Sierra Nevada, large high-severity fires and large areas of tree cover loss from drought and bark beetle related mortality, especially over the last five years, has substantially reduced the amount of suitable nesting habitat within closed canopy forests. Habitat occupancy rates for northern goshawk decrease in areas of tree cover loss. For example, in the Rim Fire on the Stanislaus National Forest, the amount of high severity fire within a territory negatively affected occupancy and nesting of goshawk; prevalence declined overtime from 70 percent the year following fire to 54 percent three years post-fire (Kalinowski et al. 2017). These results indicate that high-severity fire and associated loss of tree cover

reduces the quantity and quality of goshawk habitat and is a conservation concern in the increasingly fire-prone and beetle-prone forests of California (Kalinowski et al. 2017). It is unknown how the goshawk will respond to drought and bark beetle related tree mortality.

Clear-cutting impacts altering habitat conditions for goshawk at the coarse scale is of particular concern in areas of mixed "checkerboard" land ownership (Keane 2008). It appears goshawk require a minimum threshold amount (e.g., 80 ha in the southern Cascades) of nesting habitat in mature forest condition to maintain occupancy (Woodbridge and Detrich 1994). Thus, alteration of goshawk habitat on private lands adjacent to national forest land may increase the importance of habitat condition on national forest land for continued goshawk occupancy. For example, in mixed ownership areas that include the Stanislaus National Forest, occupancy monitoring suggests that at least two northern goshawk territories were abandoned immediately following harvest activities, despite the maintenance of nearby suitable nesting habitat on national forest land. Additional studies are needed to better determine what goshawks do and where they go after timber harvest (Rodriquez et al. 2016).

Multiple scientists have studied the effects of vegetation management (e.g., timber harvest, fuels treatments, etc.) and wildfire on the amount, distribution and quality of habitat (Bloom et al. 1985, Keane and Morrison 1994, Kennedy 1997, Squires and Reynolds 1997a, Daw et al. 1998, Smallwood 1998). The common threats identified include past timber harvest that resulted in a loss of large diameter trees and or foraging opportunities, principally in the lower elevations. Key ecological requirements for northern goshawk are suitable nesting and foraging habitat that support adequate prey populations. Increasingly, a major threat to goshawk is large high-severity fire that has impacted mature forests at all elevations in recent decades and is exacerbated by climate change. Long term fire suppression can lead to overstocking of forest stands, and along with drought and high ozone levels that stress trees can facilitate high fire severity (Long et al. 2014). During timber harvests in northern Idaho, nesting areas that retained greater than 39 percent of the 170 ha (420 acres) of forest surrounding a nest were more likely to have goshawks reoccupy the area the year following fire (Moser and Garton 2009).

Rodriguez et al. (2016) conducted a meta-analysis and their results suggest that although both timber harvest and a lack of large trees are associated with lower occupancy by nesting goshawks, pairs that nest near timber harvest or in small trees have indistinguishable nesting success from pairs nesting in large trees or farther from timber harvest. However, if goshawk pairs do nest at timber-harvest sites, their reproduction appears unaffected by this harvest. In agreement with other reviews (Squires and Kennedy 2006), that regardless of forest type, goshawks prefer patches of more mature trees, relative to availability, for situating nests. Rodriguez et al. (2016) found only a lack of evidence that stand characteristics and timber harvest influence the success of nesting attempts that occur in the presence of timber harvest. When evaluating the size of buffers to timber harvest in regards to nesting success, Rodriguez et al. (2016) states that it remains mostly untested whether larger buffers ameliorate negative effects of timber harvest on goshawk occupancy. Overall, the studies that compared goshawk nesting success to tree size or timber harvest were based on small samples, which led to large confidence intervals around the average effect size and reflecting low precision of the estimate (Rodriguez et al. 2016).

It is unclear how goshawk populations will respond to climate change. One potential threat from climate change is an increasing rate of fire in higher elevation forest stands (Schwartz et al. 2015), areas that contain old-growth forest that have largely been spared from timber harvest. However, the effect of fires in these stands is largely dependent on fire severity, as lower fire severity can maintain or benefit goshawk habitat. Based on the "climate change vulnerability index", a risk assessment tool developed by NatureServe to predict a species vulnerability to climate change, northern goshawk in the Sierra Nevada was rated as Moderately Vulnerable, which is defined as "abundance and/or range extent within geographical area assessed likely to decrease by 2050" (Siegel et al. 2014). Across their range, northern

goshawk display population-specific demographic relationships with local weather and regional climates. Based solely on projections of climate change, this population-specific variation is anticipated to result in population-specific responses to future climate scenarios, which could range from little effect to potentially significant effects (Araújo et al. 2005, Long et al. 2014). For example, in Europe goshawks have responded positively to increasing temperatures that have enabled earlier breeding and larger clutches (Lehikoinen et al. 2013). The impact that climate change may have on northern goshawk nesting and foraging habitat and prey populations in the future is unclear. It is also unclear what if any effect climate change would have on goshawk populations, as these changes would likely very depending on population-specific conditions.

Many kinds of human activities have been documented to affect raptors by altering habitats, physically harming or killing eggs, harming young, killing or stressing adults, or by disrupting normal behavior (Postovit and Postovit 1987, Delany et al. 1999 as cited in Morrison et al. 2011). A recent study on nesting northern goshawk response to logging truck noise found that while goshawk alerted to the noise by turning their head in the direction of the noise, they did not flush and response was inversely proportional to the distance of the nest from the road (Grubb et al. 2012). A study conducted by Morrison et al. (2011) in the Lake Tahoe Basin indicates, although weak statistically, human activity was about 75% less within frequently as compared to infrequently occupied territories.

In summary, goshawks are well-distributed and relatively abundant in most forested areas in California; distribution is limited and rare in the North Coast and Southern California Provinces. Goshawks use a broad range of vegetation types, and habitat on national forests in California is widespread and well distributed. While they may be "vulnerable" in California, northern goshawk populations are well distributed across their core breeding range. Goshawks possess excellent dispersal capabilities, and there are no identified barriers to dispersal. Some reduction in historical goshawk populations likely resulted from large-scale changes in amounts of old growth habitat from roughly 1850 to 1950, but goshawk territories remain well-distributed and, according to surveyed areas with intensive inventories, at densities comparable to studies elsewhere in North America (USDI 1998). Potential contemporary threats to goshawk include habitat loss from wildfire and climate change. Effects from wildfire vary greatly, depending on fire severity. Goshawk populations may be influenced by climate change in the future; however, there is significant uncertainty about how goshawk populations might respond to changing habitat conditions.

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013) and associated topic papers (USDA 2013, chapters 1, 3, 5, 8) the draft biological evaluation (Krueger 2016) the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit

Northern goshawk is known to occur on all four ranger districts of the Inyo National Forest; protected activity centers on the forest are shown in Figure 7. There are currently 38 known goshawk nesting territories on the forest; the Inyo National Forest reported 30 northern goshawk territories in 1998 (see table 21 USDI 1998). Available population data are inadequate to allow determination of any current trends in goshawk populations; territory data represent an accumulation of territory locations over time, and only small subsets of these territories have been monitored adequately to assess occupancy trends (see wildfire paragraph in "The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristic" below).

There are a total of 557 (June 2017) records for goshawk in the NRIS database, which includes multiple observations at a site. Most records occur on the Mono and Mammoth Lakes Ranger Districts around the Mammoth Lakes-June Lakes area, which may be reflective of survey intensity and not necessarily habitat suitability or preference because surveys for goshawk on the forest typically occur at the project level. In eBird, there are 137 records with 145 individuals in the plan area, and within a 5 mile buffer and including the forest, there are 201 records of 223 individuals. In CNDDB, there are 32 records within the forest and 36 records within 5 mile buffer and including the forest.

Ecological conditions for this species (see above general rationale for additional details)

Old growth habitat components, including large trees and snags, down logs and forests with open understory, closed canopy cover, and higher basal area are key ecosystem characteristics needed by goshawk. In general, there is considerable variability in structural characteristics of nest stands across the Sierras. Hargis et al. (2004) found that goshawks nesting on the Inyo National Forest selected nest stands with a mean canopy closure of 29 percent, other reports for the Inyo include mean canopy cover of 31 percent.

On the Inyo National Forest, ecological conditions for goshawk can be found in the mixed conifer, lodgepole pine (subalpine conifer), red fir, and Jeffrey pine forest, and aspen assessment types. The mixed conifer assessment type is most prevalent on the Kern Plateau and includes various combinations of white fir, red fir, and/or one or more pine species, typically with a very sparse understory. The majority of the mixed conifer assessment type (which does not necessarily include all mixed conifer stands) in the core timber management area was included in the Owens River Headwaters Wilderness, designated in 2009. With the exception of Monache Meadow on the Kern Plateau, approximately seventy-five percent of the mixed conifer assessment type is within wilderness. Goshawk nests found in the aspen assessment type generally occur on the eastside of the White Mountains.

Potential goshawk habitat in the Inyo National Forest was determined using the California Wildlife Habitat Relations (CWHR) types as described in the 2001 Sierra Nevada Forest Plan Amendment for high potential nesting and foraging habitat. On the Forest there are approximately 98,560 acres of high potential nesting habitat and 156,880 acres of foraging habitat.

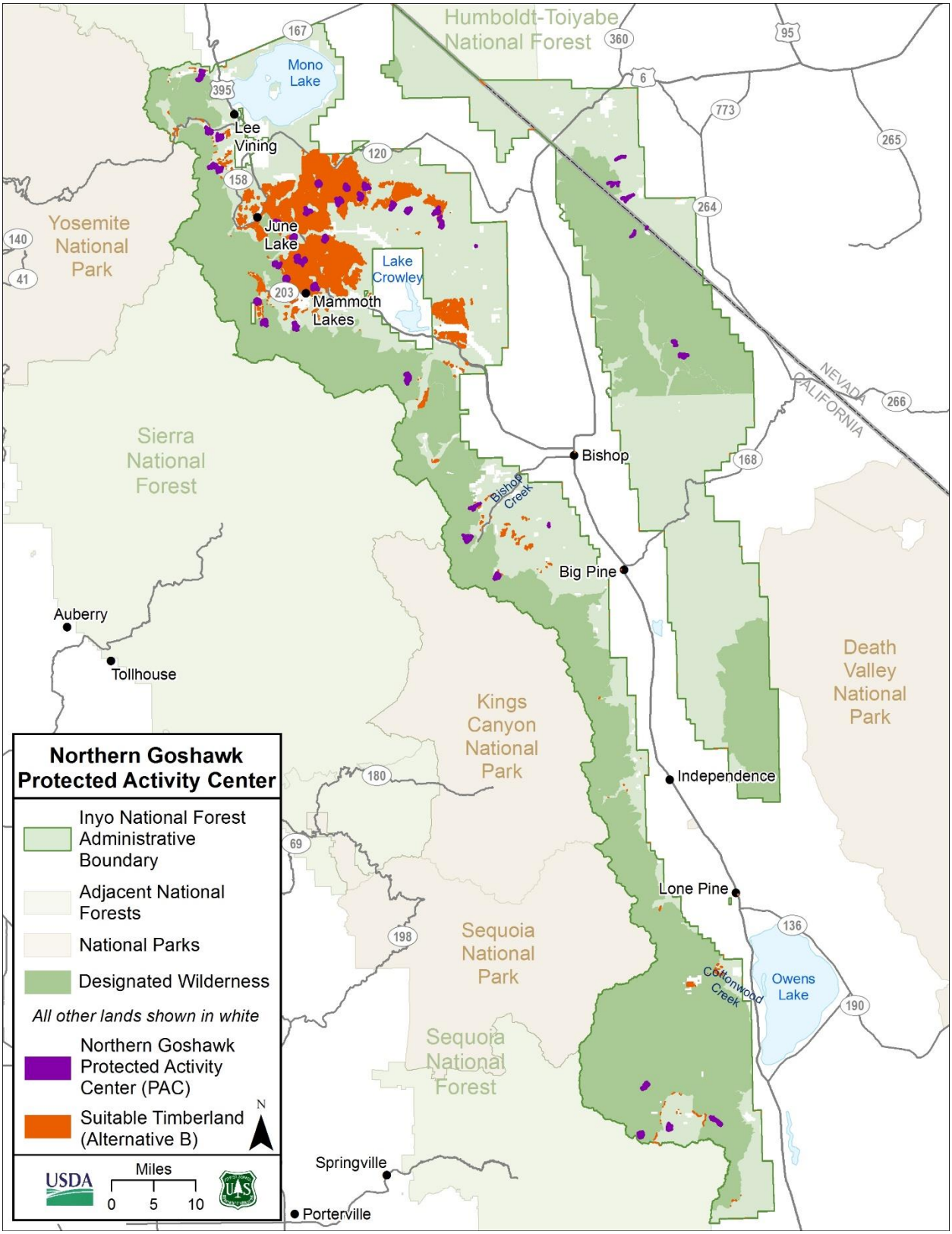

Figure 7. Northern goshawk protected activity centers (PAC) on the Inyo National Forest.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

Forest ecosystems on the Inyo National Forest are experiencing increasing tree densities and canopy cover that likely exceed the natural range of variability (NRV) (Gross and Coppoletta 2013, Safford 2013). Decades of fire suppression and commercial timber harvesting have resulted in forest conditions greatly altered from pre-European settlement times (before 1860). A lack of low intensity surface fires which would have occurred historically in drier forests have led to increases in surface and ladder fuels which has led to several high intensity fires on the Inyo National Forest. In general, the forest contains higher densities of small to medium sized trees while there is a deficit of open-canopy mature and old forests in most of the planning area.

