BEFORE THE CALIFORNIA FISH AND GAME COMMISSION

A Petition to List the Greater Sage-grouse (*Centrocercus urophasianus*) as Threatened or Endangered under the California Endangered Species Act (CESA)

California Sage-Grouse in the Bi-State Area. Photo: Jeannie Stafford/USFWS

Center for Biological Diversity

November 18, 2022

Notice of Petition

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and Division 3, Chapter 1.5, Article 2 of the California Fish and Game Code (Sections 2070 *et seq*.) relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED:

Species Name: greater sage-grouse (*Centrocercus urophasianus*)

II. RECOMMENDED ACTION: Listing as Endangered or Threatened

The Center for Biological Diversity submits this petition to list the greater sage-grouse (*Centrocercus urophasianus*) as Threatened or Endangered pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq., "CESA").

This petition demonstrates that the greater sage-grouse is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations. A species is an "endangered species" when it is "in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." Cal. Fish & Game Code § 2062. A "threatened species" is one "that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts . . . ." Cal. Fish & Game Code § 2067.

As detailed in this petition, given the greater sage-grouse's limited range, declining populations and known threats, listing as an endangered or threatened species clearly "may be warranted." We respectfully request the Department of Fish and Wildlife and the Fish and Game Commission should make such recommendations and findings pursuant to their respective authorities. Cal. Fish & Game Code §§ 2073.5 & 2074.2.

Petitioners believe that the greater sage-grouse warrants protection under CESA throughout its range in California. In the event the Commission determines that it does not, the Commission must assess whether either of the two population of the species (Northern California in Lassen and Modoc counties or the Bi-State populations in Mono and Inyo counties) separately warrant listing as ecologically significant units (ESUs).

III. AUTHORS OF PETITION:

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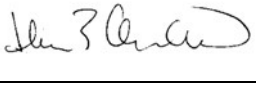
I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature:  Date: November 18, 2022

Signature:  Date: November 18, 2022

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Executive Summary

The Center for Biological Diversity submits this petition to list the greater sage-grouse (*Centrocercus urophasianus*) as either Threatened or Endangered pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq., "CESA"). This petition demonstrates that the greater sage-grouse is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations.
Under CESA, a "threatened species" is "a native species or subspecies…that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts…" California Fish and Game Code § 2067. An endangered species is "a native species or subspecies of a bird…which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." California Fish and Game Code § 2062.

The greater sage-grouse is a large, gallinaceous bird with a spiky tail that evolved in sagebrush ecosystems. Greater sage-grouse in California occupy the western periphery of this species' overall range and represent 7% of its overall population. In California, greater sage-grouse currently exist in two separate populations, denoted under the federal Endangered Species Act ("ESA") as distinct population segment ("DPS") and under CESA as evolutionarily significant units ("ESUs"). The "Northern California" sage-grouse population persists in Lassen and Modoc counties in northeastern California and is contiguous with other populations in Nevada. The "Bi-State" sage-grouse population persists east of the Sierra Nevada Mountains straddling the California Nevada border in Inyo and Mono counties. It is a genetically unique and isolated population. Both ESUs are at imminent risk of extirpation due to threats from habitat loss due to land development, agricultural habitat conversion, invasive species, climate change, off-road vehicle usage, increased predation, and disease, among other threats. These threats reduce the viability of the species in all or a significant portion of its range. Consequently, whether evaluated as a single population or as two separate ESUs, the California's greater sage-grouse meets the definition of an "endangered species" or, at a minimum, of a "threatened species". Figure 1 below shows the sage-grouse range from 1944 to 2008 in California.

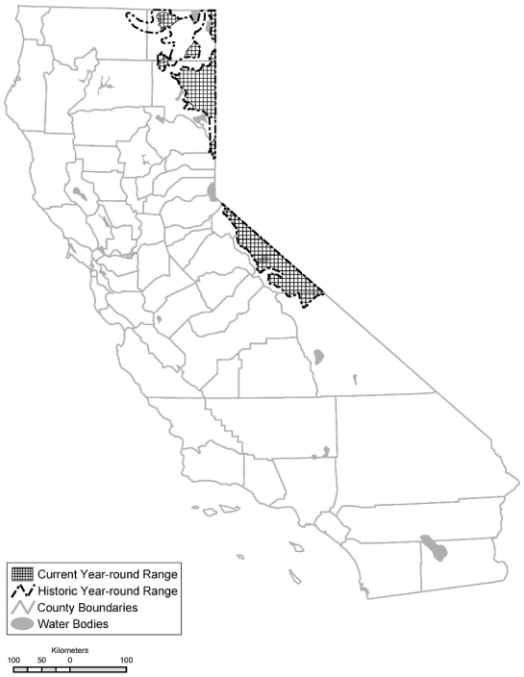

Figure 1. Range Map of Sage-grouse Distribution from 1944 to 2008 in California.[1]

Despite its historic abundance in California, the greater sage-grouse has declined and continues to decline throughout most of its range within California. Coates et al (2021b) estimated the Bi-state population at only 3,305 birds and noted that many of the Bi-state subpopulations were in precipitous decline and in danger of extirpation, which could cascade into an overall decline for the Bi-state population.[2] In northeastern California, the California Department of Fish and Wildlife's lek count trends show significant declines in both Central Lassen and East Lassen.[3] In identifying neighborhood clusters, Coates et. al. (2021b) recognizes that naturally occurring habitat fragmentation as well as human-caused loss and fragmentation of sagebrush habitat have split sage-grouse populations into smaller, loosely connected lek complexes where connectivity is compromised.

The greater sage-grouse is almost completely dependent on large expanses of sagebrush-dominated habitat for its existence. Greater sage-grouse exhibit fairly strong site fidelity to seasonal habitats for nesting, brood rearing, and wintering. While there is no conclusive data regarding the minimum sagebrush patch size required to support populations of sage-grouse in

[1] Hall et al. 2008
[2] Coates et al. 2021b.
[3] CDFW 2022 (lek excel spreadsheet)

California, seasonal and annual movements emphasize the need for large, functional landscapes to support viable sage-grouse populations.[4]

Actual and functional habitat loss is one of the most significant threats to greater sage-grouse in California. The Northern California population has already lost a significant portion of its range in northeastern California over the past 35 years, particularly in the most northern portion of its range where it has been extirpated from eastern Siskiyou County and prior to 1944 extirpated from eastern Shasta County.[5] While birds remain in Lassen and Modoc Counties, range contraction is primarily due to habitat conversion and the loss of sagebrush habitat upon which sage-grouse depend.

The Bi-state population in California have also lost habitat. Coates et. al. determined that between 1995-2018, the Bi-state population lost 858 hectares (2,120 acres) annually or 20,573 hectares (50,837 acres) over the 23 years [6]. Ongoing and future habitat loss and fragmentation has been modeled to occur. For example, modeling derived Percent Extirpation Probability for Bi-State sub-populations in California indicate the following over the next 10 years: Fales (38%), Bodie Hills (2.4%), Parker Meadows (64.3%), Sage Hen (74.8 %), Long Valley (7.9%) and White Mountains, including parts of Nevada (75.1%).[7] Sagebrush habitat is typically accessible, irrigatable, and rich in minerals, and therefore has and will likely continue to be heavily modified for agriculture, ranching, mining, and development unless additional protections are in place. As acknowledged by the U.S. Fish and Wildlife Service, such land conversion also exacerbates other threats to the greater sage-grouse in California from increased predation, invasive and exotic species, wildfire, recreation, and the effects of climate change such as severe drought.[8]

The greater sage-grouse, the largest native grouse in North America, is a native California species famously known across the country for its unique courting dance. Year after year, male greater sage-grouse congregate on ancestral mating grounds known as leks to perform their mating strut to attract sage-grouse hens who observe from the peripheries of the leks. This ancient mating ritual and elaborate courtship dance also captures the fascination and attention of Californians and people all over the world, who visit these leks during mating season to witness this performance.

The greater sage-grouse in California is in decline and at imminent risk of continuing on an extinction trajectory due to cumulative and ongoing threats. This species has already disappeared

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[4] NRCS & Wildlife Habitat Council 2005
[5] Shuford et al. 2008
[6] Coates et al. 2020b
[7] Coates et al. 2021b
[8] USFWS 2010

from states such as Nebraska, British Columbia, and Arizona, and without the State of California stepping up to protect this species, the greater sage-grouse is likely to disappear from California. Listing the species under CESA can serve as an impetus for meaningful management actions that can help ensure that, unlike in other states and provinces, this iconic bird will remain in California in perpetuity.

1. INTRODUCTION

The greater sage-grouse (*Centrocercus urophasianus*) is an iconic sage-brush-dependent species[9] that is endangered, or at a minimum, threatened, in California. It faces numerous threats to its continued existence including habitat loss, predation, livestock grazing, wildfires, and climate change, among others.[10] Listing the greater sage-grouse under CESA would provide necessary protection against many of these direct and indirect threats. CESA protection would aid in ensuring the continued survival and eventual recovery of the species in California. As this petition documents below, greater sage-grouse in California meet the criteria for protection as an endangered, or at a minimum, threatened species under CESA, and would benefit greatly from such protection. This petition reviews the natural history and status of greater sage-grouse in California, focusing on trends and threats to the two endangered populations located within the state. The petition describes the importance of protecting these populations under CESA and explains why this is crucial for the survival and recovery of this species in California.

2. NATURAL HISTORY

The greater sage-grouse are sagebrush obligate birds that are often referred to as a landscape indicator species because they respond relatively quickly to changes in their habitat and are relatively easy to observe. If the landscape supports greater sage-grouse, it is likely to support the 350+ species of plants and animals are also dependent on the sagebrush ecosystem.[11] Because sage-grouse depend on high-quality habitats that historically were relatively extensive in nature, they are often used as an indicator of the health of a broader ecosystem of sagebrush-dependent species.[12] Conserving sage-grouse therefore benefits a host of other species in sagebrush (also known as the "Sagebrush Sea,") including pronghorn, elk, mule deer, native trout, pygmy rabbit, and nearly 200 migratory and resident bird species.[13]

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[9] Connelly et al. 2004. Hall et al. 2008
[10] USFWS 2013a.
[11] Hanser, S.E. 2018.
[12] Rowland et al. 2006
[13] Wisdom et al. 2011

2.1 Description

Greater sage-grouse are relatively robust gallinaceous birds that are dependent on sagebrush.[14] It is the largest grouse found in North America and exhibits the greatest sexual dimorphism with the males generally being nearly twice the size of the females.[15]

Adult male greater sage-grouse range in length from 66 to 76 centimeters (26 to 30 inches) and weigh between 2 and 3 kilograms (4.4 and 6.6 pounds). Adult females are smaller, ranging in length from 48 to 58 centimeter (19 to 23 inches) and weigh between 1 and 2 kilograms (2.2 and 4.4 pounds). Male sage-grouse tend to be heaviest in early spring (start of seasonal display cycle) and females tend to be heaviest in late spring (start of egg laying period); both sexes tend to be lightest in autumn. Yearlings (about 0.5 – 1.5 years old) average 0.1 – 0.2 kilograms lighter than adults among females and 0.3 – 0.4 kilograms lighter among males.[16]

Both males and females have mottled gray/brown body plumage with many small gray and white spots and black bellies. Each have long pointed tails, fully feathered legs and feet. The female tends to be cryptically colored year-round. Males have a blackish chin and throat feathers, conspicuous filoplumes (specialized erectile feathers) at the back of the head and neck, and white feathers forming a ruff around the neck and upper belly.

Figure 2: Female (small) and male (large with white ruff) greater sage-grouse on lek (Photo:NRCS 2010)

Male breeding plumage is impressive with blackish brown throats that are separated from a dark "V" shaped pattern on the neck by a narrow white band. Males have expansive white breast feathers that conceal two large, frontally directed sacks of olive green skin (apteria), which the male inflates and deflates during sexual display.[17] Short white feathers with stiffened shafts are

[14] Connelly et al. 2004l; Hall et al. 2008
[15] Connelly et al. 2004; Sage-grouse Initiative 2022
[16] Connelly et al. 2004
[17] IBID

located on the margins of the sacks and grade into softer and longer white feathers, and finally into a number of long black filoplumes. These hair-like structures are erect during sexual display. During mating displays, males typically fan their tail feathers into a starburst pattern. Females lack these display features, have buffy throats with black markings, and have blackish brown barring on their lower throats and breasts.