Higher levels of conifer mortality have recently been detected in the Sierra Nevada range in association with extreme or protracted droughts and increased bark beetle activity. Tree mortality levels are not as extensive on the eastside as compared to westside forests. The greatest mortality in 2014 on the Inyo National Forest was in pinyon and keystone high elevation species, such as whitebark pines (Meyer et al. 2014, Meyer et al. 2016) as shown in Table 3. In lower elevation pine and dry mixed conifer forests there is elevated tree mortality, especially in white fir and red fir. Based on aerial surveys conducted by the USDA Forest Service State and Private Forestry program, mortality has more recently extended into higher elevation mixed conifer forests (**Error! Reference source not found.**).

Table 3. Acres of insect and disease related mortality by tree type on the Inyo National Forest

Host	2012	2013	2014	2015	2016	2017
Single leaf pinyon	1,500	2,000	13,000	5,000	6,000	2,500
Whitebark pine	5,000	4,500	10,000	1,000	4,000	8,500
Lodgepole pine	2,000	3,500	6,000	1,500	0	1,000
Jeffrey pine	3,000	4,000	2,500	1,800	12,500	12,500
White fir	100	2,000	2,000	4,500	22,000	5,000
California red fir	100	1,000	1,500	1,100	7,000	42,000

Wildfires have occurred within six goshawk protected activity centers (PACS); the Rainbow and Aqueduct PACs were surveyed post fire and the territories were active. The Casa Vieja and Summit Meadow PACs, located on the Kern Plateau, have not been surveyed since the McNally (2002) and Summit (2003) fires so no information is available on whether these territories remain active and if the area is providing suitable habitat for goshawks. The same is true for the Buttermilk PAC located within the Forks (2009) fire. No birds were observed in the Wet Meadow PAC after the Dexter Fire (2003), however, this PAC was not active at the time of the fire, with last known goshawk presence identified in 1996. During a twenty-year period (1996-2016), approximately 43,319 acres burned in the Montane Ecological Zone where goshawk habitat occurs. This equates to 2,157 acres/year.

Aspen forest type assessments show an increase in conifer cover in both the overstory and understory in the Indian and Cottonwood PACs. The increase in understory cover by conifers may have reduced the suitability of these stands for nesting goshawks. Aspen stands within the Chiatovich PAC are at a moderate to low risk of loss due to conifer encroachment.

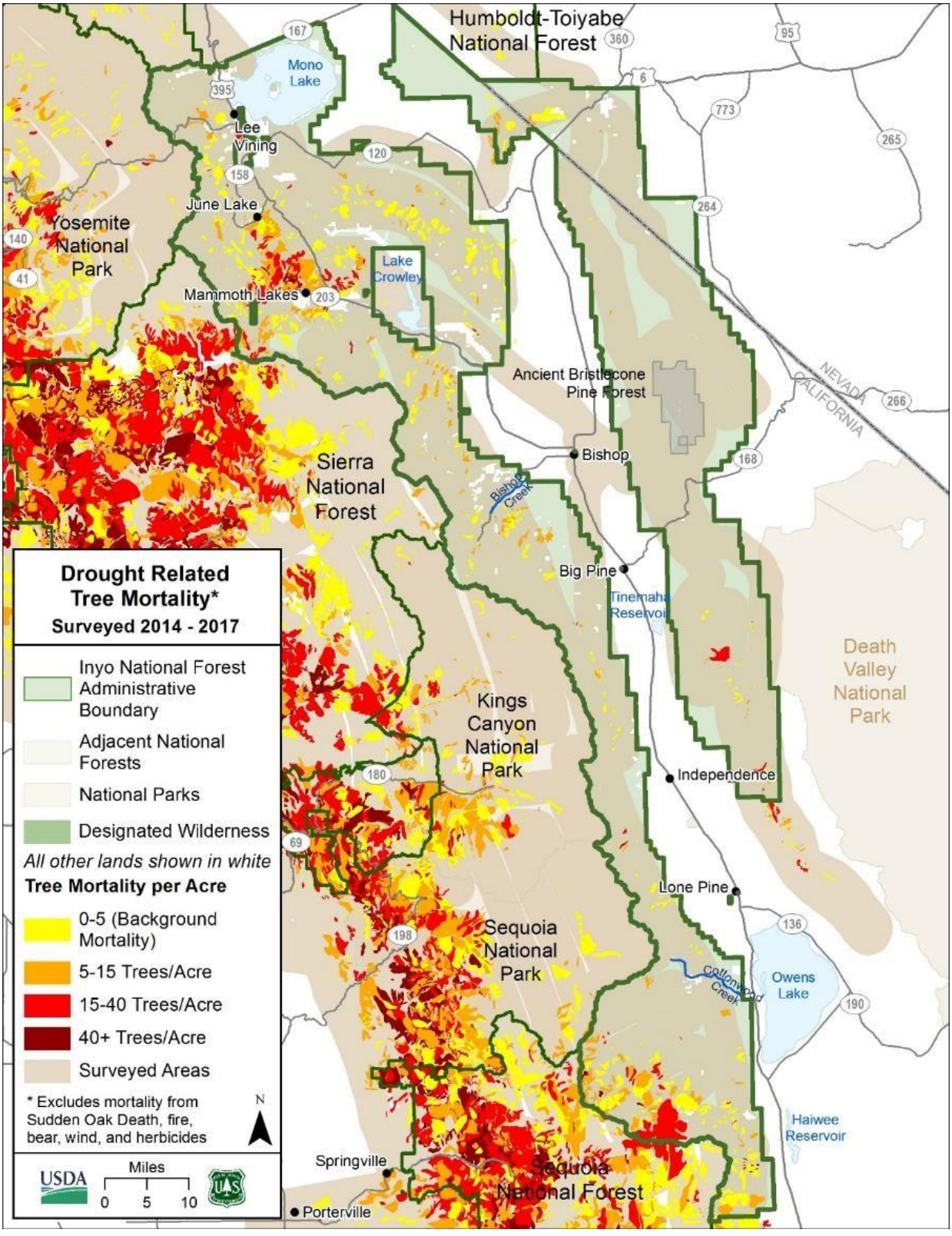

Figure 8. Drought and insect-related mortality through 2017 in the eastern Sierra Nevada based on aerial detection surveys

Densities of snags greater than 15 inches dbh follow similar patterns as large trees by forest type, coefficient of variation in parentheses: 1.2 (158 percent) in aspen; less than 0.1 (277 percent) in Jeffrey pine; less than 0.1 (234 percent) in pinyon-juniper; 1.8 (109 percent) in red fir; 0.3 (85 percent) in mixed conifer; 1 (139 percent) in lodgepole pine; and 4 (152 percent) in subalpine mixed conifer forest (See page 32 of the Inyo Assessment for additional information on large trees and snags).

The projected status of those ecological conditions relative to the species considered

Anticipated trends for red fir forest, Jeffrey and lodgepole pine and mixed conifer are similar to current; trending towards higher fuel loading, and changes in forest structure and composition associated with fire suppression coupled with a changing climate. In addition, projected increases (2006-2050) in mountain pine beetle activity for high-elevation white pine forest will have substantial cascading impacts on subalpine forest ecosystems, leading to outbreaks that can cause significant changes in forest structure, function, and composition (Meyer 2013). Aspen stands on the forest may see an increase in conifer encroachment with continued fire suppression and limited resources for restoration treatments. There may be increased future risk of inadequate number, distribution, and quality of large trees and snags. Snags are ephemeral features on the landscape, and fire and insect outbreaks may create both positive and negative opportunities for recruitment over time. As disturbance events (e.g., high-intensity fire, insects) increase in frequency and intensity there may be short term pulses of snags that benefit goshawk, however these events may also act to limit recruitment of trees into larger trees size classes over time. However, the habitat projections for old forest habitat (containing large trees greater than 50 inches in diameter and large snags) found in The Sierra Nevada Framework Environmental Impact Statement (2001) found those features to increase significantly over a 140-year time scale.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

N/A

Key risk factors arising from non-ecosystem conditions and/or management activities

Historically, risk factors include even aged management that reduced overstory trees, loss of prey, and loss of nesting habitat that includes features such as logs, snags and adequate understory. However, present timber removal practices (post-1990) on the Inyo National Forest have shifted emphasis toward a restoration based approach aimed at reducing stand density to improve overall forest health. The primary trees removed as a result of this effort are small to medium diameter trees, rather than the larger-trees goshawks prefer for nesting. This focus helps to reduce tree densities and improve overall resilience in the face of drought, insects and disease, and uncharacteristic high intensity wildfire which can destroy entire forest stands as well as older, bigger trees. This restoration based approach is consistent with forests in other western regions where goshawks occur in habitat previously characterized by frequent low intensity fire regimes (Reynolds et al. 2013, Dickson et al. 2014).

Vegetation management is ongoing and contributes to ecological restoration; vegetation treatments largely occur in Jeffrey pine, mixed conifer, and subalpine forest assessment types in Glass Mountain, Mammoth, and Upper Owens River areas. Personal and commercial fuelwood sales have been relatively stable over the past decade and that trend is expected to continue. Forest assessment types used by goshawks which are included in the suitable timber base in the Mammoth Lakes-June Lake core timber management area include Jeffrey pine (49, 370 acres—80 percent), lodgepole pine (7,930 acres-13 percent), mixed conifer (3,814 acres—6 percent) and red fir (878 acres-1 percent). Most trees in the area are 8-14 inches dbh with 50 to 400 or more trees per acre contributing to lack of structural diversity and recruitment of trees into older, larger size classes.

Effects from climate related change and variable precipitation brought on by El Nino and La Nina have the potential to negatively affect goshawk productivity. Reynolds et al (2017) recently analyzed a 20-year data set on goshawk demography on the Kaibab Plateau in Northern Arizona. They concluded that climate change-related drought effects on prey abundance coupled with the risk of habitat loss from stand replacing fire to be primary threats (Reynolds et al 2017). This study reinforces previous work by Salafsky et al. (2005) who found that while goshawks readily exploited a variety of different prey species, their overall productivity was greatly driven by differences in the densities of several key prey species. Similar factors may also be relevant to the Inyo National Forest goshawks and their prey base as climate change effects become more prevalent.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

On the Inyo National Forest, goshawk territories remain well-distributed in the plan area despite the past widespread changes in the amount and distribution of mature forest habitat. There are 38 known northern goshawk nest sites on the Inyo National Forest; 30 territories were reported in 1998. The nests are distributed across the forest and goshawks use multiple vegetation types. Tree mortality associated with drought and bark beetle activity has increased but impacts to goshawk are unknown at this time and goshawk activity will be monitored. Climate change and potential drought related effects will likely exert pressure on the key ecological conditions that this species depends upon (as noted above), but it is unknown what long term role these stressors will have on the species' ability to persist in the planning unit over time. The best available scientific information about the northern goshawk does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the northern goshawk does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Olive-sided flycatcher - *Contopus cooperi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Potential threats to the olive-sided flycatcher include use of logged and recently burned forest habitat, which is considered a potential ecological trap.

Rationale for Olive-sided flycatcher

The olive-sided flycatcher has a global rank of G4 (Apparently Secure), a California State rank of S4 (Apparently Secure), and is recognized as a Species of Special Concern and Species of Greatest Conservation Need by California Department of Fish and Wildlife and a Bird of Conservation Concern by USFWS.

Olive-sided Flycatchers breed across Canada and throughout western North America and migrates to winter in Central and South America (AOU 1998, Altman and Sallabanks 2000). In California, they breed throughout northern California, especially along the coast and in the Sierra Nevada Mountains. They also nest in scattered high-elevation areas in southern California.

Olive-sided Flycatchers are considered uncommon to locally common as a breeding species and migrant in California (Garrett and Dunn 1981, Small 1994, Fix and Bezener 2000, Floyd et al. 2007, Widdowson 2008). However, as Grinnell and Miller noted (1944), they are highly conspicuous, and they are likely to be over represented in some surveys. Analyses of Breeding Bird Survey (BBS) data provide an estimate of 1,700,000 total Olive-sided Flycatchers worldwide (PIF 2013). BBS data indicate that California has the highest abundance of Olive-sided Flycatchers across its range with approximately 100,000 individuals within the state (PIF 2013). Although they are not recorded in the CNDDB database, they are commonly reported on eBird in all Forests within the USFS region 5.

Breeding Bird Survey data indicate a significant decrease in Olive-sided Flycatcher populations between 1966 and 2013 with a 2.94 percent annual decline in California (95 percent CI[-3.53, -2.37]) and a 3.48 percent annual decline across the entire BBS survey area (95 percent CI[-4.64, -2.84]]; Sauer et al. 2014). A study analyzing data from point count areas across the northeastern United States also detected a significant decline in that region (Ralston et al. 2015). Local extirpations from the southern Sierra Nevada have also been documented, despite no apparent change in habitat type and structure in those areas (Marshall 1988).

Olive-sided Flycatchers are associated with open canopy conifer forests and prefer forest edges adjacent to open areas with early-successional characteristics that provide high, exposed perches from which to hunt insects such as bees and wasps. Habitats used include burned forests and unburned logged or naturally occurring open forest habitat. Although there has been an increase in the availability of logged open forest since the 1800's, this may not provide high quality breeding habitat. However, the increase in forest fires has increased the availability of burned forest habitat, which is considered higher quality breeding habitat several years post fire. Extensive deforestation on wintering grounds in the Andes has resulted in widespread habitat loss.

Threats to the persistence of the olive-sided flycatcher include widespread deforestation on wintering grounds Central and South America and the use of logged and recently burned forests, although the understanding of these threats is limited. Despite high densities of Olive-sided Flycatchers occurring in logged forests, studies have found that compared with other types of habitats, including naturally burned forests, nesting success and survival rates are lower. Logged areas are documented to have higher predation rates. At least one study has also observed that the nesting success of flycatchers breeding in recently burned forests decreased relative to those breeding in unburned areas with similar habitat structure, although sample sizes for this study were small.

It has been hypothesized that although fire may initially reduce reproductive success in this species, they still require older burned forests or a more natural fire regime. Greater nesting success was documented in burned habitats relative to unburned habitats in a forest nine years post-fire. Some suggest that ongoing fire suppression and post-fire salvage logging may also be threats to Olive-sided Flycatchers; however, fire size and severity have been trending up in low and mid-elevation forests on USFS lands over the last

20 to 30 years, and these trends have been linked to increasing forest fuels from historical forest management actions, fire suppression, and climate change (Miller et al. 2009, Miller and Safford 2012, Safford et al. 2012, Malleck et al. 2013). Tracking of salvage operations on National Forest System lands in Region 5 show that only about 2.6 percent of burned habitat (greater than 50 percent basal area mortality) is actually salvaged any given year, although this is known to fluctuate annually. Thus, the availability of higher quality breeding habitat is not considered a limiting factor for this species.

Adult survival is often high on their breeding grounds, thus declines in Olive-sided Flycatcher populations may in fact be driven by habitat loss and degradation taking place on their wintering grounds in Central and South America (Marshall 1988, Widdowson 2008, Altman and Sallabanks 2012); however, no study has yet to directly address this hypothesis.

While the olive-sided flycatcher is experiencing population declines, it is unknown whether the threat is on their breeding or wintering grounds. Suitable breeding habitat is available within the plan area and is not considered a limiting factor to the persistence of this species.

Inyo National Forest Rationale

In eBird, there are 687 records of 969 individuals on the Inyo National Forest; within 5 miles of and including the Forest, there are 1359 records of 2024 individuals. There are no records in CNDDB for the Inyo National Forest. In the Biodiversity Information serving Our Nation (BISON) database, it shows olive-sided flycatcher locations are well distributed across the range of the forest.

The best available scientific information about the olive-sided flycatcher does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the **olive-sided flycatcher doesn't meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Pinyon jay - *Gymnorhimus cyanocephalus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA); S2S4 (NV)

Other Designations: USFWS BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

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Red knot - *Calidris canutus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Rufous hummingbird - *Selasphorus rufus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S1S2 (CA); S3M (NV)

Other Designations: None

Evidence (e.g., eBird data) indicates that the trend over the past 10 years or three generations probably has been relatively stable or at least has not changed at a fast rate. There is no scientific evidence there is concern for the species persistence in the plan area habitats. The S1S2 status is likely a reflection of the migrant passage status of this species in CA.

Literature Cited

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Rufous-winged sparrow - *Peucaea carpalis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Sagebrush sparrow - *Artemisiospiza nevadensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Sage thrasher - *Oreoscoptes montanus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in the plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA); S5B (NV)

Other Designations: USFWS BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Summer tanager - *Piranga rubra*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Threats to the persistence of summer tanager include loss and degradation of mature riparian habitat dominated by cottonwoods and willows.

Rationale for summer tanager

The summer tanager has a global rank of G5, a California state rank of S1, and a Nevada state rank of S2B. In California, it is also recognized as a Species of Special Concern and a Species of Greatest Conservation Need by CDFW.

The summer tanager has three recognized subspecies occurring in central and eastern North America, east-central Arizona, and elsewhere in southwestern North America (Robinson 1996). The southwestern subspecies (*P. r. cooperi*) breeds locally in California and southern Nevada, primarily along the Colorado River but also in very isolated riparian patches west and north to Santa Barbara, Kern, and Inyo counties (Grinnell and Miller 1944, Unitt 2008), and in the southern tip of Nevada (Floyd et al. 2007).

Summer tanager is currently regarded as a rare to locally uncommon species in California (Small 1994). Extensive surveys for breeding summer tanagers during the 1980s-2000s estimated a total known breeding population of only about 100 pairs for the state of California (Unitt 2008).

Summer tanagers in California are split into two breeding groups that are undergoing substantially different population trends (Unitt 2008). Along the Colorado River bordering Arizona the species was regarded as "common" prior to the 1940s (Grinnell and Miller 1944), but by 1976 had "declined drastically" there (Rosenberg et al. 1991), and during the 1980s-2000s only 1-3 pairs could be found on the California side of the river (Unitt 2008). At the same time, however, breeding populations of summer tanagers to the north and west of the Colorado River appeared to be expanding in both range and

numbers, from none prior to the 1960s to an estimated 80-90 pairs during the 2000s, about half of which occur along the South Fork of the Kern River on Sequoia National Forest (Unitt 2008). Perhaps reflecting these divergent trends, Breeding Bird Survey (BBS) data (Sauer et al. 2011) indicate non-significant increases in the summer tanager population in California, during both 1966-2010 (of +2.9 percent) and during 2001-2010 (+2.8 percent).

Summer tanagers in California breed primarily in riparian forests and river bottoms dominated by cottonwoods (*Populus fremontii*), non-native salt-cedar (*Tamarix*), and other riparian tree species (Rosenberg et al. 1991, Robinson 1996, Unitt 2008). This species is a medium to long-distant migrant, with most populations (including those of western North America) migrating to the Neotropics for winter (Robinson 1996).

The greatest threat to the persistence of summer tanagers in California is the removal, degradation, or loss of riparian forest. The California state rankings are driven by the population decline well south of the plan area along the Colorado River, their historic breeding range. Degradation includes fragmentation and lowering of water tables. The heat-moderating qualities of cottonwoods and willows are critical for nesting success. Fragmentation can reduce the availability of cooler microsites along rivers. Unnatural water regimes, including floods and extraction of groundwater, have resulted in the loss of most cottonwoods along the Colorado and Mojave Rivers. Invasion of species including tamarisk, Russian olive, and giant reed have displaced suitable summer tanager breeding habitat. Fire is a threat as it typically favors tamarisk at the expense of cottonwood.

Biodiversity Information Serving Our Nation (BISON) database has a total of 5,358 occurrences in California.

Inyo National Forest-specific Rationale

Summer tanagers are noted in many locations within the Inyo National Forest, including two bird banding stations (BISON 2017). Spring and fall migrants observed north to Mono Basin, Mono County. Although this species is considered riparian, it does show up in many locations that are non-riparian in and near the Forest. Overall, Summer tanagers occur in low numbers on and near the plan area and are considered an irregular or ephemeral species on and near the plan area. They have expanded their range presumably based on the availability of suitable breeding habitat. For a description of riparian conditions on the Inyo National Forest, see the section “The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics” in the rationale for Sierra Nevada willow flycatcher.

Overall, summer tanagers occur in low numbers on and near the plan area. They have been expanding their known range and increasing their numbers compared to historic times. The degradation or loss of riparian habitat within the plan area is low and not considered a limiting factor or a threat to the persistence of summer tanagers.

Best available scientific information about the summer tanager does not indicate substantial concern about the species’ capability to persist over the long term in the plan area. Based upon the lack of evidence and supporting best available science, the **summer tanager doesn’t meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Swainson's hawk - *Buteo swainsoni*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

No relevant threats identified.

Rationale for Swainson's hawk

The Swainson's hawk has a global rank of G5 and a California State rank of S3. The Swainson's hawk is listed as Threatened under the California Endangered Species Act and is considered a Species of Greatest Conservation Concern by CDFW. The State Rank for Nevada is a S2B.

The Swainson's Hawk is a monotypic species that breeds throughout western North America from southeastern Alaska to north-central Mexico and winters south through Mexico and northern South America (AOU 1998, Bechard et al. 2010). This species is highly migratory (AOU 1998, Bechard et al. 2010).

Breeding habitat can be variable, ranging from grass-dominated native habitat, sparse woodlands, and shrublands (Bechard et al. 2010). Foraging habitat includes row-crop agriculture during or after harvest, flooded agricultural fields, fields being burned (when prey are pushed to field margins), and open grassland (Bechard et al. 2010). Swainson's Hawks in California breed primarily in open grasslands and marshes that support populations of rodents, large insects such as grasshoppers, and reptiles such as lizards and snakes (Grinnell and Miller 1944, Bloom 1980, CDFG 1988, Small 1994, Bechard et al. 2010). Nests are typically located in trees near the edge of riparian vegetation, lone trees, or trees in residential neighborhoods adjacent to foraging habitat. This species is generally considered a winter visitor and transitory in nature on National Forest System lands.

Throughout North America and in California, populations of Swainson's Hawks declined substantially both in range and in abundance during the late 1800s and early 1900s due to human persecution and conversion of native grassland habitats to agriculture (Bloom 1980, Bechard et al. 2010). Swainson’s hawk is highly migratory and appears to be increasing in California. Based on Breeding Bird Survey data in California, Swainson’s Hawk had large population increases from 1966-2013 (8.5 percent per year), and from 2003-2013 (11.26 percent per year) (Sauer et al. 2014). Christmas Bird Count data from across the United States indicate a non-significant decline in population size from 1966-2013 (-3.5 percent per year) (Soykan et al. 2016).