2.2 Taxonomy

The greater sage-grouse was first described in print by Meriwether Lewis near the confluence of the Marias and Missouri rivers in Montana on June 5, 1805.[18] The "sage-grouse" (greater and Gunnison, combined) was originally named *Tetrao urophasianus* and subsequently renamed as *Centrocercus urophasianus*.[19] Research showed that greater sage-grouse along the California-Nevada border near Mono Lake appeared to display numerous unique genetic characteristics[20], so in 2010, USFWS determined that Bi-State sage-grouse, which inhabit the Mono Basin area and surrounding lands on the border of California and Nevada, comprise a separate Distinct Population Segment (DPS) or Evolutionarily Significant Unit (ESU) of greater sage-grouse because this population is genetically unique and isolated from the rest of the greater sage-grouse range.[21]

2.3 Habitat

Greater sage-grouse are dependent on large areas of contiguous sagebrush.[22] They depend on a variety of semiarid shrub-grassland habitats throughout their life cycle and are considered obligate users of various species and subspecies of sagebrush.[23] Sage-grouse, particularly the males, exhibit strong site fidelity to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas).[24]

Little information is available regarding minimum sagebrush patch size required to support populations of sage-grouse. This is due in part to the migratory nature of some, but not all sage-grouse populations; the lack of proximal seasonal habitats; and differences in local, regional and range-wide ecological conditions that influence the distribution of sagebrush and its associated understory. Where home ranges have been reported, they are extremely variable from 4 to 615

[18] Zwickel and Schroeder 2003
[19] Connelly et al. 2004
[20] Oyler-McCance et al. 2005
[21] USFWS 2010
[22] Connelly et al. 2004; Wisdom et al. 2011; Hanser 2018
[23] Connelly and Braun 1997; Braun 1998; Schroeder et. al. 2004
[24] IBID

km^2 (1.5 to 237.5 mi^2). [25] Home range occupancy is related to multiple variables associated with both local vegetation characteristics and landscape characteristics.[26] Pyke (2011) estimated that greater than 4,000 ha (9,884 ac) was necessary for sage-grouse population sustainability; however, Pyke did not indicate whether this value considered groups of birds that moved long distances between seasonal habitats versus those who can meet all necessary seasonal requirements within a local area, nor if this included juxtaposition of all seasonal habitats.[27] Large seasonal and annual movements emphasize the need for large, connected functional landscapes to support viable sage-grouse populations.[28]

2.3.1 Seasonal Habitats

Sagebrush-grassland surrounding leks are used for escape cover, nesting, and foraging. Coates et al. found that in northeastern California, sage-grouse consistently selected areas dominated by sagebrush and that had few or no conifers.[29] However, the type of sagebrush selected, varied by season and region.[30] The proximity, configuration, and abundance of nesting habitat are key factors influencing lek locations.[31] Productive nesting areas are typically characterized by sagebrush with an understory of native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover for the hen during incubation. [32] Shrub canopy and grass cover provide concealment for sage-grouse nests and young and are critical for reproductive success.[33] Average clutch size is seven eggs[34] for the greater sage-grouse (six and a half eggs in the Bi-state sage-grouse)[35], and sage-grouse exhibit limited re-nesting if the first clutch fails.[36] Sage-grouse move from sagebrush uplands to more mesic areas (moist areas, such as streamside areas or wet meadows) during the late brood-rearing period (three weeks post hatching) in response to summer desiccation of herbaceous vegetation in the sagebrush uplands in order to find adequate food resources for the young grouse.[37] In northeastern California, the variation in use was based on

[25] Connelly et al. 2011
[26] Knick et al. 2013.
[27] Pyke, D.A., 2011.
[28] Knick et al. 2013; Connelly et al. 2011.
[29] Coates et. al. 2020a
[30] Coates et. al. 2020a
[31] Connelly et al. 2011
[32] Hagen et.al. 2007; Kolada et al. 2010; Popham and Gutiérrez 2003
[33] Connelly et al. 2011
[34] IBID
[35] Casazza et al. 2009
[36] Connelly et al. 2011
[37] Connelly et al. 2000

water resources availability and amount of herbaceous cover.[38] For example, sage-grouse strongly selected for upland natural springs in xeric regions, for larger wet meadows in more mesic regions and during breeding in spring, selected strongly for herbaceous cover in more mesic areas.[39]

The annual range of greater sage-grouse in northeastern California indicates that conserving habitat within 5 km of active lek sites is insufficient to sustain long-term population persistence. Although most female greater sage-grouse in northeastern California sought suitable nesting habitat within a relatively small area (within 5 km of a lek site), 29% of females nested greater than 5 kilometers from an occupied lek site, of which 62% nested successfully. Consequently, larger areas of habitat are needed to conserve greater sage-grouse in northeastern California to accommodate seasonal movements, annual variation in habitat requirements, and to maintain connectivity among leks.[40]

Summer use areas include sagebrush habitats, riparian areas and wet meadows, which provide an abundance of forbs and insects that benefit both hens and chicks.[41] Late brood-rearing habitats are often associated with sagebrush, but selection appears to be based on the availability of forbs, correlating with a shift in the diet of chicks from forbs and insects to sagebrush as they mature.[42]

As vegetation continues to desiccate through the late summer and fall, sage-grouse shift their diet entirely to sagebrush and depend entirely on sagebrush throughout the winter for both food and cover.[43] Sage-grouse may move between seasonal ranges in response to habitat distribution and resources[44], so some populations are considered migratory while others are non-migratory[45]. Maximum movement distances of up to 160 km (100 mi) have been recorded[46], however, movement distances vary depending on the locations of seasonal habitats.[47] Information regarding the distribution and characteristics of movement corridors for sage-grouse is limited[48]; although, in a few areas monitoring of radio-collared birds has provided some insights into seasonal movement patterns.[49] These movement corridors have been considered "traditional",

[38] Coates et. al. 2020a
[39] Coates et. al. 2020a
[40] Davis, D.M. 2012
[41] Schroeder et al. 1999; Connelly et al. 2000; Connelly et al. 2004; Thompson et al. 2006
[42] USFWS 2013a.
[43] Schroeder et al.1999
[44] Connelly et al. 2004; Fedy et al. 2012
[45] Dumroese, et al. 2020b
[46] Tack et al. 2011; Smith 2012; Newton et al 2017
[47] Schroeder et al. 1999
[48] Connelly et al. 2004
[49] Smith 2012

and the birds use pathways of gently rolling grasslands and sagebrush flats within large, intact landscapes composed of native vegetation.[50] Sage-grouse dispersal (permanent moves to other areas) is poorly understood and appears to be sporadic.[51]

2.4 Food

Greater sage-grouse is a sagebrush-obligate species and the importance of sagebrush as a source of food and cover has been well established. Sagebrush is a primary food item for adults throughout the year.[52] However, sage-grouse food habits are complex and forbs and insects are consumed at certain times of year.[53] Diet composition may have an influence on reproductive success of females and forbs and insects are crucial for growth and survival of chicks.[54] In addition, seasonal variation in sage-grouse diets particularly during spring, summer, and fall/winter may directly influence their habitat use.[55]

2.5 Breeding

Sage-grouse are renowned for their courtship displays during the spring breeding season. California's sage-grouse, as well as most grouse species, are polygynous. Polygyny can be defined as one male mating with multiple females and each female selectively choosing the male with whom she mates.[56] Sage-grouse exhibit "clumped polygyny" where multiple males display in the same mating area (lek) for all nearby females.[57]

Greater sage-grouse courting arenas, or leks, are clearings in the sagebrush that the greater sage-grouse use as communal breeding grounds. The females predominately choose to mate with the one or two dominant males on the lek, but occasionally mate with a lesser dominant male.[58] Leks can range from one to 16 hectares in size.[59] A common feature for sage-grouse leks is sparse vegetation compared to the surrounding landscape. Leks can occur on wind swept ridges and rocky knolls, grassy swales, bare openings created by dirt roads or fire, air strips, natural meadows, dry lake beds, and other lightly vegetated areas.[60]

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[50] Newton et al. 2017
[51] Connelly et al. 2011
[52] Sage-grouse Initiative
[53] Klebnow and Gray 1967; Conover and Roberts 2016
[54] Gregg et al. 2008; Johnson and Boyce 1990
[55] Klebenow and Gray 1967; Connelly, et al. 2004
[56] IBID.
[57] Connelly, J.W. et al. 2004.
[58] Sage-grouse Initiative
[59] Schroeder et al 1999
[60] IBID

Leks often occur in the same location each year and are located in areas of high female traffic surrounded by good nesting habitat.[61] Male numbers increase when females arrive and remain stable when females are present.[62] Adult males arrive at the leks earliest in the season (February to early April[63]) followed by females which arrive mid to late March in California.[64] Peak hen attendance is typically in late March to early April in California[65] males perform "strutting display" for up to 3-4 hours each morning and often during the late evening and nights with bright moonlight trying to attract females.[66] Hen numbers drop relatively quickly subsequently.[67] Male sage-grouse attendance at leks is variable annually but typically they attend for several months each spring[68] but with reduced participation during precipitation events.[69]Males appear on leks just prior to sunrise during the early part of the display season and depart shortly after sunrise.[70]

2.6 Natural Mortality

Greater sage-grouse have an average life span of one and a half years although birds have been documented to live up to ten years.[71] Natural survival rates for greater sage-grouse are estimated to be 59.2% for adult females, 77.7% for yearling females, 36.8% for adult males, and 63.5% for yearling males.[72]

In California, nest success is estimated to be 40%.[73] Predation, food availability, habitat quality, hunting harvest, and weather may all impact nest and juvenile survival.[74] Nest success was dependent upon female age, with adults more likely to nest successfully than yearlings.[75] Connelly et al (2011) averaged the results from several studies and estimated only 10% survival for juveniles from hatch to breeding age, while noting that some of the studies were in "fragmented or otherwise marginal habitat."[76] Thus, conservation and management efforts

[61] Schroeder et al 1999
[62] Connelly et al. 2004
[63] IBID
[64] IBID
[65] IBID
[66] Schroeder 1999
[67] IBID
[68] Sage-grouse Initiative
[69] Fremgen et al. 2018
[70] Sage-grouse Initiative
[71] USFWS 2006
[72] Connelly et al. 2004.
[73] Connelly et al. 2011
[74] IBID
[75] IBID
[76] IBID

should include enhancing greater sage-grouse habitat and survival during the breeding and brood-rearing season.

3. RANGE AND DISTRIBUTION

3.1 Historical Range

In California, greater sage-grouse distribution historically included portions of eastern Siskiyou, Shasta, Plumas, Sierra, and Alpine counties; and portions of the Modoc Plateau and Great Basin regions of northeastern California including Lassen, Modoc, Mono and Inyo counties as far south as the Owens Valley near Big Pine. Elevation ranged from 3500 to 12,000 ft. See Figure 1 (map) in Executive Summary above at page 8. Based on the range of sagebrush and occurrences of sage-grouse, the California Department of Fish and Wildlife estimate that the historic range was 26,011 km^2 or 2,601,100 hectares (6,427,458 acres).[77] Sage-grouse were seen in Lava Beds National Monument as late as 2008, but no confirmed nesting within the monument has been documented since the late 1970s.[78] The nearest active lek is only 15 miles away in the Clear Lake National Wildlife Refuge.[79]

3.2 Current Range

The 2020 U.S. Geological Survey (USGS) report[80] analyzed the trend of the two California sage-grouse populations (Northern and Bi-State populations) that occupy the western periphery of the species' range.[81] For purposes of analyses, the USGS organized the sage-grouse populations into "Neighborhood Clusters" based on lek locations to represent a fine scale and into "Climate Clusters" to represent broad spatial scale. Some Bi-State's Neighborhood Clusters' boundaries overlap into Nevada. Some Northern California sage-grouse Neighborhood Clusters' boundaries overlap into Nevada and Oregon. In both areas, the data were analyzed on the bird's lek locations in California only.[82] The currently occupied Neighborhood Clusters in California total 1,764,201 hectares (4, 359,436 acres) and include 136 leks. The sage-grouse in California have been extirpated from eastern Siskiyou County and the extreme northeastern part of Shasta County, while the range in Modoc County has contracted, as well as southern Inyo County (See Figure 1 at page 9; Figure 4 at page 22).

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[77] Hall et al. 2008.
[78] Adamus et al. 2013
[79] IBID at 85,
[80] Coates et al. 2021b.
[81] IBID at Appendix 4. Statewide Analysis – California. pg. 108 and Figure 4.2 pg. 112
[82] IBID at Figure 4.1 at pg. 109

4. ABUNDANCE AND POPULATION TREND

Based on data going back to 1960's, and incorporating documented natural oscillations in populations, the results of the most recent analysis of population abundance and trend indicate that all sage-grouse populations in California have been and continue to be in decline.[83] Using the rate of population change (λ) where a stable population equals 1, a declining population less than 1, and an increasing population more than 1, all populations (and Climate Clusters) are less than 1, indicating declining population (Figure 3). The analysis also examines several temporal scales based on the documented number of population oscillations (see Figure 3 below). These temporal scales identify the number of population oscillations included as follows: long time frame (six oscillation periods), medium (four periods) and short (two periods). Here too, regardless of the temporal timeframe, the population change (λ) for the combined California populations was less than 1, indicating a declining population throughout the range of the California populations.[84]

Table 4.1. Table of greater sage-grouse (*Centrocercus urophasianus*) average annual rate of population change ($\hat{\lambda}$) across six periods of oscillation in abundance that represent temporal scales for each climate cluster within the state of California. Estimates were derived from leks within the entire climate cluster.

[CC, climate cluster; A, Bi-state area; E, Great Basin area]

CC	Percent CC[1]	Temporal scales[2]						Number of leks[3]	Average count/lek
		Long	Medium/Long	Medium	Short/Medium	Short	Recent		
A	62.8	0.978 (0.965–0.988)	0.978 (0.962–0.986)	0.990 (0.974–1.000)	0.995 (0.979–1.005)	0.973 (0.964–0.981)	0.981 (0.969–0.993)	84 (55:41, 48:36)	21.3 (19.9–22.8)
E	3.8	0.971 (0.967–0.976)	0.973 (0.967–0.978)	0.974 (0.963–0.979)	0.986 (0.981–0.990)	0.968 (0.964–0.971)	0.949 (0.944–0.955)	4,012 (2,187:38, 1,908:33)	17.3 (17.1–17.5)

[1]The percent of each climate cluster that intersects the state.

[2]Temporal scales were estimated from present to each major population abundance nadir (trough) since 1960. Number of temporal scales were used to estimate population trends across six different temporal scales from approximately 10 to approximately 60 years.

[3]Number of leks in database. In parentheses from left to right is (1) total number in cluster were used in trend analysis, (2) number used in trend analysis within state boundary, (3) total number in cluster were used in the targeted annual warning system (TAWS) analysis, and (4) number used in TAWS analysis within state boundary.