Extensive draining and agricultural modification of wetland-marsh and grassland habitats historically inhabited by breeding Swainson's Hawks greatly affected populations during the 1800s and early 1900s, but such degradation has substantially abated in the past 50 years. However, many anthropogenic factors still threaten Swainson's hawk populations, including conversion of natural or agricultural lands to urban sprawl or commercial properties, ‘clean’ farming techniques that leave few residual vegetation areas for prey, heavy livestock grazing that reduces cover for nesting and prey resources, and increased disturbance at nests. Along with other raptors, Swainson’s Hawks are considered to be at high risk of population decline because of wind turbines (Beston et al. 2016). Swainson’s Hawks have begun nesting in urban environments, which may help offset loss of natural habitat.

Inyo National Forest-specific Rationale

The Inyo National Forest is not known to be a place that Swainson’s hawks nest, nor is it known to have a critical stop over location or habitat type. In Biodiversity Information Serving Our Country (BISON) database, there are 503 occurrences in Inyo County and 362 occurrences in Mono County, with the majority being in the valley lowlands. In eBird, there are 33 records of 38 individuals within the Forest boundary; there are 730 records of 2278 individuals within a 5 mile buffer and including the forest. In CNDDB, there is 1 record within the Forest boundary and 30 records within 5 mile buffer and including the Forest. Habitats that this species uses are not limited or at risk in the plan area. Their food is non-specific and is available. The best available scientific information about the Swainson’s hawk does not indicate substantial concern about the species’ capability to persist over the long term in the plan area. Based upon the supporting best available science, **Swainson’s hawk doesn’t meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Soykan, C. U., J. Sauer, J. G. Schuetz, G. S. LeBaron, K. Dale, and G. M. Langham. 2016. Population trends for North American winter birds based on hierarchical models. *Ecosphere* 7:1–16.

Vermilion flycatcher - *Pyrocephalus rubinus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Decline in southwestern U.S. possibly is related to destruction of breeding habitat and cowbird parasitism (USFWS 1987). This species is a winter non-breeding resident.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S2S3 (CA); S2 (NV)

Other Designations: CA SSC; CA SGCN

Core range for the vermilion flycatcher occurs outside of the planning unit primarily in the lower Colorado River and the Mojave River. A few spring and fall migrants are observed every few years from the Mono Basin south to Owens Valley. No substantial or local concerns were identified on the planning unit.

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NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/ [accessed 31 March 2017].

Virginia's warbler - *Oreothlypis virginiae*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Nothing known in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S2 (CA); S4B (NV)

Other Designations: USFWS BCC

This species is widely distributed across the Great Basin and southern Rocky Mountains, the western limit of the breeding range barely extends into eastern California. Virginia's Warbler is a rare and irregular breeder in pinyon-juniper habitats of Mono and Inyo Counties but are more common breeders just east of the Glass Mountain and White Mountains regions. No substantial or local concerns were identified for this species.

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White-faced ibis - *Plegadis chihi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Nothing known in plan area.

Rationale for Species

Species is native to and known to occur in the plan area: Yes

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S3S4 (CA); S3B (NV)

Other Designations: None

The white-faced ibis is a common resident of the Central Valley, breeds at a few isolated marshes north of Truckee, and wanders widely after the nesting season. Numbers increased substantially following the banning of DDT. No substantial or local concerns have been noted.

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White-headed woodpecker - *Picoides albolarvatus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S4 (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Williamson's sapsucker - *Sphyrapicus thyroideus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: USFWS-BCC

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Yellow-breasted chat - *Icteria virens*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Yellow-headed blackbird - *Xanthocephalus xanthocephalus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Yellow Rail - *Coturnicops noveboracensis*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Small and isolated breeding populations in California are rare. Require very specific habitat requirements for nesting. Extensive draining and anthropogenic modification of historical sedge-marsh and wet grassland habitats.

Rationale for yellow rail

NatureServe Global Rank: G4

NatureServe T Rank: None

State Rank: S1S2 (CA)

Other Designations: FS-SS; CA-SSC; CA-SGCN; USFWS-BCC

Yellow rails are small, quiet and secretive birds that generally remain concealed in dense wetland and marsh vegetation. Consequently, they are even difficult to detect by experienced birders. Yellow rails are rare in California. Until a small breeding population was rediscovered in southern Oregon in 1989, it was believed that breeding populations had been extirpated from the western United States (Stern et al. 1993).

Based on records of occurrence from eBird 1970-2016 (eBird 2016) and California Natural Diversity Database (CNDDB) (CDFW 2016), yellow rails are known to occupy four locations in California during breeding season, with two located on a national forest: Cowhead Slough near Fort Bidwell, Modoc County, near but not on the Modoc NF; within 5 mile buffer of Shasta-Trinity NF near Mt Shasta, Siskiyou County, near but not on the Forest; two locations on the Lassen NF, in Lassen County near Papoose Meadows and in Plumas County near Willow Lake. Nesting is suspected at these northeastern California locations based on the timing of observations during the breeding season and/or the presence of vocalizing males. With so few known sites, and the apparently low numbers of individuals present at

those sites there is significant concern for the persistence of populations at a national forest level. Yellow rails are not known to occur on the Inyo National Forest, but are considered fly over species.

Wintering yellow rails occur along the length of the California coast but primarily around and just north of San Francisco Bay, and not on Forest Service Region 5 national forests (Hamilton et al. 2007, Sterling 2008). This wintering population likely consists primarily of birds that breed in the Canadian Prairie Provinces and bordering United States, with only a small proportion representing birds that breed in California.

Population trends in California are unknown. Yellow rails are rare and cryptic, consequently there are too few detections to perform analyses of abundance or trends based on Breeding Bird Survey (BBS) or Christmas Bird Count (CBC) data (PIF 2013, Sauer et al. 2014).

Yellow rails have very specific habitat requirements, and are reliant on wetland habitats (Bookhout 2015). Across their breeding range, yellow rails are commonly associated with large swaths of sedges, particularly of the genus *Carex* (Bart et al. 1984, Bookhout and Stenzel 1987, Popper and Stern 2000). They prefer to nest in areas with standing water and a high density of senescent vegetation (Bart et al. 1984, Popper and Stern 2000). They winter in moderately dry, grassy portions of coastal salt marshes (Bookhout 2015).

They appear to require medium to large wetlands with density estimates ranging from 1 male per 6.5 hectares (16 acres) to 1 per 34 (85 acres) during breeding within appropriate habitat (Bookhout 2015). The average area of use for yellow rails tracked was about 8 hectares (20 acres), although areas of use often overlapped with those of other conspecifics (Bookhout and Stenzel 1987).

Loss of wetland habitat is the greatest threat to yellow rails. Draining and modification of sedge-marsh and wet grassland habitats needed by yellow rails is likely the greatest concern for this species (Stern et al. 1993, CalPIF 2000, Popper and Stern 2000, Sterling 2008, Bookhout 2015). Wetland and grassland habitat in California continue to be affected by anthropogenic factors including grazing, draining, and agricultural transformation (Sterling 2008).

Fire suppression may negatively impact yellow rails by allowing woody vegetation to encroach on preferred breeding habitats (Austin and Buhl 2013). Burning every 2–5 years appears to provide the litter, ground-level cover, and woody conditions attractive to yellow rails (Austin and Buhl 2013). Climate change is expected to result in warmer temperatures and dryer conditions which may threaten wetlands and potentially yellow rail populations. In southern Oregon, the primary threat has been the draining of occupied sedge marshes during the 1980s and early 1990s, rendering those locations unsuitable as rail habitat (Stern et al. 1993). It is not known if draining of sedge marshes has recently degraded occupied or suitable habitat in California.

The effects of cattle grazing on breeding habitat are unclear: the breeding season site near Mt. Shasta has active cattle grazing, whereas the Cowhead Slough site is fenced to exclude cattle (Sterling 2008). Cattle grazing was not mentioned in the descriptions of occupied breeding sites in southern Oregon (Stern et al. 1993), but at least one site was described as ungrazed (Popper and Stern 2000). Overgrazing during the breeding season probably increases the likelihood of eggs getting crushed by trampling from cattle and degrades habitat by removing vegetative cover. The length of the breeding season is poorly known in California, but on the basis of information from Oregon it probably extends from May through early September (Popper and Stern 2000).

Inyo National Forest-specific Rationale

On the Inyo National Forest, the yellow rail is considered a fly-over species and is not known to nest or have a significant stop over point. There is one museum collection record from 1943 within the Inyo National Forest from BISON, but no records in eBird or CNDDB. However, there are no other sightings of yellow rail on the forest. *There is currently insufficient information to determine if this species is at risk for persistence on the planning unit*. Based upon the lack of evidence and supporting best available science, the yellow rail does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Yellow warbler - *Setophaga petechia*

Is there scientific information to conclude that there is substantial concern about species capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Threats include habitat loss, climate change and nest parasitism by brown-headed cowbirds.

Rationale for yellow warbler

Yellow Warblers have a broad range and can be found across much of North America. The bulk of their breeding range extends from as far north as the Arctic Circle to as far south as Arkansas. They also nest throughout the Sierra Madre Occidental. Birds breeding in these areas are migratory and winter in southern Mexico, Central America, and northern South America

There are currently 35 recognized subspecies of yellow warbler (ITIS 2017). Four yellow warbler subspecies occur in California: *S. p. brewsteri*, *S. p. morcomi*, *S. p. rubiginosa* and *S. p. sonorana*, (Grinnell and Miller 1944, NatureServe 2015). The *S. p. sonorana*, subspecies is found only along the lower Colorado River, is not present on any of the national forests in California, and is not considered further here (NatureServe 2015). *S. p. rubiginosa* is a passage migrant that breeds in Alaska and Canada and may stop in California briefly during migration (Heath 2008).

S. p. brewsteri and *S. p. morcomi* are the two subspecies known to breed on the national forests in California. *S. p. brewsteri* and *S. p. morcomi* are not consistently distinguishable from each other and *brewsteri* is best considered synonymous with *morcomi* (Patten et al. 2003, Heath 2008, NatureServe 2015).

The yellow warbler has a global ranking of G5, and the *S. p. morcomi* subspecies has a ranking of T5 indicating it is secure which is defined as “common; widespread and abundant” (NatureServe 2015). The ranking of S3S4 in California indicates a range of uncertainty about its status in California which lies between vulnerable and apparently secure (CNDDB 2016). *S. petechial* is designated as a species of special concern and both *S. petechial* and sub.sp. *morcomi* are designated as species of greatest conservation concern by the State of California.

The yellow warbler is the most common warbler species in North America. It remains very common in much of its large range and based on Breeding Bird Survey (BBS) data, the population in California is estimated at 600,000 and the global population is estimated to be 90 million individuals (PIF 2013). They are known to occur on every national forest in California. Population declines have been reported in southern California, the Central Valley and coastal California where riparian habitats have been most impacted (Heath 2008).

Yellow warblers typically breed in riparian areas near streams and wet meadows (Grinnell and Miller 1944, Lowther et al. 1999). They prefer to nest in willows and cottonwoods, but they will use many species of woody riparian plants (Grinnell and Miller 1944, Knopf and Sedgwick 1992). They place nests in dense stands of large, more mature shrubs to escape detection by predators and nest parasites (Knopf and Sedgwick 1992). They feed on a wide diversity of invertebrates, and choose prey items based on availability (Grinnell and Miller 1944, Lowther et al. 1999). In addition to riparian habitats, yellow warblers in the northern Sierra Nevada also breed in low densities in montane chaparral (Humple and Burnett 2010).

During migration yellow warblers utilize a large variety of habitat types in addition to riparian areas, including urban parks, second growth forest, and scrubby pastureland (Lowther et al. 1999).

Yellow warblers are primarily threatened by anthropogenic factors. Loss and degradation of riparian habitats on both breeding and wintering grounds is a continuing threat to this species. Human activities such as urban and agricultural development, livestock overgrazing, introduction of exotic plants, and water diversion are all major threats to riparian habitats (Katibah 1984, DeSante and George 1994, RHJV 2004, Heath 2008). Such habitat loss has been especially extensive in coastal California and the Central Valley, where the effects of urbanization and agricultural have been most severe. Over 90 percent of wetland habitats once used by Yellow Warblers in the Central Valley has been lost over the past 150 years (CSU Chico 2003). Clearing of native habitats to provide more open conditions for cattle grazing and the installation of feedlots have led to an increased abundance of the nest parasite brown-headed cowbird across California, which has increased pressure on many species of breeding birds, including the yellow warbler (Staab and Morrison 1997, Lowther et al. 1999, Heath 2008). Climate change is predicted to affect breeding and wintering habitat (Franco et al. 2006, Diffenbaugh et al. 2015). Climate change could potentially affect the synchronization of migration, breeding phenology and food availability on their breeding grounds (Marra et al. 2005, Both et al. 2010).

Inyo National Forest - specific Rationale

From eBird, there are 2874 records of 7674 individuals within the Inyo forest boundary; within 5 miles of and including the forest, there are 6420 records of 23323 individuals. In CNDDB, there are only 5 records for the same area. In review of Biodiversity Information Serving Our Nation (BISON) database, yellow warblers are found well distributed across the Inyo National Forest. There is a predominate number of sightings along the Owens River corridor just outside the forest which is expected since it is considered a birding hotspot.

Despite threats to the yellow warbler in some areas of California, populations on the Inyo National Forest are expected to persist: it is a common species with large populations; has a high capacity for dispersal; its prey items are chosen due to availability; and it is able to breed in a relatively wide range of riparian and non-riparian habitats. Suitable habitat is expected to persist on the Inyo National Forest. Based on these factors, there is insufficient information to demonstrate substantial concern for long-term persistence in the plan area.

Based upon the lack of evidence and supporting best available science, the yellow warbler does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Amphibians

Mount Lyell salamender (Owens Valley web-toed salamander) - *Hydromantes platycephalus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

There are relatively few threats to the species according to Wake and Papenfuss (2005) and NatureServe. However, climate change is identified as a threat to the species in California Department of Fish and Wildlife's state wildlife action plan.

Rationale for Mt. Lyell salamander

Mt. Lyell salamander is considered globally secure by NatureServe (rank of G4) and is a species of least concern by IUCN. It is a California species of special concern and a species of greatest conservation need based on California Department of Fish and Wildlife state wildlife action plan (SWAP).

The range of the Mt. Lyell salamander is relatively narrow, confined primarily to the highest elevations of the Sierra Nevada (Rovito 2010), but has been found at some relatively low elevations (3,900 feet (1,220 meters)) (Wake and Papenfuss 2005). Its longitudinal range is relatively large, extending from near Lake Tahoe in the north, southward to the Owens Valley (Wake and Papenfuss 2005). Little is known about the population size or trend. Its existence in remote areas and lack of population surveys likely underestimate the abundance of this salamander (Wake and Papenfuss, 2005, NatureServe 2017). In addition, much of the habitat occupied by Mt. Lyell salamander is presumed stable because it lies within wilderness areas that are protected from anthropogenic disturbance.

The Mt. Lyell salamander lives primarily at high elevations in the Sierra Nevada and is frequently associated with expanses of granitic rock, granitic talus slopes, and streamside environments. It is primarily active during and after snowmelt when surface moisture on rocks and outcroppings is high, and potentially retreats into deep talus when surface moisture is low. The salamander is primarily insectivorous and has a curious projectile tongue used to catch its prey (Wake and Papenfuss 2005). *H. platycephalus* was previously thought to be comprised of three potential species or subspecies and has been treated as such by California Department of Fish and Wildlife and U.S. Fish and Wildlife Service. Initially, the Owens Valley populations appeared to be different and occupied habitats different from the rest of the range of the species, thereby leading some to consider the Owens Valley populations to comprise a distinct subspecies or species. However, Rovito (2010) found, using mitochondrial DNA tests, two deeply divergent lineages between northern and southern populations, with the break in these lineages occurring around the Mammoth Lakes area. Rovito's analysis included individuals from the Owens Valley area which were not substantially different from other individuals from the southern lineage (Rovito 2010, Evelyn and Sweet 2012).

Based on the widespread distribution of the Mt. Lyell salamander throughout the Sierra Nevada and the stable condition of the habitats it relies upon, there is little conservation concern for the continued persistence of *H. platycephalus*. The analysis of the genetic history of the Mt. Lyell salamander does not support the existence of a unique subpopulation of salamanders from the Owens Valley.

Since the species is wide ranging at high elevations within the Sierra Nevada range or found within riparian areas with the Owens River Valley, this species is not tied to a specific habitat. Biodiversity Information Serving Our Nation (BISON) database shows a wide range of recent museum collections on the crest of the Sierra Nevada Range.

Inyo National Forest-specific Rationale

On the Inyo National Forest, *Hydromantes platycephalus* appears well distributed to the north and south of the forest within the Sierra Nevada Mountains. The best available scientific information about the Mt. Lyell salamander does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the Mt. Lyell

Salamander doesn't meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Reptile

Panamint alligator lizard - *Elgaria panamintina*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Impacts to water supply and/or adjacent microhabitats associated with 30 localities known from six mountain ranges in Inyo and Mono Counties may be potentially affected by activities such as; mining, energy development, illegal water diversions, unauthorized grazing, unauthorized off highway vehicle (OHV) use, invasive species, roads, and climate change. White and Inyo Mountains have active faults and movements within the earth's crust or volcanic action could compromise the perennial spring fed riparian zones or deep talus rock piles that dominate microhabitat types occupied by this species.

Rationale for Panamint alligator lizard

NatureServe indicates the Panamint alligator lizard is vulnerable to extinction at both the global (G3) and state (S3) levels. The lizard is a Forest Service sensitive species for the Inyo National Forest and by the Bureau of Land Management. The California State Wildlife Action Plan gives the Panamint alligator lizard designations of Species of Special Concern and Species of Greatest Conservation Need. *Elgaria panamintina* was petitioned for Endangered Species Act listing consideration in 2015 and the U.S. Fish and Wildlife Service is in the process of gathering additional information on the species (Federal Register, Volume 80, Number 181).

Generally, little is known about the population sizes and trends at the known occurrences. The lizard is reportedly very difficult to detect, even under ideal circumstances (Stebbins 1958, Banta 1963, Clause et

al. 2015, Yasuda 2015). Hammerson (2007) stated total population size is at least 1,000 individuals based on an assumption of at least 20 populations of 50 or more adults. Other researchers familiar with the species have not made such assumptions for population sizes (Mahrdt and Beaman 2002, Yasuda 2015). The most comprehensive information to date includes a summary of work and existing information by Clause et al. (2015). Adam Clause is preparing his doctoral dissertation based on his extensive research on the species.

The Panamint alligator lizard is endemic to California (suspected to occur in Nevada) and known from 28 localities in six mountain ranges (Clause et al. 2015). Recent and ongoing research (Clause et. al. 2017) report 30 known localities. All known localities occur on Federal lands, with 11 of 28 (39 percent) occurrences on the Inyo National Forest. Based on museum records, the elevation range of the species is from 1050-2330 meters (3445-7644 feet). Initially, *E. panamintina* was thought to be strictly associated with riparian habitats surrounding streams with permanent water (Stebbins 1958). However, Banta (1963) captured several individuals in drier habitats with no apparent associated water, leading him to hypothesize a tolerance for a broader range of ecological tolerance and thus a facultative reliance on water. Subsequent surveys have supported this hypothesis leading to additional occurrences in xeric habitats (Yasuda 2015, Clause et al. 2015), with Clause et al. (2015) contending the existing localities "undoubtedly represent a gross underestimate of the locality-level distribution of the species". If the Panamint alligator lizard was a riparian obligate, dispersal between suitable habitats would be unlikely within its range. However, if moist conditions are provided by deep talus and the species is capable of occupying dry, desert habitats, there is likely greater connectivity among populations than previously acknowledged (Clause et al. 2015).

Little information on population size is available; therefore, it is not possible to establish a trend in overall population size. NatureServe indicates short- and long-term trends to be declining by up to 30 percent; however they state the reliability of that assumption is uncertain and acknowledged that distribution and abundance probably have been stable. Clause et al. (2015) report that the *E. panamintina* is extant at all known localities (no extirpations of local populations) and the probable occurrence of the species in unsurveyed areas across a broader range of habitats indicate the population status is secure. Further, habitat recovery has occurred in locations with severe impacts to riparian condition.

Spring of 2017 field surveys (Clause 2017) targeted genetic samples for this species, which is in support of this status review by Pacific Southwest Regional office of the US Fish and Wildlife Service. PhD student at UCLA in the Shaffer lab is conducting genomic research. These additional samples will increase the scope and breadth of the genomic analysis, and allow estimation of both intra- and inter-population genetic diversity.

The following threats to the Panamint alligator lizard appear to be applicable to the Inyo forest plan area: water diversions and habitat destruction from illegal marijuana grows, unauthorized grazing, invasive species, roads, and climate change. Mining, energy development, and unauthorized off highway vehicle (OHV) use are not expected to occur in the plan area. Energy development could potentially occur on National Forest System (NFS) lands, a speculative activity, but regulatory processes are in place to minimize effects to native species. Mining in occupied or suitable *E. panamintina* habitat is not currently occurring.

Evelyn and Sweet (2012) reiterated Jennings and Hayes (1988) in identifying OHV use and domestic livestock as threats to the lizard. Off-highway vehicle use is currently restricted to those routes identified on the Inyo's motorized vehicle use maps, and unauthorized use off of those routes is prohibited. This provides protection to habitats and individuals from illegal OHV use. The known populations of the lizard on the Inyo National Forest do not occur within permitted grazing allotments, thereby negating this threat.

While the Inyo National Forest retains riparian water rights, any individual can apply for water rights under state law. There is the potential, however, for increased water diversion given current trends in population growth in the state and increasing demands for reliable water. Unauthorized grazing is a continuing threat to Panamint alligator lizard habitat because feral livestock (horses and burros) occupy the same landscape the lizard occupies. There have been no indications of recent impacts by feral livestock that would reduce long-term habitat suitability in the plan area, and Yasuda (2015) did not find any livestock related impacts, feral or domesticated, at her study sites on the Inyo National Forest. Invasive species, mainly saltcedar, are an ongoing threat to aquatic and riparian habitats because they disproportionately use more water than native vegetation. Neither Yasuda (2015) nor Clause et al. (2015) reported extensive occurrences of saltcedar in their studies. Programs to eradicate invasives such as saltcedar are common on National Forest System lands and would be an effective mechanism at reducing this threat should it occur. Roads are an essential component of national forests, including the Inyo. Mortality from vehicle strikes are a risk and threat to individual *E. panamintina*, but population level impacts are not anticipated because most roads in the vicinity of known occurrences are not paved, are primarily suitable for high clearance vehicles, and facilitate lower speeds (Mahrdt and Beaman 2002, Clause et al. 2015).

Climate change is potentially the biggest threat to the Panamint alligator lizard (Wright et al. 2013, Clause et al. 2015, Yasuda 2015). Substantial uncertainty exists regarding climate outcomes, especially for the desert habitats in which this species occurs. Changes in precipitation patterns could result in reduced water availability in the riparian habitats occupied by the lizard with a related reduction in riparian vegetation frequented by the species. Additionally, increases in daily temperatures are possible, but the Panamint alligator lizard adaptively is active during moderate times of the year (spring and fall), utilizes cooler riparian areas, and is nocturnal during the heat of the summer. Wright et al. (2013) identified *E. panamintina* as a "highest at-risk species" for climate shifting away from the range of conditions the species could tolerate.

Despite a lack of information on population trends, the best available scientific information suggests that the number of populations is stable and likely greater than what is currently known. Limiting factors identified as threats to persistence for the Panamint alligator lizard are those likely to result in a change in water surface flow and riparian integrity. At present, these threats are minimal. Habitat within the plan area is at low risk of loss or degradation due to anthropogenic activities; however, climate change has the potential to influence daily temperatures, precipitation amounts and timing and type of precipitation. The best available scientific information about the Panamint alligator lizard does not indicate substantial concern about the species' capability to persist over the long term in the plan area. Based upon the evidence and supporting best available science, the **Panamint alligator lizard does** No**t meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Northern sagebrush lizard - *Sceloporus graciosus graciosus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T5

State Rank: S3 (CA)

Other Designations: BLM-SS

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

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Fish

Lahontan Lake tui chub - *Siphateles bicolor pectinifer*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: T3

State Rank: None

Other Designations: CA-SSC-SS

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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Owens sucker - *Catostomus fumeiventris*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats in plan area.