Figure 3. Results of Data Analysis of California's Climate Clusters from data reaching back to 1960 from Coates et al. 2021b – Appendix 4 at pg. 110. "A" denotes Bistate Climate Clusters, "E" denotes Northeastern California Climate Clusters

[83] IBID at pg. 108
[84] IBID at pg. 108

4.1 Northeastern California Population

The Northeastern California population of the greater sage-grouse is grouped into thirteen Neighborhood Clusters containing 38 leks that were used in the trend analysis.[85] Of the thirteen Neighborhood Clusters, four occur wholly within California[86], with two overlapping into Oregon and the remaining seven overlapping into Nevada (Figure 4).[87] Trend analysis over six different temporal scales of 10 to 60 years (recent, short, short-medium, medium, medium-long, long) results in a negative population trend (λ) ranging from 0.949 to 0.986.[88] Trend analysis of individual Neighborhood Clusters over six different temporal scales of 10 to 60 years (recent, short, short-medium, medium, medium-long, long) results in six Neighborhood Clusters having at least one time period with a positive trend (λ greater than one), although in two cases (E-132 and E-135) the trend analysis used leks within the Neighborhood Cluster but not located in California as a basis for the trend analysis.[89]

Therefore, the data and trend analysis over the last 60 years in the Northeastern California population of the greater sage-grouse shows a steady decline throughout the range[90] in addition to a contraction of occupied habitat, despite translocation of birds from Nevada to California,[91]

4.2 Bi-state Population

The Bi-State population of the greater sage-grouse is of great concern because of its historic isolation from other sage-grouse populations as confirmed by genetic results.[92] This genetic distinction may be the result of natural geologic events and subsequent long-term geographic isolation based on prevailing physiographic and habitat conditions.[93] The U.S. Fish and Wildlife Service recognizes this population as a Distinct Population Segment of the greater sage-grouse.[94] The Bi-State population occupies an area approximately 170-miles long and up to 60 miles wide along the California-Nevada border.[95] In California, it includes portions of three counties:

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[85] IBID at Table 4.1 at pg. 110
[86] IBID at Table 4.2 at pg. 111
[87] IBID at Figure 4.1 at pg. 109
[88] IBID at Table 4.1 at pg. 110
[89] IBID at Table 4.2 at pg. 111
[90] Coates et al. 2021b.
[91] Bell and George 2012
[92] Oyler-Mccance et al. 2005; Oyler-McCance et al. 2014
[93] bistatesagegrouse.com
[94] IBID
[95] IBID

Alpine, Mono, and Inyo.[96] A majority of the bird's California range occurs in Mono County and the White Mountains in Inyo County.

The USGS grouped the Bi-State Population into eight Neighborhood Clusters containing 41 leks that were used in its trend analysis.[97] Of the eight Neighborhood Clusters, five occur wholly within California[98] with three overlapping into Nevada (Figure 4).[99] Trend analysis over six different temporal scales of 10 to 60 years (recent, short, short-medium, medium, medium-long, long) results in a negative population trend (λ) ranging from 0.973 to 0.990.[100] Trend analysis of individual Neighborhood Clusters over six different temporal scales of 10 to 60 years (recent, short, short-medium, medium, medium-long, long) results in only two Neighborhood Clusters having at least one time period with a positive trend (λ greater than one) yet not offsetting the overall decline of the population.[101]

[96] IBID
[97] Coates et al. 2021b at Table 4.1 at pg. 110
[98] IBID at Table 4.2 at pg. 111
[99] IBID at Figure 4.1 at pg. 109
[100] IBID at Table 4.1 at pg. 110
[101] IBID at Table 4.2 at pg. 111

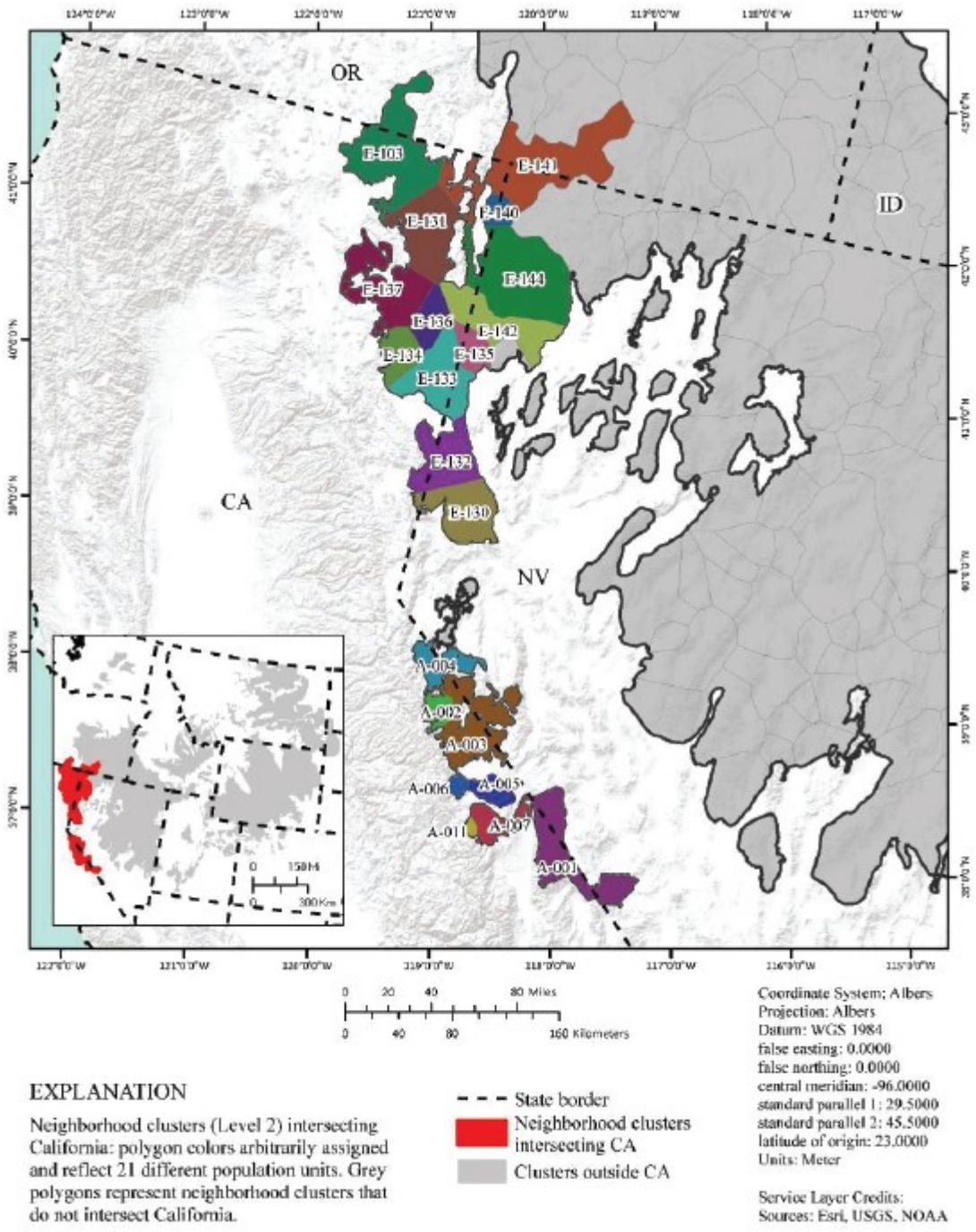

Figure 4.1. Greater sage-grouse (*Centrocercus urophasianus*) hierarchical population monitoring framework for neighborhood clusters that intersect the state of California. Map image is the intellectual property of Esri and is used herein under license. Copyright © 2020 Esri and its licensors. All rights reserved.

Figure 4. Neighborhood Clusters within California's boundaries from Coates et al. 2021, Appendix 4 at pg. 109. "A" denotes Bistate Neighborhood Clusters, "E" denotes Northeastern California Clusters

In conclusion the data and trend analysis over the last 60 years in California's sage-grouse populations show a steady decline throughout the range in addition to a contraction of occupied habitat.

5. FACTORS AFFECTING SUCCESSFUL REPRODUCTION & SURVIVAL

5.1 Habitat Modification/Destruction

Very little sagebrush within the range of the sage-grouse remains undisturbed or unaltered from its condition prior to Euro American settlement in the 1800s.[102] Actual and functional habitat loss is the most significant threat to California's sage-grouse. Disturbed or altered habitats have less resilience than intact habitats due to the disruption of primary patterns, processes and components of sagebrush ecosystems. Studies show that sage-grouse occupation was strongly associated with measures of sagebrush abundance and distribution, including sagebrush area, patch size, proximity of patches, and size of core areas.[103] These results support past studies that identified sage-grouse as a sagebrush obligate, dependent on sagebrush for persistence.[104] Research results indicate that sagebrush area is one of the best landscape predictors of sage-grouse persistence.[105]

5.1.1 Land Management

Because California's sage-grouse rely exclusively on large, continuous stands of sagebrush habitat for their existence, protection of sagebrush habitat is clearly imperative for the conservation of the species. As noted above, data indicate that the sage-grouse's sagebrush habitat has declined from 2,601,100 hectares to 1,764,201 hectares, a 32% contraction in habitat.[106] Most of this habitat was lost in the northeastern population, but the Bi-state habitat has also retracted from historic occurrences near Big Pine in Inyo county.[107] This contraction does not comprehensively include the fragmented and degraded habitat that reduces successful nesting and survivorship. Numerous land use impacts are ongoing and described here.

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[102] USFWS 2013a
[103] Wisdom et al. 2011
[104] Schroeder et al. 1999, Rowland 2004, Wisdom et al. 2011
[105] Wisdom et al. 2005b; Walker et al. 2007, Doherty et al. 2008, Aldridge et al. 2008
[106] Hall et al. 2008
[107] Hall et al. 2008

5.1.1.1 Conversion of Habitat to Agriculture & Urbanization

Sage-grouse habitat conversion to agriculture initially around the peripheries of habitat resulted in declining populations of the birds throughout its range.[108] Agricultural areas expanded into additional sage-grouse habitat with the advent of irrigated agriculture and a low level of conversion continues on private lands to date.[109] Tillage rates of only 21–25% of the landscape can lead to abandonment of display grounds by greater sage-grouse.[110] A certain level of urbanization has occurred in support of agricultural activities. Large-scale disturbances (e.g., agricultural conversions) within surrounding landscapes influence sage-grouse habitat selection[111] and population persistence.[112]

It is unclear how many acres of sage-grouse habitat has been converted to agriculture or urbanization in California.

5.1.1.2 Habitat Fragmentation/Connectivity

In addition to habitat loss, fragmentation of sagebrush habitats has long been known to be a major threat to California sage-grouse populations.[113] Habitat fragmentation can negatively affect sage-grouse by causing lek abandonment, lowering population recruitment, yearling survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat.[114] Habitat loss also increases habitat fragmentation, and greater sage-grouse are documented to also avoid leks with nearby anthropogenic noise, even where sagebrush remains intact.[115] Research has shown sage-grouse are sensitive to habitat fragmentation caused by anthropogenic features[116] and human activity can affect sage-grouse habitat selection.[117] In an analysis of population connectivity, Crist et al (2017) demonstrated that in some areas of the sage-grouse's range, populations are already isolated and at risk for extirpation due to genetic, demographic, and stochastic events.[118] Habitat loss and fragmentation contribute to the population's isolation and increased risk of extirpation.[119]

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[108] Braun 1998.
[109] Braun 1998.
[110] Remington et al. 2021
[111] Knick et al. 2011
[112] USFWS 2013; Aldridge et al. 2008; Wisdom et al. 2011.
[113] USFWS 2013; Braun 1998; Connelly et al. 2000; Connelly et al. 2004; Schroeder et al. 2004; Davis et al. 2015
[114] Braun 1998; Schroeder and Robb 2003; Walker et al. 2007; Doherty et al. 2008, Connelly et al. 2011
[115] USFWS. 2013. Blickley et al. 2012
[116] Knick et al. 2011, Wisdom et al. 2011
[117] Aldridge et al. 2008, Doherty et al. 2010
[118] Crist et al. 2017
[119] IBID

Reversing habitat fragmentation is important to the long-term viability of sage-grouse populations because the species is dependent on landscape level habitat stability.[120] Grouse populations are particularly vulnerable to fragmentation of habitat [121] and the ability of sage-grouse to move among suitable patches of habitat depends not only on the juxtaposition of the patches but also on the dispersal behavior of the species.[122] Data on natal dispersal distances are important for understanding the genetic structure of populations and the effects of habitat fragmentation on metapopulation dynamics. [123]

Research shows that California sage-grouse population success is closely associated with high quality habitat patches and that the geographic distribution of greater sage-grouse habitat is strongly affected by topographic complexity.[124] Analysis of lek connectivity indicates that the length of movement corridors between adjacent leks exceeded the dispersal capability of greater sage-grouse, resulting in dispersal routes too long to promote connectivity. Functional connectivity between adjacent leks is likely altered by invasive annual grass species, such as cheatgrass (*Bromus tectorum*) and medusahead rye (*Taeiatherum caput-medusa*), and in some cases juniper expansion. Thus, the current spatial structure of the greater sage-grouse population in northeastern California threatens long-term persistence. To ensure landscape connectivity, maintenance of large tracts of contiguous sagebrush is critical to sustain demographic and genetic exchange among greater sage-grouse populations occurring on the western periphery of the species geographic range.[125]

Oyler-McCance et al (2014) found genetic structuring within the Bi-State populations where genetic evidence found isolation by distance on a north-south axis. The conclusion for this genetic structure is "likely the result of habitat loss and fragmentation that has been exacerbated by recent human activities and the encroachment of singleleaf pinyon (*Pinus monophylla*) and juniper (*Juniperus* spp.) trees."[126]

Fragmentation of habitat by roads, overhead lines, fences, reservoirs, ranches, farms, landfills, vegetation "treatments" and housing have resulted in loss and degradation of sage-grouse habitat.[127] Large linear disturbances such as highways and power lines can effectively divide a