Rationale for Species

NatureServe Global Rank: G3G4

NatureServe T Rank: None

State Rank: S3 (CA)

Other Designations: CA-SSC; CA-SGCN

There is no evidence for substantial concern on the planning unit; no known local threats and no local concerns.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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Terrestrial Invertebrates

A grasshopper - *Agnostokasia sublima*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G1

NatureServe T Rank: None

State Rank: SNR (CA); S2 (NV)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

Riblet ambersnail – *Catinella gabbi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No information.

Rationale for Species

NatureServe Global Rank: G1G2

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

Sierra ambersnail - *Catinella stretchiana*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No information.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Ringlet - *Coenonympha tullia mono*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No information but assumed that impacts to meadows could impact species depending on extent.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T2T3

State Rank: SNR (CA)

Other Designations: None

This subspecies of the widespread Holarctic butterfly is not endangered, is in meadows around edge of Mono Lake, and common in wet meadows from Crowley Lake north to Bridgeport area where foodplant grasses or sedges grow (see USDA Forest Service 2015). Though meadow conditions are vulnerable to impacts, the species is fairly common and there are no substantial concerns in the planning unit.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Monarch (California overwintering population) - *Danaus plexippus plexippus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about species capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern:

No

Relevant threats to species:

Habitat loss and destruction, both overwintering habitat and breeding habitat.

Rationale for Danaus plexippus:

NatureServe Global Rank: G4

NatureServe T Rank: T2T3

State Rank: S2S3

Other Designations: CA-SSC; CA-SGCN; FS-SS

The monarch butterfly, *Danaus plexippus*, may be the most familiar North American butterfly, and is considered an iconic pollinator species. The global rank for the species is G4 (apparently secure), but it has a T2T3 (imperiled to vulnerable) ranks for the California overwintering population. The state ranks it S2S3 (imperiled to vulnerable) in California where it is also a California Department of Fish and Wildlife species of special concern and an invertebrate species of greatest conservation need. The monarch butterfly is not currently listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) or protected specifically under U.S. domestic laws. However, there has been a major push to conserve the monarch butterfly, which has been largely fueled by reports of the declining numbers of overwintering monarchs. Given the concern over the overwintering numbers, the Center for Biological Diversity, the Center for Food Safety, the Xerces Society and Lincoln Brower have filed a petition to the United States Department of the Interior to protect the monarch by having it federally protected and that petition is still under review as of May 2018. The species is a sensitive species for Region 5 and a Tuolumne County special status species.

In 2014, President Barack Obama issued a Presidential Memorandum entitled "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators". The Memorandum established a Pollinator Health Task Force, to be co-chaired by the Secretary of Agriculture and the Administrator of the Environmental Protection Agency, which stated: that the number of migrating monarch butterflies sank to the lowest recorded population level in 2013–14, and there is an imminent risk of failed migration.

The eastern population annually completes a 4,800 km (3,000 mi) migration between overwintering sites in the highland oyamel fir (*Abies religiosa*) forests of Michoacán State in Mexico and southern Canada. West of the Rocky Mountains, monarchs overwinter in sheltered groves along the California coast, where it is considered to be rare with a restricted range. NatureServe provides a global rank of G4 but a rank for the North American subspecies as T2T3 (Imperiled to Vulnerable) and a state rank for California S2S3 (Imperiled to Vulnerable).

Abundance at California winter habitats has been monitored since 1997 at over 170 locales as part of the annual Western Monarch Thanksgiving Counts (See Monarch Watch), analyses indicates that population numbers declined from a high of 1,237,487 monarchs in 1997 to only 99,063 in 2002 (Stevens and Frey 2004). Ongoing monitoring conducted by the Xerces Society and Mia Monroe has determined that the overwintering population in California was 292,674 monarchs in 2015 (Pelton et al. 2016).

Recent declines in monarch overwintering populations along the California Coast have been precipitous: more than one million individuals were counted at 101 sites during 1997, while in 2008 only 130,000 individuals were counted at 115 sites, the majority of which were the same. Even at the most populous sites declines have been about 50 percent. At the overwintering grove in Ellwood, near Goleta, populations have declined from an estimated 200,000 to 20,000 during this same period. Recently at some groves, monarchs have entirely disappeared and appear to have been extirpated.

Increasing drought conditions in the west seem the most likely system-wide cause for declining populations. In the west, deficits in precipitation have been shown to reduce both milkweed biomass and shorten its late summer availability. Stevens and Frey (2004) reported that that nearly 99 percent of the variation in western monarch abundance (data for Arizona, California, Nevada, and Oregon) between the El Nino event in 1998 and 2003 was explained by variation in PDSI values, that the extent and severity of the drought increased significantly over this time period and the decline in monarch abundance coincided with increasingly severe drought conditions throughout the west.

The Xerces Society maintains a Western Monarch Overwintering sites Database and reports that the distribution of monarchs among overwintering sites changes over the season and annually, based on

regional and individual site conditions. Populations of overwintering monarchs have been declining since regular monitoring began in 1997 (Pelton et al. 2016). In 2016, only 221 of the 412 known overwintering sites were listed as actively occupied. Severe storms in the winter of 2016-2017 have had profound impacts on the eastern monarch population as they overwintered in Mexico, strong storms at the tail end of last season destroyed 54 hectares of monarch habitat in Mexico (Monarch Watch 2017). Winter storms also affected coastal California, but the damage as yet to overwintering monarch populations is unreported.

Four overwintering sites have been documented on National Forest land in the Los Padres National Forest (Xerces Society Western Monarch Overwintering Site Database 2017).

Forest-specific Rationale:

All monarch records on the Inyo National Forest are non-breeding records. There are breeding records within 8 kilometers (5 miles) of the administrative boundary at Fish Slough (2), Round Valley (1), Warm Springs (WMMOD 2017). There are known occurrence records for Saddlebag Lake, June Lake, and White Mountains. Observation records adjacent to the Inyo National Forest occur at Bishop Reservation, Fish Slough, Gerkin Springs, Lone Pine, Mono Lake, Mule Springs, Round Valley, and in Benton, Mammoth Lakes, and Warm Springs, CA (WMMOD 2017). Based upon the evidence and supporting best available science, this species does not meet the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

Literature Cited:

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Square dotted blue - *Euphilotes battoides hadrochilus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T1T2

State Rank: SNR (CA); SNR (NV)

Other Designations: None

Adult phenotypes are strikingly different between *E. b. hadrochilus* and *E. b. mazourka. Euphilotes battoides hadrochilus* was found to be very common on July 9, 2014 in the upper canyons in the White Mountains on it's host plant, *Eriogonum unmbellatum* by Dr. Kenneth Davenport. This "blue" reportedly has a small range and very few collectors know of it or where it occurs. Lepodopterist Dr. Paul Opler found this species in this are in 2015. Its host is *E. ancilla* in adjacent areas, and at earlier times of the year. There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science.

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USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

Mount Whitney grasshopper - *Hebardacris albida*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G2G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

Sierra skipper (T) - *Hesperia miriamae*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern:

No

Relevant Threats to Species:

Climate change

Rationale for Sierra Skipper:

NatureServe Global Rank: G2G3

NatureServe T Rank: None

State Rank: SNR (CA); SNR (NV)

Other Designations: None

This species is widespread in the highest elevations of the Sierras (above 10,000 feet) from Olancha Peak to Sonora Pass, in arctic-alpine cushion plant community. The NatureServe rank essentially reflects very limited range. More information is needed. Not considered critically imperiled and seems too restricted to call it secure, at least without more actual evidence to that effect (NatureServe 2017). Larval foodplant is bluestem beard grass (*Andropogon scoparius*) (Howe 1975). *Hesperia miriamae* is known only from the crest region of the central Sierra Nevada of California and from the equally high White Mountains of eastern California and western Nevada. The species flies in late summer, from late July through August and probably early September. It inhabits rocky fell-fields, benches and summits well above timberline and flies usually between the altitudes of 11,000 to over 14,000 feet.

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

Although this species is considered widespread, there are only a couple historic museum records for the Inyo National Forest, one in 1934 and one in 1980. The museum type locality is south of Mono Lake, not on the Inyo National Forest and contains a handful of records according to Biodiversity Information Serving Our Nation (BISON) database. Mono Lake water level is about 6,400 feet elevation and this species as described in the literature should be between 11,000 to 14,000 feet. This does not match with the species type location so it is unclear if it is the correct species or if the species is wider ranging or a generalist in nature. This species is thought or known to occur on the Forest due to availability of suitable habitat as both defined by the species type location and where the past museum records are known.

The current range includes the Sierra Nevada from Tuolumne County to Inyo County, California; White Mountains of eastern California and western Nevada (Schlick 2015). No current records or observations were found for this butterfly (CNDDB).

Ecological conditions for this species (see above additional details):

Generally, this species is known to occur in Rocky alpine tundra from 11,000-14,000 feet. Host plant may be alpine fescue (*Festuca brachyphylla*) (www.butterfliesandmoths.org).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics:

The host plant does occur on the Forest and suitable habitat is available. Rocky, alpine habitat is on the Inyo National Forest.

The projected status of those ecological conditions relative to the species considered:

With climate change, species may have an upward shift in its distribution. Being at the highest elevations, it may not be able to adequately adapt to changing conditions.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Impacts to the Sierra skipper may arise from human-caused activities that include the use of pesticides treating invasive species. Other disturbance could be recreational related activities (i.e., campgrounds, trails).

Under the species conservation at www.butterfliesandmoths.org, it states “populations should be monitored and threats, if any, identified”, plus it does not identify any management needs.

A summary of the overall at-risk status along with a conclusion as to whether or No**t the species was considered at risk for persistence on the planning unit**

Due to the ambiguous nature of the species type locality in the literature as compared to the known locations of museum records, it appears that the science is unclear on this species. Species is thought to occur from 11,000 to 14,000 feet elevation but many museum specimens are off forest at 6,400 feet elevation. The host plant was thought to be a bluestem beard grass, but typical grass the adults are seen near is a fescue. Due to the discrepancies, the best available science has insufficient information to determine the species ability to persist on the planning unit.

Literature Cited:

Biodiversity Information Serving Our Nation (BISON) database. 2017. An online database. Accessed July 11, 2017. www.bison.usgs.gov.

Butterflies and Moths of North America. 2017. An online database about Lepidoptera. Accessed July 11, 2017. www.butterfliesandmoths.org.

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

Howe, W.H. 1975. The Butterflies of North America. Doubleday and Company, Inc. New York. 633pp.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 11 July 2017].

Schlick, Kary. 2015. Butterfly Reference Document for the Inyo, Sequoia & Sierra National Forests, USFS Region 5. Internal Document – Unpublished. June 2015.

White Sierra (or Mountains) skipper - *Hesperia miriamae longaevicola*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern:

No

Relevant Threats to Species:

Climate Change

Rationale for White Sierra (or Mountains) Skipper:

NatureServe Global Rank: G2G3

NatureServe T Rank: T1T2

State Rank: S1 (CA); S1 (NV)

Other Designations: CA Species of Greatest Conservation Need

This subspecies is considered to be in the White Mountains of Mono County from Mount Barcroft to Mount Campito and including Boundary Peak (Esmeralda County, Nevada) (NatureServe 2017). According to NatureServe (2017), there is one occurrence in Nevada and nine locations in California, yet a map location has not been given. There is no known population size, trend, vulnerability given for this subspecies (NatureServe (2017).

Larval foodplant is Bluestem Beard Grass (*Andropogon scoparius*) for the species (Howe 1975). NatureServe (2017) states for this subspecies that "usual needs for skippers are adequate larval foodplant (*Festuca*), adequate nectar (often *Asteraceae* or vetches) and sometimes suitable edaphic substrate". The species inhabits rocky fell-fields, benches and summits well above timberline and flies usually between the altitudes of 11,000 to over 14,000 feet.

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

Very little information could be found about this subspecies. McGuire states that the butterfly is found in the White Mountains of Mono County from Mount Barcroft in the north to Mount Campito in the south (Schlick 2015). Populations are restricted to elevations above 10,500 feet also found in at Boundary Peak in Esmerelda County, Nevada (Schlick 2015).

According to Biodiversity Information Serving Our Nation (BISON) database (2017), there are 10 locations but none of them are georeferenced. This species is thought or known to occur on the Forest due to the statement that the subspecies occurs in 10 locations across the White Mountains at high elevation.

Ecological conditions for this species (see above additional details)

Generally, this species is known to occur in rocky alpine tundra from 11,000-14,000 feet (Schlick 2015). Host plant may be alpine fescue (*Festuca brachyphylla*) (www.butterfliesandmoths.org).

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The host plant does occur on the Forest and suitable habitat is available.

The projected status of those ecological conditions relative to the species considered

Climate change may impact this species and related stochastic events due to its preference to high elevation habitat.

The ecological conditions not assessed by the assessment of key ecosystem characteristics

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities

Impacts to the White Sierra (or Mountains) skipper may arise from climate change events where high elevation habitat is becomes tree lined. NatureServe (2017) did not list any known threats.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit**

Due to the ambiguous nature of the species type locality in the literature as compared to the known locations of museum records, it appears that the science is unclear on this species. Species is thought to occur above 10,500 feet in the White Mountains, but there are no accessible specimens (BISON 2017, Butterflies and Moths of North America 2017). NatureServe (2017) defines the species as a "generalist" and defers the species information to skippers in general. Due to the discrepancies, the best available science has insufficient information to determine the species ability to persist on the planning unit.

Literature Cited:

Biodiversity Information Serving Our Nation (BISON) database. 2017. An online database. Accessed July 11, 2017. www.bison.usgs.gov.

Butterflies and Moths of North America. 2017. An online database about Lepidoptera. Accessed July 11, 2017. www.butterfliesandmoths.org.

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Howe, W.H. 1975. The Butterflies of North America. Doubleday and Company, Inc. New York. 633pp.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 11 July 2017].

Schlick, Kary. 2015. Butterfly Reference Document for the Inyo, Sequioa & Sierra National Forests, USFS Region 5. Internal Document – Unpublished. June 2015.

Gorgon copper - *Lycaena gorgon micropunctata*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Invasive weed competition with exotic grasses and other weeds; development.

Rationale for Species

NatureServe Global Rank: G3G4

NatureServe T Rank: T1

State Rank: SNR (CA)

Other Designations: None

Lycaena gorgon micropunctata is an endemic subspecies to California with records (BISON) that ranges from Inyo County, south to Kern and Tulare Counties where it is locally common at Lower Rock Creek; Ninemile Canyon and south of Three Butterbredt Peak; and likely in canyons on Sierran east slope. It also occurs near Rovana in Inyo County on the steep sandy slopes of lower Big Pine Canyon where the host *Eriogonum nudum* is abundant. Though some colonies are known to be lost to development and others degraded from effects of exotic grasses and other weeds. This subspecies is not endangered, it ranges south to Kern and Tulare Counties where it is common. It is not limited to Lower Rock Creek, it also occurs near Rovana in Inyo County on the steep sandy slopes of lower Big Pine Canyon where the host *Eriogonum nudum* is abundant.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Davenport, Kenneth. 2016. Personal communication between Fran Smith, Project Manager, US Forest Service and Dr. Kenneth Davenport, March, 2016.

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USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

White Mountains icarioides blue - *Plebejus icarioides albihalos*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T2T3

State Rank: S2? (CA); S1 (NV)

Other Designations: None

Very common in the White Mountains in the elevated mountain sagebrush scrub habitat in association with *Lupinus argenteus,* the larval food plant. There is no evidence for substantial concern on the planning unit based on fairly common observations in its known habitat.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

Arrowhead arctic blue - *Plebejus podarce cilla*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known in the planning area; potential impacts from climate change, and habitat specificity.

Rationale for Species

NatureServe Global Rank: G3G4

NatureServe T Rank: T2

State Rank: SNR (CA)

Other Designations: None

Common and widespread in Canadian, Hudsonian and lower Arctic-Alpin Zones of the Sierra Nevada, in meadow habitats where the larval shooting star hosts occur. Populations are more centered west of the Sierra Nevada Divide; populations are common in the Tioga Pass area. There are disjunct populations in many places, including at high elevation Sawmill Meadow near Glass Mountain and in a meadow up the south fork of Bishop Creek at above 9000', below South Lake. Detections occur at Horseshoe Meadows and from Tuolumne Meadows and Saddlebag Lake south to Tulare County. May not be as common on Inyo because of the steep eastern escarpment. Fairly common; no substantial concerns in the planning unit.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

White Mountains saepiolus blue butterfly - *Plebejus saepiolus albomontanus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats; potentially climate change and habitat specificity.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T2

State Rank: S2S2 (CA); S1 (NV)

Other Designations: None

Plebejus saepiolus albomontanus has been recently detected on the Inyo National Forest. It is common in riparian areas and wet meadows generally above 10,000 ft elevation in the Inyo Mouintains and White Mountains, including the bristlecone pine mountain sagebrush scrub community areas further north. The principal larval host plantfood is *Trifolium andersonii monoense*, which grows in dryer habitats, contrasting with the usual wet meadow habitat of *P. saepiolus*. Species rank needs to be re-evaluated, especially with respect to abundance and threats. S1 suggests this species is critically imperiled in Nevada and rare in CA, however, Dr. Kenneth Davenport (pers. comm.) reports that they are common in the meadows. Fairly common; no substantial concerns in the planning unit.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

Davenport, Kenneth. 2016. Personal communication between Fran Smith, Project Manager, US Forest Service and Dr. Kenneth Davenport, March, 2016.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

White Mountains Sandhill skipper - *Polites sabuleti albamontana*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Sufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats; potentially climate change.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T2

State Rank: S2 (CA); S1 (NV)

Other Designations: None

Polites sabuleti albomontana is found in high meadows of White Mountains including Trail Creek, Nevada. Although confined to the higher elevations of the White Mountains, this entity is widespread and common. Foodplant is various grasses. Fairly common; no substantial concerns in the planning unit.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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USDA Forest Service. 2015. Butterfly reference document for Inyo, Sequoia, & Sierra National Forest – USFS R5, June 29, 2015. Unpublished report. USDA Forest Service, Pacific Southwest Region. 58 p.

Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

A monkey grasshopper - *Psychomastax robusta*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: None

State Rank: SNR (CA); SNR (NV)

Other Designations: None

Psychomastax robusta is restricted to the eastside of the southern Sierra Nevada around Mt. Whitney and in the adjacent spring Mountains of Nevada. Found associated with juniper, pinyon, wild gooseberries, and mountain mahogany, *Cercocarpus ledifolius*, as well as on bare ground and high elevation granite gravel and on boulders. There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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Strohecker, H.F., W.W. Middlekauff, and D.C. Rentz. 1968. The grasshoppers of California (Orthoptera: Acridiodea). University California Press, Berkeley and Los Angeles.

Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

Sooty hairstreak - *Satyrium semiluna maculadistinctum*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

No known threats.

Rationale for Species

NatureServe Global Rank: G4

NatureServe T Rank: T3T4

State Rank: SNR (CA)

Other Designations: None

Common at high elevations around Bodie in the Bodie Hills in late June. Also common on Sonora Pass north of Inyo National Forest. Formerly treated as *Satyrium fuliginosum maculadistinctum* where you might find a rating. There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

Atronis fritillary - *Speyeria mormonia obsidiana*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats include drought and any activity that could impact the meadow conditions in the long term

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T1

State Rank: SNR (CA)

Other Designations: None

Very little information exists on this subspecies, or populations, or habitat, or threats, or its locations (NatureServe 2017). It is known to occur in wet meadow habitat on the Inyo National Forest, in the Sawmill Meadow, Glass Mountain and vicinity areas (Schlick 2015). The species is univoltine and flies from mid-July to late August or early September. The larval host plant for this subspecies is thought to be *Viola adunca* (Schlick 2015).

Forest-specific Rationale:

Information from this section is primarily derived from the Inyo National Forest Assessment (USDA 2013a) and associated topic papers (USDA 2013b, chapters 1-3 and 5), the draft biological evaluation (Krueger 2016), the Draft Environmental Impact Statement for Revision of the Inyo, Sequoia and Sierra National Forests Land Management Plans (USDA 2016), Butterfly Reference Document for the Inyo, Sequoia and Sierra National Forests (Schlick 2015) and forest-level data, unless otherwise noted.

Information on current distribution of the species on the planning unit:

Only known locations occur in the Sawmill Meadow, near Glass Mountain (Schlick 2015). There are no records in BISON (2017) and 3 records from www.butterfliesandmoths.org from 1965. Communications with Paul Opler and Ken Davenport both state that the only locations are at Sawmill Meadow (Schlick 2015).

Ecological conditions for this species (see above additional details)

Key ecological conditions for this species are not well known. Meadow habitat appears to be the preferred habitat, based on records. Host plant is not well-known, but thought to be a *Viola*.

The current status of ecological conditions on the planning unit based on the assessment of key ecosystem characteristics

The number of large meadows on the Inyo National Forest has not changed significantly in the last decade (USDA 2016); however, composition structure and function has. According to the assessment of

the natural range of variation for meadows (Gross and Coppoletta 2013), the total area of meadows within the assessment area (Sierra Nevada and South Cascades) has decreased due to conifer encroachment; species diversity has also departed from reference conditions in those areas. Researchers sampled 10 randomly selected meadows on the Inyo National Forest as part of a Sierra Nevada study which found vegetation cover and bare ground cover ranged from natural condition to moderately or heavily altered, depending on location. Encroachment (the ingrowth of trees) was the most common impact, with 60 percent moderately impacted and 10 percent slightly impacted.

Non-meadow riparian areas include shrub- or tree-dominated springs and stream systems on the Forest, they are estimated to cover 3,093 acres on the Forest. Non-meadow riparian areas are present in the Eastern Slopes, Glaciated Batholith, Mono Valley, Owens Valley and White Mountains subsections, but are not present in significant amounts (those greater than 300 ft. in width) in the remaining subsections, including the Glass and Inyo mountains.

A total of 1,643 miles of perennial streams are mapped on the Inyo National Forest, which support varying amounts and types of meadow and non-meadow riparian ecosystems. There are approximately 194 miles of streams that flow through meadows on the forest.

Approximately 300 acres of non-meadow riparian are currently occupied by one or more non-native plant species, while approximately 175 acres of meadow riparian are occupied by one or more non-native plant species.

The projected status of those ecological conditions relative to the species considered:

Long term monitoring data collected on a subset of meadow plots by the Forest Service Pacific Southwest Region Range Program, show that most of those plots (74 percent) are in excellent to good vegetation condition and stable, 5 percent are in excellent to good vegetation condition and trending upward, 14 percent were in good condition with a downward trend, 2 percent were in fair condition and stable, and 5 percent were in fair condition and trending downward. No plots were in poor vegetation condition (Gross and Coppoletta 2013).

Meadows, which are depend on snowpack to maintain the water table, will continue to be at risk if the precipitation pattern in the southern Sierra Nevada shifts to more rain than snow (Gross and Coppoletta 2013). Warming temperatures, particularly if combined with less precipitation could result in loss or change in riparian ecosystems. The response of meadows to climate change is expected to be highly site-specific, depending upon site hydrologic regime, morphology and surrounding vegetation (Gross and Coppoletta 2013). This, coupled with increasing demands for water by humans, may cause riparian systems to become more fragmented, with less connectivity resulting from stream diversions. Invasive species will continue to be a primary issue of concern affecting meadow and non-meadow riparian ecosystems in the future. Warming temperatures will potentially influence the establishment and subsequent spread of non-native species in these areas.

Recent assessments using the proper functioning condition protocol, which looks at stream channel function of streams reaches through meadows, showed that 17 out of 114 (15 percent) reaches assessed were not functioning at desired condition, 67 were in proper functioning condition and 21 were trending in an upward direction.

The ecological conditions not assessed by the assessment of key ecosystem characteristics:

Not Applicable.

Key risk factors arising from non-ecosystem conditions and/or management activities:

Invasive species, grazing, and recreation (e.g., trails) could have negative impacts on this subspecies.

A summary of the overall at-risk status along with a conclusion as to whether or Not **the species was considered at risk for persistence on the planning unit:**

Key information about this subspecies is not well known. It is thought to be a meadow dweller only known from Sawmill Meadows near Glass Mountain, with Viola as its host plant. Overall, there is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science, to determine the species persistence in the plan area.