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[120] Wisdom et al. 2005a.
[121] Schroeder and Robb 2003, Guttery et al. 2013
[122] Stiver et al. 2010.
[123] Beck et al 2010, Davis et al. 2015, Apa et al. 2017
[124] Davis 2012
[125] IBID
[126] Oyler-McCance et al. 2014
[127] Hall et al. 2008

sage-grouse population and, even if the direct loss of habitat is small, the effects of fragmentation may be dramatic.[128]

Increasing fragmentation of sagebrush and sage-grouse habitat coupled with declining greater sage-grouse populations would result in declines of genetic diversity when increasingly smaller fragmented populations become progressively isolated. Ultimately local extinctions would ensue.[129]

Sagebrush destruction, often implemented to increase herbaceous forage for domestic livestock, is a common practice that fragments sage-grouse habitat. Conservative estimates identify that at least 50% of all western sagebrush landscapes have been impacted at least once, fragmenting sage-grouse habitat "with sage grouse use being slightly to heavily (complete avoidance) altered for periods of at least 2-3 years (minimum) to as much as 30 years."[130]

5.1.1.3 Livestock and Free-Ranging Equids

Domestic livestock and free-ranging equids (primarily feral horses) can alter sagebrush-ecosystem processes in a number of ways, including selective consumption of plants, trampling of plants, and compaction of soil and increased soil erosion.[131] These species can also spread and facilitate establishment of invasive species by ingesting, transporting and/or excreting them including cheat grass (*Bromus tectorum*) (see below section on Invasive Species). In addition, domestic stock and free-ranging equids create soil disturbance that facilitates invasive plant establishment,[132] compete with sage-grouse for nutritious herbaceous cover, degrade the important herbaceous layer, and reduce plant cover which conceals grouse, their nests, and chicks, and increases their vulnerability to predation.[133] Land management that increases forage for livestock, has reduced and degraded sagebrush habitat.[134] Braun (1998) states "No areas used by sage-grouse are known to have escaped treatment. Domestic livestock alone have grazed over most, if not all, areas used by sage-grouse."[135] Areas without wild horses, in the Great Basin, had higher shrub cover, native plant cover, species richness, overall plant biomass, and lower cover of invasive plant species such as cheatgrass than areas with horses.[136]

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[128] Connelly, Hagen & Schroeder 2011
[129] Dumroese 2020
[130] Braun 1998
[131] Remington et al. 2021
[132] Remington et al. 2021
[133] Hall et al. 2008.
[134] Braun 1998, Hall et al. 2008
[135] Braun 1998
[136] Remington et al. 2021

Domestic livestock grazing often requires infrastructure that directly and indirectly affects sage-grouse. Fencing has long been documented to cause sage-grouse mortality when birds fly into and are entangled in fences' barbed wire. Fences also create perching opportunities for predators.[137] Sage-grouse mortalities have been documented from collisions with vehicles and farm equipment and birds have been victims of pesticide applications.[138]

Behnke et. al. studied the levels of the stress hormone (corticosterone) levels in greater sage-grouse that were exposed to non-native ungulate grazing. The preliminary results indicate that greater feral horse densities were associated with higher corticosterone levels and that livestock grazing produced similar results. [139] This effect was exacerbated by drought conditions.[140]

Wayment (2022) studied livestock grazing and greater sage-grouse in Utah with the preliminary results suggesting the relationship between livestock and sage-grouse might be competitive on the short term.[141]

Nearly all sage-grouse habitat in California has either or both domestic livestock grazing allotments and/or management areas for free-roaming equids designated on it.

Livestock grazing is an insidious form of biotic disturbance that has exerted ongoing disturbance on the sagebrush ecosystem over many decades.[142] Grazing effects are not distributed evenly because historic practices, management, and animal behavior all lead to differential use of the habitat.[143] At high levels of grazing, impacts lead to loss of vegetation cover, spread of invasive plants, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including the sage-grouse.[144] Structural range improvements, such as fences (both barbed wire and woven-wire fences) used to manage livestock, represent movement barriers to sage-grouse, predator perches, and cause direct mortality to sage-grouse.[145]

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[137] Connelly, Hagen and Schroeder 2011, Braun 1998
[138] Connelly, Hagen and Schroeder 2011
[139] Behnke et al. 2022
[140] Behnke et al. 2022
[141] Wayment 2022
[142] Connelly et al. 2004
[143] Manier et al. 2013
[144] IBID
[145] IBID

Livestock grazing is the most widespread type of land use across the sagebrush biome, and almost all sagebrush areas are managed for livestock grazing.[146] In California, there are 377 federally designated grazing allotments covering over 3.6 million acres of public lands that overlap the "neighborhood clusters" of sage-grouse identified by USGS. 220 of those allotments are administered by the Bureau of Land Management and cover almost 2 million acres. 157 of the allotments are administered by the U.S. Forest service and cover over 1.6 million acres of sage-grouse habitat. (see Appendix A, listing the allotments).

Figure 5 below shows the areas of overlap between sage-grouse "neighborhood clusters" and federally designated grazing allotments. Grazing has long been identified as a factor affecting sage-grouse and its habitat.[147] Grazing livestock can affect soils, vegetation, water, and nutrient availability by consuming or altering vegetation, redistributing nutrients and plant seeds, trampling soils and vegetation, and disrupting microbial composition.[148] Livestock may also trample nests, cause nest abandonment, and disturb sage-grouse behavior.[149]

[146] Connelly et al. 2004
[147] Nevada Dept. of Wildlife 2004
[148] Connelly et al. 2004
[149] Crawford et al. 2004; Sage-grouse National Technical Team 2011

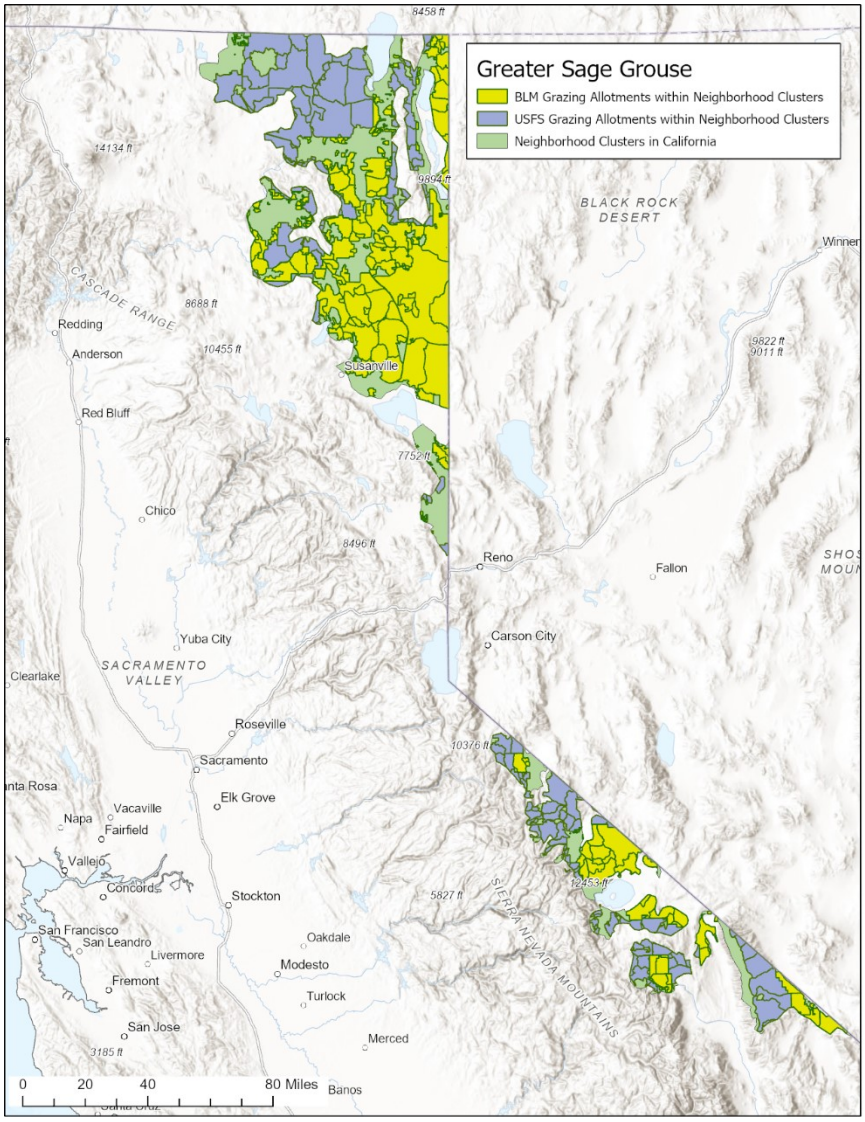

Figure 5. Federal grazing allotments that overlay "neighborhood clusters" of sage-grouse. Source: https://gbp-blm-egis.hub.arcgis.com/, https://data.fs.usda.gov/geodata/

Sage-grouse in California can also occur on private lands that are grazed, but data on the status of the birds on private lands is generally unavailable to the public.

5.1.1.4 Wild Horses and Burros

Wild horses (*Equus caballus*) and burros (*E. asinus*) in the United States have unique management status among ungulates because they are protected under the Wild and Free-Roaming Horses and Burros Act of 1971. This legislation requires that these animals are neither

hunted nor actively managed with fences and rotation among pastures. Past research has elaborated that feral horses can exert notable direct influences in sagebrush (*Artemisia* spp.) communities on structure and composition of vegetation and soils, as well as indirect influences on numerous animal groups whose abundance collectively may indicate the ecological integrity of sagebrush communities.[150] In the Great Basin, wild horses are documented to disrupt sage-grouse leking activity based on monitoring of presence of ungulate type and sage-grouse presence.[151] This disruption of lek activity could result in reduced sage-grouse breeding and limit breeding areas.[152] Currently, most wild horse populations are above the maximum Appropriate Management Levels (AML_{max}) for wild horse populations set by land management agencies. Subsequent modeling within the range of the sage-grouse, predicts that each increase of 50% over the AML_{max} in horse abundance will result in a 2.6% annual decline in sage-grouse abundance and that modeling "results indicated 76%, 97%, and >99% probability of sage-grouse population decline relative to controls when horse numbers are 2, 2.5, and ≥3 times over AML_{max}, respectively".[153]

Impacts to vegetation and invertebrates can directly affect fitness of sage-grouse and other sagebrush-obligate species. Alterations of soils and other ecosystem properties may also indirectly affect these species. Wild horse and burro grazing results in a reduction of shrub cover and more fragmented shrub canopies, which can negatively affect sage-grouse habitat.[154] Elevation, horse density, and season and duration of use vary the effects of feral equids on ecosystems.[155] Climate change modeling indicate that increasing temperatures as well as increasing aridity will affect the Great Basin landscape[156] which will alter feral equids uses of sagebrush and increase competition for increasing diminished water resources to the detriment of native wildlife.[157] Spatially, the addition of horses to sagebrush landscapes means more of the landscape receives use by nonnative grazers than if domestic cattle alone were present.

On BLM-managed lands in California, two types of areas are designated for wild horses and burros: Herd Management Areas (HMAs) and Herd Areas (HAs). HAs were designated under the Wild Horse and Burro Act of 1971 as areas where wild horses and/or burros appeared to be inhabiting in 1971 but they are not managed for wild horses and/or burros. The management

[150] Beever and Aldridge 2011, Muñoz et al. 2021
[151] Muñoz et al. 2021
[152] IBID
[153] Coates et al. 2021a
[154] Beever and Aldridge 2011, USFWS 2013b
[155] IBID
[156] Knick and Connelly 2011, Snyder et al. 2019
[157] Scasta et al. 2016

status can change within the HAs based on changing conditions. Nine HAs overlap the sage-grouse "neighborhood clusters" and cover over 660,000 acres (see Table 1).

Table 1. Name of herd area, acreage within sage-grouse "neighborhood clusters" and type of herd(s).

Designated Herd Area Name	Acres	Herd Type
Fort Sage	15,257.2	Horse
Montgomery Pass	937.7	Horse
New Ravendale	32,125.3	Horse
New Years Lake	73,833.9	Horse
Piper Mountain	50,522.7	Both
Round Mountain	7,756.1	Horse
Sand Spring-Last Chance	73.3	Burro
Tuledad	61,206.7	Horse
Twin Peaks	419,714.3	Horse
Total	**661,427.1**	

Source: https://gbp-blm-egis.hub.arcgis.com/, https://data.fs.usda.gov/geodata/

HMAs are BLM-managed lands designated specifically to be managed for wild horses and/or burros. Some HMAs overlap with HAs. Nine HMAs overlap the sage-grouse "neighborhood clusters" and cover over 570,000 acres (see Table 2)

Table 2. Name of Herd management Area, acreage within sage-grouse "neighborhood clusters" and type of herd.

Herd Management Area Name	Acres	Herd Type
Buckhorn	6,528.2	Horse
Carter Reservoir	1,995.9	Horse
Coppersmith	54,678.5	Horse
Fort Sage	15,257.2	Horse
Montgomery Pass	935.1	Horse
New Ravendale	14,876.9	Horse
Piper Mountain	50,150.7	Both
Round Mountain	7,756.1	Horse
Twin Peaks	419,713.8	Both
Total	**571,892.4**	

Source: https://gbp-blm-egis.hub.arcgis.com/, https://data.fs.usda.gov/geodata/

Figure 6 below shows the location where the HAs and HMAs overlap with sage-grouse "neighborhood clusters."