Literature Cited:

Biodiversity Information Serving Our Nation (BISON) database. 2017. An online database. Accessed July 11, 2017. www.bison.usgs.gov.

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Mexican cloudy wing - *Thorybes mexicana blanca*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

None known.

Rationale for Species

NatureServe Global Rank: G5

NatureServe T Rank: T2

State Rank: SBR (CA); S1 (NV)

Other Designations: None

Common in its only known location above timberline in the White Mountains, ranging from 10 to 11,000 feet elevation. Foodplant is Trifolium species. There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science.

Literature Cited

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Inyo blue-wing grasshopper - *Trimerotropis leucophaea*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Rationale for Species

NatureServe Global Rank: G2G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Aquatic Invertebrates

Yuba snowfly - *Capnia shepardi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats are unknown.

Rationale for Species

NatureServe Global Rank: G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

Stoneflies (Order Plecoptera) are a relatively small insect order with an immature larval stage that is entirely aquatic in North America. This species is considered vulnerable. There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

NatureServe. 2017. NatureServe Explorer. Arlington, VA. U.S.A. Available at: http://explorer.natureserve.org/[accessed 31 March 2017].

Xerces. 2017. Xerces Society for Invertebrate Conservation: Red Lists. https://xerces.org/red-lists/

A mayfly - *Cinygmula tioga*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats are unknown.

Rationale for Species

NatureServe Global Rank: G1G2

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

Insufficient information regarding threats. Insufficient information regarding species presence or the threats and stressors to the species in the plan area, including limited best available science

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

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Denning's cryptic caddisfly - *Cryptochia denningi*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Land management activities, including timber harvest, prescribed fire, grazing, and road construction and maintenance.

Rationale for Denning's cryptic caddisfly

NatureServe Global and Taxa (subspecies) Rank, if applicable: G1G2

NatureServe State Rank: S1S2 (CA); SNR (NV)

CA State Status: None

Denning's cryptic caddisfly is in the family Limnephilidae. There are five occurrence records in CNDDB, but may be better represented in unpublished research collections. Due to its rarity, based on limited records, it was petitioned for federal listing under the Endangered Species Act in 1989. Erman and Nagano (1992) evaluated *C. denningi* for the State of California, reporting on available literature and summarizing that information. At that time, essentially no information other than the species description was available and, in 1994, the US Fish & Wildlife Service determined they did not have sufficient information at the time to support listing due to lack of persuasive data on biological vulnerability and threat (Federal Register 1994).

The genus *Cryptochia* contains seven species according to NatureServe, all confined to western North America. With the exception of a couple of species, little is known about the life history of any of the cryptic caddisflies in this genus. Wiggins (1975) stated *Cryptochia* were associated with small, cool streams. Some species are semi-aquatic, spending time in the wetted terrestrial zone of a stream foraging on vegetation or decaying wood (Wisseman and Anderson 1987, Betts and Wisseman 1995). *C. neosa* and *C. pilosa* larvae were almost always associated with partially decayed wood and bark, found above and below the waterline in decaying leaves, and found in higher gradient small order streams (Wisseman and Anderson 1987, Betts and Wisseman 1995). Apparently, *C. neosa* is intolerant of fine sediment, especially when accumulated on rough, decaying wood (Betts and Wisseman 1995). The available information on *C. pilosa* indicates it is semi-aquatic, utilizes organic debris (leaves and wood) along the stream margin, requires up to two years to develop to the adult form, and the population of one stream was centered on the 3rd order section (Wisseman and Anderson 1987). Eggs of the species were found attached above the water surface to rootlets from seeps and springs with water dripping down them (Wisseman and Anderson 1987). Larvae float on pieces of salmonberry stems when incidentally swept away by streamflow, wick water from damp environs to keep the larvae saturated, and float as a mechanism for downstream dispersal (Wisseman and Anderson 1987). Erman (1989) found two species of *Cryptochia* in springs or spring streams at Sagehen Creek Field Station (Nevada Co., CA) and both were rare in light trapping collections.

Nothing is known about abundance or population trends in Denning's cryptic caddisfly. Based on the information for other species of *Cryptochia*, it is assumed that *C. denningi* is associated with forested streams with relatively low stream order. However, the occurrence in Division Creek on the Inyo National Forest might suggest broader habitat associations since this stream is not heavily forested in the section where the occurrence is attributed to. Based on *C. neosa*, it is assumed that *C. denningi* is intolerant of excessive sedimentation, and, based on the species' association with decaying wood, the species is threatened by the loss of vegetative inputs (large wood and leaf detritus) from riparian areas. If the assumption of sediment intolerance is valid, land management activities that have the potential to deliver sediment to suitable stream threaten habitat quality for Denning's cryptic caddisfly. Examples of these activities include road construction and maintenance, prescribed fire, logging, and livestock grazing. If the assumption of vegetative inputs is valid, any type of management activity that reduces riparian vegetation or large woody debris accumulations in streams threatens the habitat suitability for the caddisfly. Wildfire is included as a threat to the species if it effectively reduces allochthanous inputs to the streams.

Based on the lack of specific information about the life history, distribution, or population status and trend of Denning's cryptic caddisfly, there is insufficient scientific information available to conclude there is a substantial concern about the species' capability to persist in the plan area over the long term. Based upon the lack of evidence and supporting best available science, the **Denning's cryptic caddisfly doesn't meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

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Wisseman, R.W. and N.H. Anderson. 1987. The life history of Cryptochia pilosa (Trichoptera: Limnephilidae) in an Oregon Coast Range watershed. *In* Proceedings of the Fifth International Symposium on Trichoptera, M. Bournaud, et al., editors. Pages 243-246.

A mayfly - *Ironodes lepidus*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats are unknown.

Rationale for Species

NatureServe Global Rank: G2G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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A caddisfly - *Lepidostoma castalianum*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats are unknown.

Rationale for Species

NatureServe Global Rank: G1G3

NatureServe T Rank: None

State Rank: SNR (CA)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

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A caddisfly - *Lepidostoma ojanum*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant Threats to Species

Threats are unknown.

Rationale for Species

NatureServe Global Rank: G2

NatureServe T Rank: None

State Rank: SNR (CA); SNR (NV)

Other Designations: None

There is insufficient information regarding species populations, trends, threats and stressors in the plan area, including limited best available science and no information provided by public.

Literature Cited

California Department of Fish and Wildlife, Natural Diversity Database. April 2017. Special animals list. Periodic publication. 51 pp.

California Natural Diversity Database (CNDDB). California Department of Fish and Game, Biogeographic Data Branch. 2017. California Natural Diversity Database. Sacramento, CA. Data downloaded April 2017.

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California sallfly - *Sweltsa resima*

Is there sufficient scientific information available to determine if there is substantial concern about the species' capability to persist over the long term in the plan area? Insufficient

Does the best available science indicate substantial concern about the species' capability to persist over the long term in the plan area? No

Proposed Species of Conservation Concern

No

Relevant threats to species

Groundwater pumping, water diversions, grazing, mining, and habitat specificity.

Rationale for California sallfly

NatureServe Global and Taxa (subspecies) Rank, if applicable: G1G2

NatureServe State Rank: SNR (CA); SNR (NV)

Xerces Red List: None

CA State Status: None

The California sallfly (*Sweltsa resima*) is known from very few localities in the Owens Valley drainage of California. They are a stonefly (Order Plecoptera) in the family Chloroperlidae. Surdick (1995) provided the general description of the larval form of *S. resima*, and Lee and Baumann (2010) redefined the species' range in relation to another species of *Sweltsa* to include distribution on the east slope of the Sierra Nevada and including the White Mountains. In general, chloroperlids are small, complete their life cycle in one year (univoltine), and have broad dietary flexibility; however, some species require two years in an aquatic environment to complete their life cycle and some are strict carnivores and detritivores (Stewart and Stark 1993).

Like many aquatic insects, very little is known about the life history requirements of *S. resima*. There is very limited specific information on the California sallfly outside of the species description. Myers and Resh (2002) reported on aquatic insect (mainly caddisflies) survey results from 28 springs in the Great Basin and indicated the California sallfly was widespread and commonly encountered. The species was only encountered in their "cold springs" habitat group. Myers and Resh (2002) commented that *S. resima* was brachypterous, a condition of having very short or reduced wings. This condition suggests the species probably does not disperse very far from its source waters and has probably occupied the same habitats for a long period of time for this condition to evolve (Myers and Resh 2002). This observation of habitat permanence has been commented on by others studying springsnails in very similar habitats in the same ecological region (Hershler and Pratt 1990, Hershler 1998, Liu et al. 2003). Myers and Resh (2000) reported adult California sallflies were commonly encountered during their sampling of undercut banks along two streams, Layton Springs (tributary to Lake Crowley in the Owens Valley) and South Fork Cottonwood Creek (stream in the Sierras near Lone Pine).

The range and distribution of the California sallfly is poorly known and is likely an artefact of the lack of targeted survey for the species. The following collection records indicate the species is restricted to the east slope of the Sierras and the Owens Valley. In Surdick's description of the species, specimens came from a stream near Whitney Portal, Lee Vining Creek, Coyote Creek, Glass Creek Meadows, and Lone Pine Creek (Surdick 1995). These are all eastern Sierra streams draining to the Owens Valley. As noted, Myers and Resh (2000) collected specimens of the species in Layton Springs (in the Owens Valley) and the South Fork of Cottonwood Creek (eastern Sierran stream), and Myers and Resh (2002) indicated *S. resima* was commonly encountered in their surveys of 28 springs in the Owens Valley (Myers 2017) indicated *S. resima* was found in most cold water springs she surveyed, approximately 15, in the White Mountains. There are no occurrences reported in CNDDB. Given the fact that the California sallfly has been found in Sierran streams from South Fork Cottonwood Creek in the south to Lee Vining Creek in the north, it may be a representative of the aquatic insect communities of all eastwardly draining Sierran streams in between the two; therefore, it may be much more common than is currently known. This may be particularly the case when combined with Myers' records from the White Mountains. Nothing is known about trends in population status.

As with other aquatic dependent organisms reliant on spring habitats in the Owens Valley, the California sallfly is vulnerable to habitat degradation associated with groundwater pumping. Much of the groundwater aquifer in the Owens Valley is supported by snowmelt from the Sierras (USGS 1998) and springs are places where groundwater emerges on the landscape. Increased groundwater pumping has been associated with decreased volume of spring flow in the valley, with the greatest decreases observed at springs closest to groundwater pumps (USGS 1998). For the stream dwelling occurrences on the east slope of the Sierra Nevada, climate change is a threat to the species which may result in decreased snowpack in the Sierras (Geos Institute 2013). Decreased snowpack may contribute to decreased streamflow, which could then affect the stream's ability to buffer from increased water temperatures. Since the sallfly is associated with cold waters, increased water temperatures could affect the timing of larval diapause, adult emergence, and food resources required by the species (Stewart and Stark 1993).

Increased water temperatures could cause shifts in occupancy away from stream reaches at lower elevations or to habitats where cold temperatures are maintained by stream shading. Water diversions from springs could reduce streamflow and cause increased water temperatures. These factors could result in a reduction in the amount of available downstream habitat. Grazing and mining have also been discussed as threats to habitat suitability, but the effects of these past and ongoing activities are not clearly understood. Myers and Resh (2002) stated that there were very few, if any, springs within the range of the California sallfly that have not been disturbed by numerous activities (including mining and grazing); however, the species has been capable of persisting in suitable environments throughout the duration of the impacts.

The California sallfly is known from relatively few localities in the Owens River drainage, but it may be more widely distributed than is currently known. It is known to occupy both stream and spring habitats. Very little information is known about habitat, dietary, or life history requirements. The sallfly's association with cold water indicates it is vulnerable to changes in stream or spring flow and the primary threats to the species put the availability of cold water habitats at risk in some locations. The California sallfly is reported to be relatively abundant where found; however, there is no indication of trends in population status.

There is insufficient scientific information available to conclude there is a substantial concern about the California sallfly's capability to persist in the plan area over the long term. Based upon the lack of evidence and supporting best available science, the **California sallfly does** No**t meet** the established criteria at CFR 1909.12 chp. 10, 12.52 (c-d) as a species of conservation concern in the plan area.

Literature Cited

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