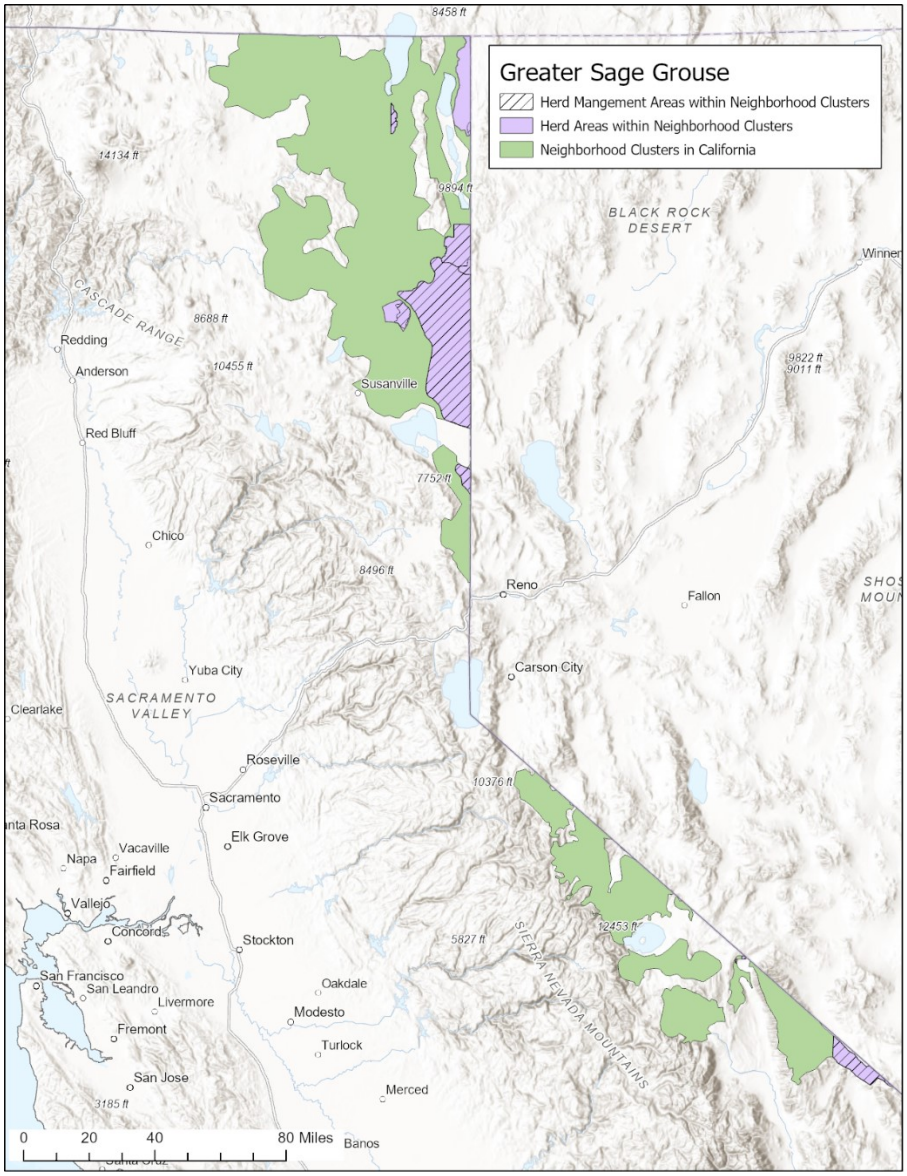

Figure 6. Location of HAs and HMAs where they overlap "neighborhood clusters" in California. Source: https://gbp-blm-egis.hub.arcgis.com/

The U.S. Forest Service also manages at least three Wild Horse Territories (WHTs) with the primary purpose of these designated areas focused on conservation of wild horses including:

- Devil's Garden Plateau WHT – Modoc National Forest;
- White Mountain WHT – Inyo National Forest; and
- Montgomery Pass WHT.

The Devil's Garden Plateau WHT includes over 100,000 hectares (248,428 acres) of Forest Service land and over 3,000 hectares (7,632 acres) of public lands managed by BLM's Applegate Field Office and overlaps wholly with federally permitted livestock allotments. It also overlaps approximately 800 acres of Tribal Lands, 640 acres of California State Lands and 500 acres of private lands which are not included in the WHT. In 2013, the Appropriate AML_{max} was set at 402 adult total horses.[158] It is the largest WHT managed by the U.S. Forest Service in both area size and number of horses.[159] In 2021, the USFS estimated the population on the WHT to be 1,926 adult wild horses, nearly 5 times the appropriate maximum.[160]

White Mountains WHT includes over 60,500 hectares (149,690 acres) of Forest Service public land managed by the Inyo National Forest and over 24,000 hectares (60,000 acres) of BLM land.[161] Livestock grazing is permitted in the WHT and the wild horse herd is managed for a population of 75 horses.[162] No publicly available data are available on the current population in the White Mountain WHT.

The Montgomery Pass WHT is just a small portion, less than 725 hectares (1,792 acres) of USFS land adjacent to the much larger BLM-managed Montgomery Pass HMA (almost 20,000 hectares [49,023 acres]).[163] The herd is managed for a AML_{max} of 230 adult horses. In the fall of 2020, the Inyo National Forest counted "642 horses in the herd, 498 of which were found outside of the herd's regular territory, and approximately 200 of which were in the Mono Lake area. On-the-ground observations have recorded well over 300 horses along Mono Lake's shore."[164] The expansion of the horse herd has impacted sagebrush habitat in the Mono Basin, which may affect the sage-grouse in this neighborhood cluster that is already declining.

The challenges of keeping the herds limited to sustainable numbers result in excessive horse/burro numbers and drought can also cause sage-grouse habitat degradation in these overlapping areas. While numbers of horses/burros on lands that overlap with sage-grouse habitat in California was unlocatable, the Congressional Research Service (2022) states the following for BLM management range-wide:

> "BLM has set the upper limit for the AML for all wild horse and burro herds on its lands at 26,785 animals. As of March 2022, there were an estimated 82,384 animals on BLM

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[158] https://www.fs.fed.us/wild-horse-burro/territories/DevilsGardenPlateau.shtml
[159] https://www.fs.usda.gov/detail/modoc/landmanagement/resourcemanagement/?cid=FSEPRD512471
[160] https://returntofreedom.org/devils-garden-calif-update-usfs-captures-25-wild-horses/
[161] https://www.fs.fed.us/wild-horse-burro/territories/WhiteMountain.shtml
[162] IBID
[163] https://americanwildhorsecampaign.org/media/herds-across-west-montgomery-pass-mustangs
[164] https://www.monolake.org/today/wild-horse-herd-reaches-south-tufa/

> lands—more than triple the current AML—and more than double the 40,605 on-range estimate from 2013."[165]

And continues for U.S. Forest Service:

> "For FS lands, the AML is roughly 2,400 (in 2022). The number of wild horses and burros on FS lands—about 11,460—is more than four times the AML."[166]

As noted above, recent models indicate that a trend of unsustainable and increasing wild horse and burro herds on public lands will degrade habitat for sage-grouse where the species overlap.[167]

It should be noted that the HAs and HMAs are not the only location where free-ranging equids are located, as documented above in the Mono Basin. However, data on the location of feral equids outside of all the HAs and HMAs are not readily available. Therefore, the overlap of HAs, HMAs and WHTs with sage-grouse habitat is the minimum area where potential conflicts between feral equids and sage-grouse occur.

According to the U.S. Forest Service, "horses consume more forage per capita body mass than cattle or sheep, potentially reducing shrub canopy and resulting in a greater abundance of annual invasive grasses."[168] On a per capita body mass, wild horses and burros consume more forage than cattle or sheep and remove more of the plant which limits or delays vegetation recovery.[169] Effects of wild horse and burro on habitats are also more pronounced during periods of drought or vegetation stress.[170] To prevent further degradation of sage-grouse habitat during the ongoing west-wide drought, controllable impacts including lowering the number of wild equids in sage-grouse habitat should be implemented.

Riparian areas and wet meadows receive yearlong use by wild horses and burros directly. These types of areas can be modified and regularly maintained with enclosure fencing and troughs to accommodate wild horse and burro use while reducing impacts to these fragile areas. But these types of "range improvements" also result in increased potential for raptor perch sites and altered hydrology that results in less water available at ground level for sage-grouse. Sequestering water into range improvements can have negative effects on sage-grouse's mesic habitat depending on

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[165] Congressional Research Service 2022
[166] IBID
[167] Coates et al. 2021a
[168] USFS 2015
[169] Menard et al. 2002
[170] Sage-grouse National Technical Team 2011

how each facility is constructed, and increase sage-grouse's vulnerability to predation. Additionally, one measure of habitat quality for wild horses is the presence of moist meadows. At population levels higher than established thresholds, impacts can lead to loss of vegetation cover, decreased water quantity and quality, increased soil erosion, and reduced overall habitat quality for wildlife, including for greater sage-grouse.[171]

Wild horse gathers have occurred in 2022 in within the Buffalo-Skedaddle area, information about other wild horse management measures in California 2022 was unavailable.

5.2 Predation

Predation of adult sage-grouse is greatest during lekking, nesting, and brood rearing seasons.[172] Late summer is a period of high survival (90–100%) for adults, (except for events outside the natural range of variability such as exposure to West Nile virus - see Section 5.10).[173] Losses of sage-grouse to predation in winter have not been well documented, but available data indicates that relatively high winter survivorship of 70–95%,[174] although extreme weather events can lead to significant losses.[175]

No one predator focuses solely on sage-grouse as their primary food source.[176] The dynamics between predators and prey in the sagebrush biome are complex.[177] Based on available data, golden eagles took the most adult sage-grouse (51% of sage-grouse predation) with coyotes depredating 21% of adults.[178] A larger number of predators depredate juvenile sage-grouse because small predators are able to take juveniles but not adults.[179] Sage-grouse nests were primarily depredated by ravens (35%), badgers (34%), and coyotes (19%).[180]

Increased predation due to reduced habitat cover is a significant threat to the sage-grouse particularly for nests.[181] Anthropogenic structures and subsidies can also increase predators that

[171] Coates et al. 2021
[172] Connelly et al. 2000, Naugle et al. 2005, Moynahan et al. 2006
[173] Naugle et al. 2005
[174] Hagen 2011
[175] IBID
[176] Schroeder et al. 1999
[177] Mezquida et al. 2006; Conover and Roberts 2017
[178] Conover and Roberts 2017
[179] IBID
[180] IBID
[181] Doherty et al. 2014

subsequently prey on sage-grouse. For example, power lines and wooden fence posts can provide perching for avian predators.[182]

Sage-grouse occupy sagebrush dominated landscapes and rely on their cryptic plumage and behavior to avoid predation.[183] Males select areas with sparse vegetation to conduct breeding displays; these areas provide opportunities for early detection of predators and greater visibility for pre-nesting female sage-grouse.[184] Nesting females select areas with greater sagebrush cover and taller grass than females rearing broods.[185] The selection of nesting cover focuses on concealment from predation and protection from weather, while early brood-rearing habitats are more sparsely vegetated. Brood-rearing habitats may pose greater predation risk to young chicks, but these risks may be outweighed by potentially increased growth rates and greater chick survival.[186] Sage-grouse winter range is largely defined by sagebrush availability and may include some of the densest stands of shrub cover.[187] Seasonal habitat selection is a trade-off where individuals try to balance competing demands, including acquiring resources while avoiding predation.

Decreased habitat quality and quantity and declining populations have created a situation in which the sage-grouse are more vulnerable to predation because of reduced numbers, cover and concealment opportunities for sage-grouse.[188] Agricultural development, landscape fragmentation, and encroaching human populations may increase the diversity and density of predators.[189] The abundance of sage-grouse predators such as red foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*), crows (*Corvus brachyrhynchos*), and common ravens (*Corvus corax*), which historically were rare in the sagebrush landscape, has increased in association with human-altered landscapes.[190] The cumulative impact of these factors has significantly increased the rate of predation and its seasonal effects on sage-grouse populations.

5.2.1 Raven Expansion

The common raven (*Corvus corax*) populations have exploded in the western states since the mid 1970's (see Figure 7)

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[182] Braun 1998; Prather and Messmer 2010; Gibson et al. 2018
[183] Schroeder et al. 1999
[184] Aspbury and Gibson 2004, Boyko et al. 2004
[185] Hagen et al. 2007
[186] Gregg et al. 2008
[187] Moynahan et al. 2006
[188] Hagen 2011
[189] Coates & Delehanty 2010, Dinkins et al. 2014
[190] Horney, M.R. et al. 2008; Coates & Delehanty 2010; Coates et al. 2016;Luginbuhl et al. 2001.

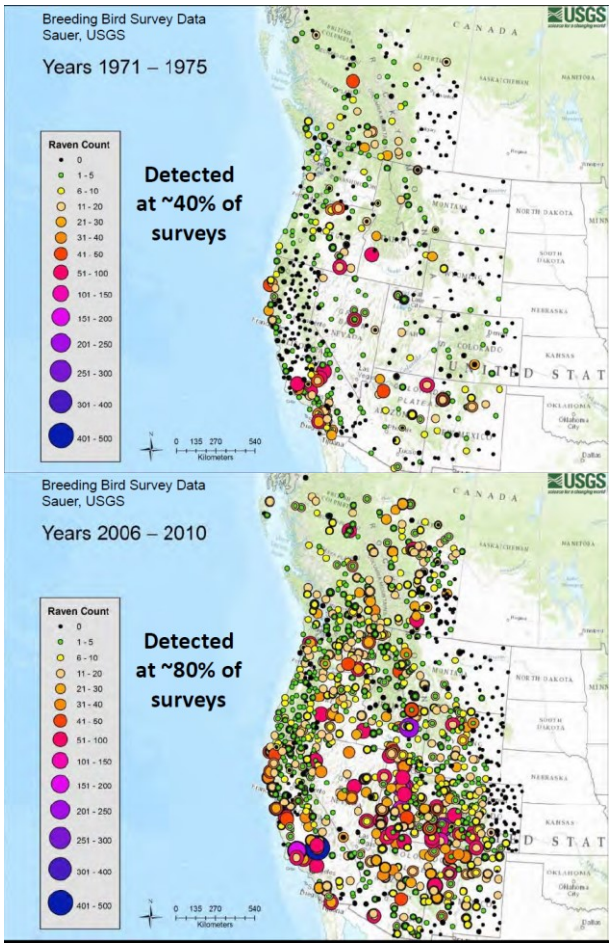

Figure 7. USGS Breeding Bird Surveys 1971-1975 and 2006-2010 showing increases in common raven populations in the western U.S.[191]

From nine years of video data, Coates (2019) determined that common ravens are the most common predator on sage-grouse nests making up 53% of the nest predation events. Common raven populations are subsidized by human-related activities including livestock grazing[192], transmission lines[193], vegetation characteristics[194] and trash.

[191] Coates 2019
[192] IBID
[193] Coates et al. 2016a
[194] Howe et al. 2015

The Benton Crossing landfill in Mono County is an "open pit" landfill in the Long Valley area and has been a known attractant for ravens for over a decade. The landfill subsidizes the raven population in the area which predates on nearby sage-grouse in Long Valley and elsewhere.[195] The landfill is considered a "high" level threat to the South Mono PMU.[196] The County's landfill lease with LA DWP expires in 2023, and as of 2018, the Bi-State Sage-grouse Accomplishments Report indicated that the "Closure is on track to be completed in 2023,"[197]and a recent Mono County press release states the facility will be closed to the public after December 31, 2022.[198] The landfill closure should eliminate a food source for the local raven population and in turn will decrease the raven population and consequently reduce predation on sage-grouse in one of the most vulnerable PMUs. However, until the landfill closure construction is completed, the ongoing problems of predation will continue to take a toll on the sage-grouse population in the south Mono PMU.

5.3 Wildfire

Most species of sagebrush are unable to re-sprout after fire and have poor seed dispersal rates resulting in high mortality and slow recovery following fire.[199] While some historic fire return intervals in sagebrush dominated areas have been as long as 350 years, depending on sagebrush type and environmental conditions, fire has been part of the ecological processes of these areas.[200] Natural sagebrush re-colonization in burned areas depends on the presence of adjacent live plants for a seed source or on the surviving seed bank[201] and requires decades for full recovery.[202] Pre-European contact fires were generally small and patchy with a fire return interval estimated to be between 15-25 years.[203] Due to its low intrinsic resistance to large fires and long recovery times, the sagebrush ecosystem is particularly susceptible to increases in fire frequency and return intervals.[204]

Because large fires are one of the primary factors linked to loss of sagebrush habitat, it is also a major factor leading to population declines of sage-grouse in California.[205] The negative effects to greater sage-grouse demographics from broad-scale fire is well documented in the

[195] Bi-State TAC 2012
[196] IBID
[197] Bi-State TAC 2018
[198] https://monocounty.ca.gov/cao/page/benton-crossing-landfill-close-december-31st
[199] Dumroese and Moser 2020
[200] Padgett 2020
[201] Dumroese and Moser 2020
[202] Hanna and Fulgham 2015
[203] Padgett 2020
[204] USFWS 2013a
[205] IBID

literature.[206] For peripheral populations, applicable to California's populations, Dudley et. al. (2021) established adverse wildfire impacts on sage-grouse population growth that disentangled the effect of wildfire disturbance from natural population fluctuations.[207] Loss of sagebrush habitat to wildfire has been decreasing California's sage-grouse range due to an increasing fire frequency particularly in northeastern California.

Current fire regimes in the sage-grouse habitat are resulting in large-scale conversion from native sagebrush shrub/perennial grass plant communities to fire-prone, nonnative, annual plant communities typically dominated by cheat grass. Often these converted landscapes are permanent and unusable for sage-grouse.[208] Continued increases in the frequency, size, and intensity of wildfires in sage-grouse habitat are modeled to occur from a warming climate (see below) with its associated decreases in growing season rainfall.[209] The increasing fire frequency followed by cheatgrass invasions have fragmented sagebrush habitat, degrading sage-grouse habitat on a large scale. The two major ignition sources for fire in sage-grouse habitat are lightening and humans. Lightening frequency increases when moving from east to west towards the eastern slopes of the Sierras.[210] Historically, fires were noted in higher elevations but were seldom reported in sagebrush valleys at lower elevations.[211] Human-caused fires in sage-grouse habitat are related to the network of roads (in addition to habitat fragmentation (see above)) and spread of non-native annual grasses (see below).[212] It is estimated that in sage-grouse habitat managed by BLM, up to 24% of fires are caused by humans.[213]

In California, between 2012 to 2018 alone, 158,000 hectares (over 390,000 acres) of sage-grouse habitat has burned, representing 28.9% of the bird's habitat in the state.[214] Figure 8 shows the locations of fires within the neighborhood clusters in California.

[206] Anthony et.al 2021; Brooks et al. 2015; Coates et al. 2016b
[207] Dudley et al. 2021
[208] Remington et al 2021, Connelly and Braun 1997
[209] Remington et al 2021
[210] Miller and Heyerdahl 2008.
[211] IBID
[212] Miller and Heyerdahl 2008, Padgett 2020
[213] Miller and Heyerdahl 2008
[214] Remington et al. 2021

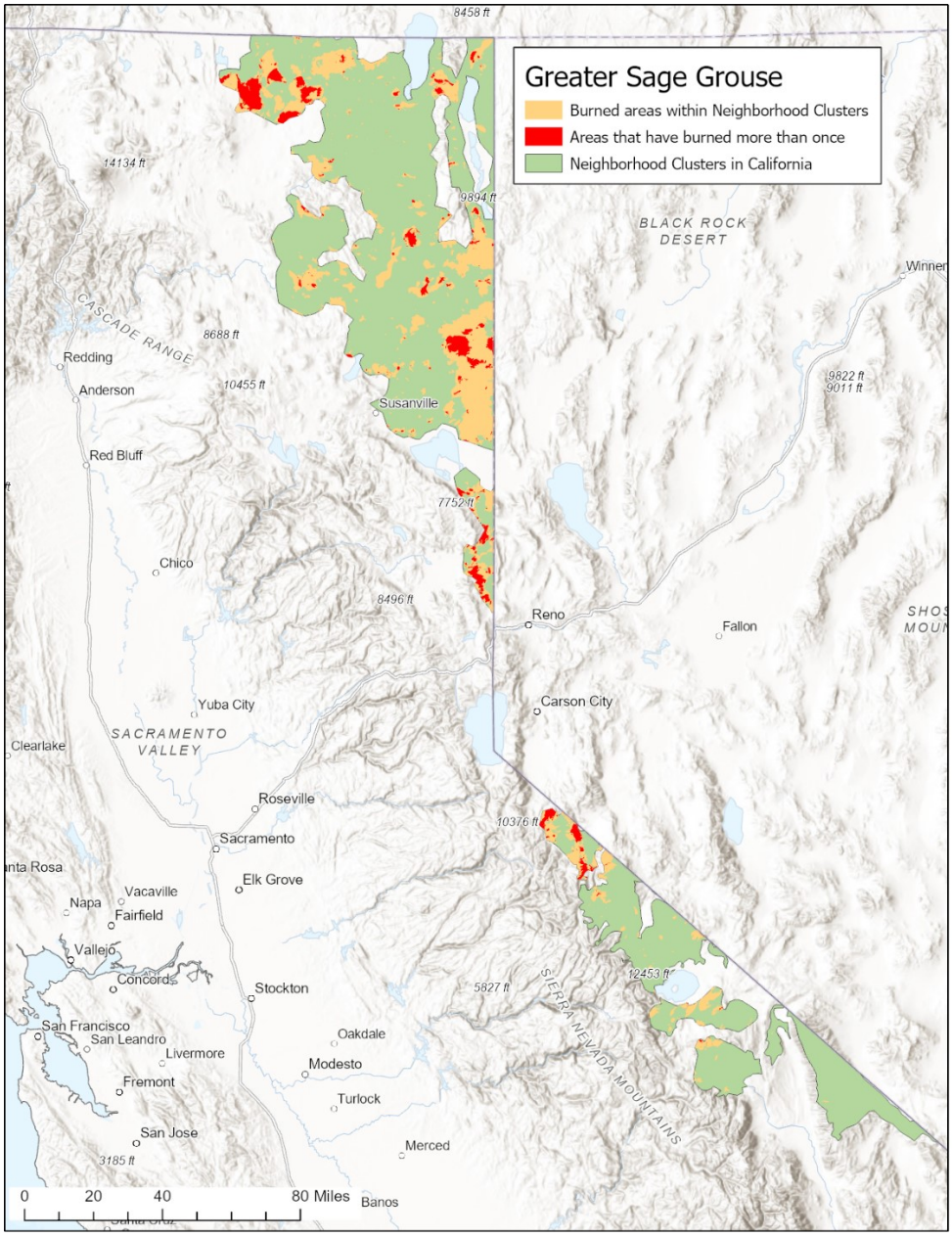

Figure 8. Location of fires within sage-grouse Neighborhood Clusters in California (1910-2021). Includes areas that burned more than once. Source: CalFire/FRAP https://frap.fire.ca.gov/mapping/gis-data/

Between 1910 and 2021, over 526,000 hectares (1.3 million acres) of habitat in the Sage-grouse Neighborhood Clusters burned, including over 64,000 hectares (almost 159,000 acres) that burned twice, over 11,000 hectares (28,000 acres) that burned three times and over 4,000

hectares (10,000 acres) that burned between four to 10 times. In the one-hundred-year interval between 1910-2010 almost 255,000 hectares (almost 630,000 acres) of habitat in the Sage-grouse Neighborhood Clusters burned in almost 600 fires. In the subsequent ten years (2011-2021) over 283,000 hectares (over 700,000 acres) of habitat in the Sage-grouse Neighborhood Clusters burned in only 200 fires, indicating that the fires are becoming larger and more frequent within the Neighborhood Cluster areas. (see Appendix B).

5.4 Non-native Invasive Annual Grasses

The degradation of sage-grouse habitat and increasingly frequent fire are closely linked to the invasion of non-native annual grasses and forbs. Non-native annual grasses are well documented to pose grave threats to sagebrush habitat because they quickly respond to disturbance and lead to more frequent and expansive wildfires which damages habitat.[215] Invasive plants impact sage-grouse habitat by replacing native plant communities' structure and transform perennial shrub-steppe sagebrush communities into invasive annual grasslands or perennial grasslands into meadows dominated by invasive forbs.[216] The invasive annual grass/fire cycle is one of the most impactful feedback loops that occurs in the sage-grouse habitat.[217]

Conversion of sage-grouse habitat to non-native invasive herbaceous plants does not provide the resources necessary to sustain sage-grouse which select for native habitat. It is well documented that pre-laying and nesting females select native herbaceous forage and sage-grouse broods initially feed almost entirely on a variety of native forbs and associated insects.[218] In nearby northwestern Nevada, sage-grouse have been documented to select large expanses of sagebrush-dominated areas for nesting and selecting microsites within those sagebrush landscapes that have higher shrub canopy cover and lower cheatgrass cover.[219]

5.4.1 Ineffectiveness of Sagebrush Restoration on Landscape Scale

While efforts have been made to restore or rehabilitate sagebrush habitat, not all historic areas dominated by sagebrush can be restored because alteration of vegetation, nutrient cycles, topsoil, and living (cryptobiotic) soil crusts have exceeded recovery thresholds.[220] Processes to restore healthy native sagebrush communities are relatively unknown and current efforts have had mixed

[215] Remington et al. 2021
[216] IBID
[217] IBID
[218] Remington et al. 2021
[219] Lockyer et al 2015
[220] USFWS 2013a

success.[221] Active restoration activities are often limited by financial and logistic resources and may require decades or centuries to restore ecological function of sage-grouse habitat. [222] Restoration plans for degraded sagebrush communities must consider not only controlling non-native species (including cheatgrass), but must also include planting the species and seed source of sagebrush and a diversity of native forbs[223] in order to establish robust ecological function. Restoring, when done at intensive levels, Poessel et. al. (2022) found that management efforts, including directed control of exotic annual grasses after wildfire and seeding of native plants, can positively affect habitat selection by sage-grouse.[224] However, the time it took to get big sagebrush to grow to height and cover for sage-grouse generally requires relatively high density ($\geq$2 plants/m^2) plantings and still takes 3 (planted) or 4 (seeded) years to reach the minimum recommended canopy cover for sage-grouse (15%).[225] Therefore even with aggressive restoration efforts, there is a temporal impact of at least 3-4 years where the habitat is not usable for sage-grouse. Except for areas where active restoration is attempted following disturbance (e.g., mining, wildfire), management efforts in sagebrush ecosystems are now usually focused on maintaining remaining sagebrush, not large-scale restoration.[226]

5.4.2 Cheatgrass

In conjunction with wildfires, invasive exotic annual grasses such as cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*) have resulted in the loss and degradation of sagebrush habitat in California and are considered a primary reason for the decline in sage-grouse populations in northeastern California.[227] Annual grasses and non-native invasive perennials are able to expand their range, facilitated by ground disturbance, including wildfire, grazing, vehicles,[228] agriculture[229] and infrastructure associated with energy development.[230] Climate change is likely to alter the range of plants including invasive species and to alter the wildfire regimes, increasing the importance of these threats.

Many areas of sagebrush in California are threatened by large-scale invasion of nonnative annual grasses primarily cheatgrass (*Bromus tectorum*).[231] The increase in mean fire frequency has been

[221] Remington et al. 2021
[222] IBID
[223] Dumroese et al. 2015
[224] Poessel et.al. 2022
[225] Pyke et. al. 2020
[226] USFWS. 2013a
[227] Padgett 2020
[228] IBID
[229] Smith et al. 2016
[230] Naugle et al. 2011
[231] Padgett 2020, USFWS 2013b

facilitated by the incursion of cheatgrass into sagebrush ecosystems.[232] As cheatgrass invades, it creates its own feedback loop with fire and disturbance, because it is adapted to quickly rebounding from these disturbances. Cheatgrass facilitates a short fire return interval by outcompeting native herbaceous vegetation through early germination, early moisture and nutrient uptake, prolific seed production, and early senescence.[233] Furthermore, cheatgrass provides a dry, fine fuel source during the peak of fire season, increasing the likelihood of fire and the likelihood of further cheatgrass spread. [234]

The positive feedback loop between exotic annual grasses and fires can preclude re-establishment of sagebrush. Even without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be type-converted to annual non-native grasslands, which have little to no ecological value to sage-grouse. Ground disturbance, including roads and livestock grazing, facilitates the establishment and spread of cheatgrass and other invasive weeds.[235]

5.5 Conifer Expansion

One factor affecting sage-grouse habitat is the expansion of pinyon (primarily *Pinus monophylla*) and/or juniper (*Juniperus occidentalis, J. osteosperma*) trees – pinyon-juniper - into sagebrush-dominated habitats.[236] In sagebrush ecosystems across the central and northern Great Basin, distribution and abundance of pinyon-juniper had increased 125 to 625 percent since 1860, coinciding closely with European settlement.[237] A recent study found that due to drying and warming conditions pinyon and juniper are now declining in some areas, with *Pinus monphylla* declining in western Nevada.[238]

In California, there has been little change in the amount of area or the location of pinyon-juniper woodland between 1945 and 1989, a result of pinyon-juniper expansion generally equaling the clearance of pinyon-junipers from the landscape.[239] However, updated California-specific data on pinyon-juniper expansion and contraction is not readily available, if inventories have been done. Pinyon-juniper expansion is complex, where determinants include elevation, slope aspect, slope steepness, hillslope position, and prior canopy cover.[240] More mesic conditions resulted in

[232] Fusco et al. 2019
[233] Bradley et al. 2018
[234] Fusco et al. 2019
[235] Bradley et al. 2018
[236] Coates et al 2017a
[237] Miller et al. 2008
[238] Shriver et al. 2022
[239] Bolsinger 1989
[240] Weisberg et al. 2007

greater pinyon-juniper expansion.[241] Complicating factors include fire return intervals, changes in land-use practices such as the overstocking of domestic livestock, and disturbance regimes. [242]

Pinyon pines and junipers are native species contributing to landscape heterogeneity in the Great Basin and some expansion may represent natural recovery of pinyon-juniper woodlands previously cleared by European settlers.[243] Because the sage-grouse inhabit the "sagebrush sea" where trees are absent, pinyon-juniper encroachment creates unsuitable habitat for sage-grouse. Several studies have also documented strong avoidance of pinyon-juniper by sage-grouse at multiple spatial scales and across different grouse life history stages[244] even at relatively low density (e.g., greater than 1.5% canopy cover[245]). Importantly, pinyon-juniper encroachment can have population-level consequences to brood survival[246] and lek persistence[247] for sage-grouse that can lead to genetic isolation.[248] Tall vertical structures (such as trees and powerlines) that provide perching and nesting habitat in an otherwise flat landscape can increase risk of avian predation, which sage-grouse may perceive as a threat.[249]

Pinyon-juniper expansion poses a threat to sage-grouse in California. In northeastern California, the Clear Lake National Wildlife refuge has seen a devastating decline from fifty leks in the 1950's to a single lek by 2017.[250] Conifer encroachment is considered one of the two greatest threats to sage-grouse habitat degradation in the area.[251] Between 2005 and 2015, over 150 sage-grouse were translocated into the Clear Lake National Wildlife Refuge from Oregon and Nevada and over 16,000 hectares (40,000 acres) of junipers has been thinned or removed within the lek area.[252] By 2017, numbers of males at the lek had increased to 34 from a low of five in 2004, but subsequently, declines have been documented in the population.[253] Juniper encroachment is also a potential threat to the Bi-State sage-grouse population.[254]

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[241] IBID
[242] Romme et al., 2009, Maestos et al.2021
[243] Romme et al. 2009
[244] Doherty et al., 2008, Casazza et al., 2011
[245] Coates et al. 2017
[246] Casazza et al. 2011
[247] Baruch-Mordo et al. 2013
[248] OylerMcCance et al. 2005; Oyler-McCance et al. 2014
[249] Dinkins et al. 2014, Conover & Roberts 2017
[250] https://www.fws.gov/story/sage-grouse-population-and-habitat-recovery
[251] IBID
[252] IBID
[253] IBID
[254] Duvall et al 2017

5.6 Extractive Threats

5.6.1 Energy Development

Sage-grouse populations can be significantly reduced, and in some cases locally extirpated, by energy development activities, even when mitigation measures are implemented.[255] The increasing demand for energy resources has led to continued development within the sage-grouse habitat, resulting in habitat loss, fragmentation, direct and indirect disturbance.[256] Sage-grouse may be affected by energy development due to loss of habitat, increases in predator perching opportunities, and other impacts. The necessary transition from fossil fuels to renewable energy to avoid the worst climate change scenarios, also poses potential impacts to sage-grouse, although the published data is limited at this time. Wind turbines and other wind facility infrastructure decreased the probability that sage-grouse selected brood-rearing and summer habitats as surface disturbance of the facility infrastructure increased.[257] For utility-scale industrial solar projects, there is potential for impacts to sage-grouse through direct mortality and habitat loss.[258]

5.6.2 Transmission Lines

Transmission lines are widespread throughout the range of the sage-grouse. Sage-grouse are negatively affected by human infrastructure which includes roads and power lines.[259] Transmission lines directly impact sage-grouse via bird collisions with lines causing mortality.[260] Electromagnetic radiation emitted from transmission lines has proven to have had a variety of negative effects on other bird species using areas on or near lines. [261]

Transmission and power line construction also have various indirect impacts on sage-grouse and their habitat. Transmission lines facilitate raptor predation of sage-grouse by providing perching/hunting opportunities.[262] The frequency of raptor and sage-grouse interactions during the breeding season increased 65 percent and golden eagle interactions alone increased 47 percent in an area in pre- and post-transmission line construction.[263] It is well documented that following construction of power lines, sage-grouse avoid vertical structures potentially due to

[255] USFWS 2013a
[256] IBID
[257] LeBeau et al. 2017
[258] Gerringer et al. 2022
[259] Manier et al. 2013, Kohl et al. 2019
[260] Gibson et al. 2018
[261] Wisdom et al. 2011
[262] Connelly et al. 2000
[263] Manier et al. 2013

increased avian predation, resulting in habitat abandonment.[264] Sage-grouse avoid leks near vertical structures, have decreased adult survival rates and nest survival, and have lower lek attendance.[265] Transmission lines and their requisite roads remove and fragment the remaining habitat.[266]

Roads associated with energy transmission facilities can contribute to habitat fragmentation by reducing the extent of contiguous blocks of habitat and reduce the amount and quality of sage-grouse habitat.[267]

5.6.3 Mining

Mining exploration and surface mining within sage-grouse habitat results in the direct loss of habitat, habitat fragmentation, invasions of cheatgrass and indirect impacts from disturbance (noise, dust, etc.).[268] Mineral extraction of all types, including locatable, leasable, and salable minerals in sage-grouse habitat results in habitat loss caused by construction and infrastructure, the footprint of the surface or subsurface operation, and other associated disturbances. Sagebrush communities that are lost or modified (even in locations where reclamation is not compromised by the presence or introduction of invasive grasses) may not regain sagebrush cover suitable for greater sage-grouse use for 20 to 30 years or longer following interim or final reclamation. Population re-establishment may take upwards of 30 years, if at all.[269] As with restoration efforts (see Section 5.5.1 above) reclamation is even more unlikely to be effective due to the minimal success criteria requirements most mining reclamation are required to meet.

Locatable minerals exploration and mining is primarily for gold, silver, and copper and cause the greatest threat to sage-grouse and its habitat. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance. Mineral extraction of all types, including locatable, leasable, and salable extraction, in sage-grouse habitat, results in habitat loss caused by construction of infrastructure, the footprint of the surface or subsurface operation, and other associated facilities. Sage-grouse avoided all mining disturbance and reclamation areas in selecting nest sites, adult

[264] Braun 1998
[265] Braun 1998; Aldridge and Boyce 2007; Kohl et al. 2019
[266] Naugle et al. 2011
[267] Walker et al 2007; Aldridge et al 2008
[268] USFS 2015
[269] Braun 1998

breeding habitat and adult winter habitat.[270] Active mining activities also increased adult breeding season mortality risk.[271]

Current threats to the California sage-grouse from mining include locatable mineral exploration in sage-grouse habitat from several projects. The Kore mining exploration proposal in Mono County's Long Valley[272] would impact sage-grouse populations that have been extensively documented to use the area (see Figure 9).

[270] Braun 1998; Pratt and Beck 2019
[271] IBID
[272] https://koremining.com/projects/long-valley/overview/

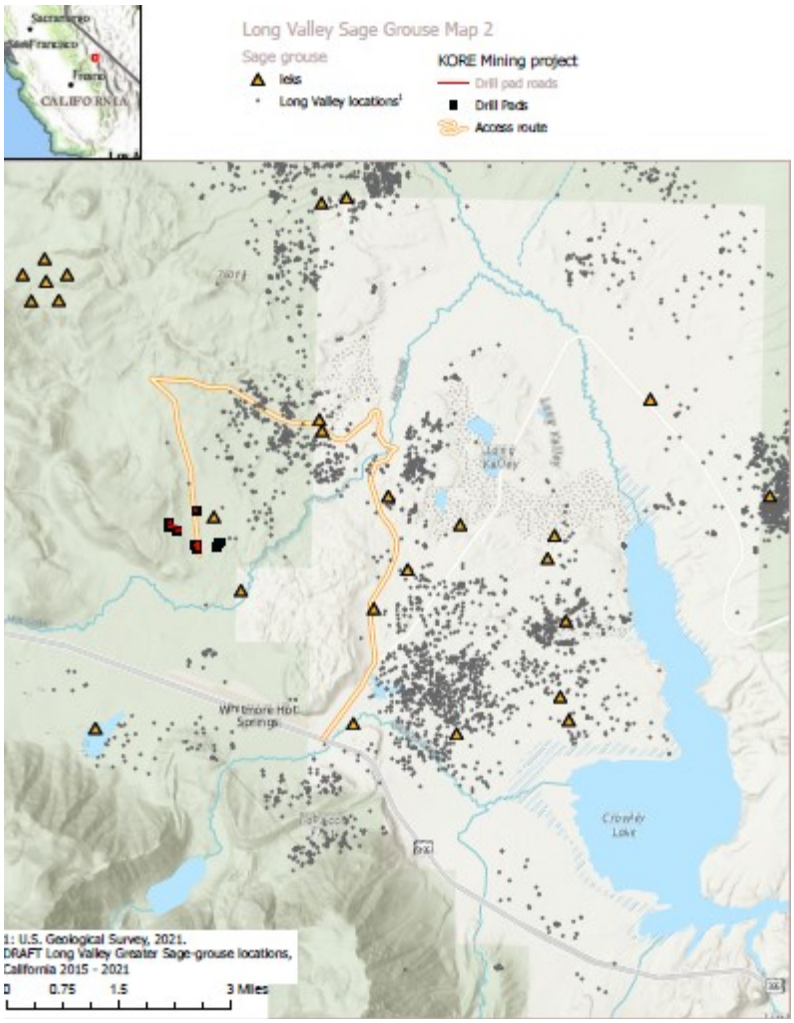

Figure 9. Mining Exploration Drill Pads and Access Roads in Long Valley and Sage-grouse Locations and Lek Locations (Source USGS 2021)

While three exploratory drilling projects (Bald Peak Gold Exploration, Hecla Nevada Sawtooth and Spring Peak) are proposed on the border of California and Nevada in the Bodie Hills, with all of the actual drilling occurring in Nevada, there may be road use and other impacts in California. It is unknown how this will affect the resident sage-grouse in the area. Bald Peak Gold Exploration (initially proposed by Radius Gold U.S. and now being implemented by Paramount Gold) north of Bodie Hills State Park in Mono County had a Mineral Prospecting Permit from the State Lands Commission from 2017-2018 and has indicated that it may apply for a Geological Survey Permit (GSP) from the State Lands Commission to explore the State Lands Commission's subsurface mineral rights in the near future, but to date has not applied for that permit. The Bodie Hills population of sage-grouse is currently the most robust population in the

Bi-state area and is used as the source population for sage-grouse translocations in the Bi-state area.[273]

5.6.4 Noise Impacts from Development

The industrial activities associated with energy and mineral development produce noise and vibration. These along with other human activities associated with development disrupt the habitat and life-cycle requirements of sage-grouse. All studies which assess impacts of energy development and mining on sage-grouse have found negative effects on populations and habitats.[274]

5.7 Climate Change

Climate change is resulting in warmer temperatures, altered precipitation amounts, altered precipitation timing, and will likely increase and compound negative effects to sagebrush and sage-grouse habitat.[275] The increasingly frequent large fires in sage-grouse habitat is one example of the ongoing effects of climate change (discussed above). Other significant threats to sage-grouse from climate change include changing precipitation patterns and the availability of water which affected utilization of leks (i.e. proximity of lek to mesic areas), nest site selection, and drought conditions resulting in overall reduced fitness for sage-grouse.[276] Climate models consistently project increases in temperature across sage-grouse habitat, with increases of 1–3°C (1.8–5.4°F) between 2020-2050 and 2–7°C (3.6–12.6°F) between 2070–2100.[277] Warmer temperatures will cause soils to dry out earlier in the year, resulting in longer periods of hot and dry conditions in summer that become more vulnerable to fire,[278] further exacerbating the fire/cheatgrass invasion cycle. All models project that spring temperature increases will be greatest in the central and southern part of the sagebrush's range, which include locations of most all of California's sage-grouse.[279]

In southwestern Wyoming, Homer et. al. (2015) analyzed precipitation and five remote sensing ecosystem sagebrush vegetation and soil components (bare ground, herbaceous, litter, sagebrush, and shrub) from 1984 to 2011 and documented an increasing trend in bare ground abundance over time while herbaceous, litter, shrub, and sagebrush showed a decreasing trend.[280] Total

[273] Coates et al. 2020
[274] Naugle et al. 2011: Blickley et al. 2012; Patricelli et al. 2013
[275] Remington et al 2021
[276] Wright, J.W. 2020
[277] Remington et al 2021
[278] IBID
[279] IBID
[280] Homer et. al. 2015

precipitation amounts also showed a downward trend and the study established statistically significant correlations between each sage-brush component and historical precipitation records.[281]

Using Intergovernmental Panel on Climate Change (IPCC) precipitation scenarios A1B and A2, they forecasted the abundance of the sagebrush components in 2050, and found that only bare ground increased while the vegetation and soil components all decreased, with litter having the greatest decrease of 4.1 and 4.2% under the respective scenarios.[282] Based on the ongoing megadrought,[283] these effects are likely occurring throughout the range of the California sage-grouse.

Riparian areas, wet meadows, seeps, springs, and other wetlands make up a small proportion of the sagebrush habitat, but they are essential to certain life stages of sage-grouse as discussed above, including summer brood rearing. Even if total precipitation changes little, temperature increases will increase plant evapotranspiration causing more soil dryness. Decreases in the proportion of precipitation falling as snow will change the amount of water available seasonally and will likely increase use of surface and groundwater by humans, further drying out riparian areas, wet meadows, seeps and springs.[284] These modeled changes in habitat, upon which California's sage-grouse rely, indicate further impacts to the birds that are crucial for reproductive success.

Pinyon-juniper expansion may also be facilitated by increases in global carbon dioxide (CO2) concentrations, and climate change, but the influence of CO2 has not been supported by some research (Archer et al. 1995).[285]

While modeled precipitation changes are less predictable, most models agree that greater precipitation will occur although most models project that the proportion of precipitation falling between May and October will decrease during important times for brood rearing. This will cause habitat loss and degradation, coupled with increased fire which are already impacting sage-grouse across the species' geographic distribution[286] and potentially increase disease.[287] Increased and exacerbated fires will lead to direct deaths of sage-grouse caught in these wildfires, as well as population declines resulting from reduced sagebrush habitat availability. As

[281] IBID
[282] IBID
[283] Williams et. al. 2022
[284] Remington et al 2021
[285] USFWS 2013a.
[286] USFWS 2013b
[287] Schrag et al. 2011, Walker and Naugle 2011

temperatures increase and if levels of rainfall generally decrease, the climate envelope supporting the sagebrush ecosystem will shift.[288] Some of these shifts, particularly in the southern half of the range, will likely occur at rates that challenge the ability of sage-grouse to adapt or effectively migrate.

5.8 Off-Road Vehicles

The impacts on sage-grouse from motorized recreation are well documented, with habitat impacts ranging from habitat loss, habitat fragmentation, invasive plant spread, induced displacement or avoidance behavior by sage-grouse, creation of movement barriers, noise, and direct encounters.[289]

5.9 Genetic Diversity

Because populations of sage-grouse in California have undergone large reductions in population numbers, they are likely to have lost genetic variation. Continued habitat loss and fragmentation has resulted in genetic structuring within the sage-grouse populations in California due to geographical isolation. Genetic diversity is necessary for a population to respond to environmental change (such as climate change), thus, loss of genetic variation could jeopardize the persistence of isolated sage-grouse populations.[290] Deleterious effects to demographic rates have been documented in California sage-grouse populations (see Parker Meadow translocation information below), a loss in genetic diversity has been associated with inbreeding and a reduction in reproductive fitness in other similar grassland birds.[291] Thus, loss of genetic variation, caused by habitat loss and fragmentation and other stressors, has a high probability of negatively impacting the long-term viability of sage-grouse populations in California.[292]

All of the populations of sage-grouse in California exist on the periphery of the species range. Extirpation of sage-grouse has already occurred in Siskiyou and Shasta counties in California. Taylor et al. (2012) identified three key vital rates that are important for population growth: female survival, chick survival, and nest success.[293] Populations in small, disjunct areas of occupied range, such as those in northeast California and in the Bi-State area, fit these conditions and continue to have a high risk of extirpation.[294]

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[288] Crist et al. 2013
[289] Knick et al 2011
[290] Shaffer 1981
[291] Frankham 1997; Bouzat et al. 1998
[292] Kardos et al. 2021
[293] Taylor et al. 2012
[294] Wisdom et al. 2011

The Bi-State population, which is geographically isolated on the southwestern edge of the species' range, shows genetic structure within the population.[295] Evidence points to isolation-by-distance. The genetic investigation revealed a north-south gradient of three subpopulations within the Bi-State population: the northern Pine Nut Mountains group, the mid Bi-State group, and the White Mountains group.[296] This genetic subdivision is likely the result of habitat loss and fragmentation from recent human activities and the encroachment of pinyon-junipers into the sagebrush habitat.[297]

In northeastern California, the genetics of sage-grouse at 13 different leks were analyzed and little genetic differentiation was found between leks, suggesting that gene flow occurs across the sampled region.[298] Lacking any substructure within the area, it also suggests that the northeastern population is a single genetic population despite population declines and habitat loss and fragmentation of habitat.[299] Isolation by distance was detected in the males of this population but not females indicating that the females were dispersing widely amongst the leks. Overall, the estimates of genetic diversity were comparable to published studies within the core of the species' distribution in Montana, Wyoming, Nevada, Oregon, and Idaho, and exhibited much greater diversity than the Bi-State sage-grouse in California.[300] Ongoing translocations in the prior ten years (2005-2015) of sage-grouse from southeast Oregon and northwest Nevada[301] may also have increased genetic diversity in the northeastern California peripheral and declining population.

The Bi-State sage-grouse translocation of sage-grouse into the Parker Meadow population was deemed necessary due to the lack of genetic diversity in the population that resulted in increasingly low numbers of birds coupled with infertility issues. The low numbers resulted in inbreeding and fewer nests successfully hatching exacerbating the infertility issues.[302] Translocations were implemented in the following years: 2017 (28 sage-grouse - 20 females, 8 males),[303], 2018 (20 sage-grouse – 13 females, 7 males)[304] and 2019 (20 sage-grouse - 15

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[295] Oyler-McCance et al. 2014
[296] IBID
[297] IBID
[298] Davis et al. 2015
[299] IBID
[300] IBID
[301] https://www.fws.gov/story/sage-grouse-population-and-habitat-recovery
[302] https://wildlife.ca.gov/Science-Institute/News/sage-grouse-relocation1
[303] Bi-State Technical Advisory Committee Nevada and California 2018.
[304] IBID

females, 5 males).[305] No translocations were done in 2020.[306] In later years translocations of broods were attempted, but no documented information is available on those efforts. All sage-grouse were translocated from the Bodie Hills PMU.

While translocation success has bolstered populations in some of the declining PMUs in the Bi-State population, key features in other sage-grouse translocations have included areas with gentle topography and high herbaceous cover. In Parker Meadows, translocation of sage-grouse was most successful in summer and with brood-rearing females.[307]

5.10 Disease

5.10.1 West Nile Virus

West Nile virus has reduced late summer survival of greater sage-grouse.[308] The virus has impacted some populations in the Bi-state area, for example, three radio-marked birds found dead in Mono County tested positive for this virus in 2004.[309] The impact is thought to be relatively low and localized at this time compared to other threats.[310] The future impacts of West Nile virus on already imperiled California sage-grouse populations is a potential looming threat to these populations, particularly as the effects of climate change progress.

6. INADEQUACY OF EXISTING REGULATORY MECHANISMS

While the greater sage-grouse populations have been monitored for decades, the ongoing declines are caused by escalating threats discussed above and inadequate conservation discussed below.

6.1 State Regulatory Mechanisms

To date, California has limited state-level protections in place for the conservation of the sage-grouse, despite population numbers that continue to decline and ongoing translocations occurring. Conservation of the California's sage-grouse requires enforceable, coordinated state action to mitigate the numerous, multifaceted threats that this species faces.

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[305] Bi-State Technical Advisory Committee Nevada and California 2019
[306] Bi-State Technical Advisory Committee Nevada and California 2020
[307] Picardi et al. 2022
[308] Naugle et al. 2005; Shuford et al.2008.
[309] Hall et al. 2008
[310] Bi-State Technical Advisory Committee Nevada and California 2012

Between 2018-2020, the federal administration called on states to take on the responsibility of protecting the greater sage-grouse within their state borders and actively initiated rollbacks of federal regulations protecting the greater sage-grouse—some of those rollbacks have since been found unlawful.[311] Below is a comprehensive list of existing protections for the greater sage-grouse within California and the reasons why each of these is insufficient to conserve the greater sage-grouse in the state.

6.1.1 Species of Special Concern

A Species of Special Concern (SSC) is a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not mutually exclusive) criteria[312]:

- is extirpated from the State or, in the case of birds, is extirpated in its primary season or breeding role;
- is listed as Federally-, but not State-, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed;
- is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
- has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

The California's sage-grouse is listed as a California Species of Special Concern ("SSC") by the Department of Fish and Wildlife. It has been ranked as second priority taxa (year round) and has been on this list since 1978.[313] The sage-grouse was included on the SSC list because of its significant range contractions in California and has numerous direct and indirect threats to sage-grouse and sagebrush habitat that reduce the extent and integrity of this habitat.

SSC is an administrative designation. The intent of designating SSCs is to focus attention on animals at conservation risk by the Department, other State, local and Federal governmental entities, regulators, land managers, planners, consulting biologists, and others; stimulate research on poorly known species; and achieve conservation and recovery of these animals before they meet California Endangered Species Act criteria for listing as threatened or endangered. While the sage-grouse's SSC designation marks the state's acknowledgement that the greater sage-

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311 *See W. Watersheds Project v. Schneider*, 417 F. Supp. 3d 1319 (D. Idaho 2019).
312 https://wildlife.ca.gov/Conservation/SSC
313 Hall et al 2008.

grouse is at conservation risk, the current status and on-going declines of greater sage-grouse in California demand further protection. As shown in this petition, greater sage-grouse meet CESA criteria for listing and therefore require an enforceable, coordinated conservation plan that an SSC designation does not provide.

6.1.2 State Wildlife Action Plan

In 2000, Congress enacted the State Wildlife Grant (SWG) program to support state government projects that broadly benefit wildlife and habitats, but particularly species of greatest conservation need (SGCN). As a trustee agency focused on safeguarding natural resources in California, the California Department of Fish and Wildlife (CDFW) manages funding from the Federal SWG program. To receive funding from this program, the United States Fish and Wildlife Service (USFWS) requires each state government to develop a comprehensive wildlife conservation strategy outlined in a State Wildlife Action Plan (SWAP).

A major component of the State Wildlife Action Plan is the identification of SGCNs in the State. The 2015 update to SWAP defined SGCNs to include all SSC in addition to listed species and those species particularly vulnerable to climate change. SGCNs (including SSCs) listed in the SWAP are eligible for conservation funding via State Wildlife Grant funds. SWAP 2015 includes threat assessments for habitats that support SGCNs and provide conservation goals and actions for these habitats.

Because the greater sage-grouse is a designated SSC in California, it qualifies as an SGCN. Under SWAP, greater sage-grouse received $601,499 in single-species grants from 2005-2014 (the most recent decadal reporting) through thirteen grants.[314] Grant-funded project outcomes included the collection of information and data.

The SWAP does not protect sage-grouse populations or their habitat. SWAP provides funding and recommends conservation goals for the protection of sage-grouse, as stated by the Department:

> "The SWAP 2015 and its companion plans are not regulatory documents. They are intended to provide a vision and a framework for conserving the state's natural heritage by prescribing, prioritizing and recommending actions to conserve these resources before they become more costly to protect."[315]

[314] Blue Earth Consultants 2015
[315] https://wildlife.ca.gov/SWAP/Final/Companion-Plans

Moreover, the only legal mandates within SWAP are grant funding for SGCN species, which have thus far provided population monitoring and other limited conservation programs for the protection of sage-grouse. Threats to California sage-grouse are multifaceted and numerous, and therefore require far greater state protection strategies. Notably, state and federal regulatory mechanisms for sage-grouse protection that existed on or prior to 2010, and include the 2005 SWAP funding, were evaluated by FWS and determined to be inadequate for the protection of greater sage-grouse.[316]

6.1.3 California Environmental Quality Act

The California Environmental Quality Act ("CEQA") is California's landmark environmental law and establishes a state policy to prevent the "elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities...." (Cal. Pub. Res. Code § 21001(c).) Towards this end, state and local agencies are required to analyze and disclose the impacts of any discretionary decision or activity. CEQA contains a substantive mandate that agencies should not approve projects as proposed if there are feasible alternatives or mitigation measures which would substantially lessen the significant environmental effects of such projects. (Cal. Pub. Res. Code § 21002.)

CEQA requires a "mandatory finding of significance" if a project may "substantially reduce the number or restrict the range of an endangered, rare or threatened species." (Cal. Code Regs., tit. 14, § 15065(a)(1).) CDFW has interpreted this provision to apply to SSC as defined above. CDFW further provides that SSC "should be considered during the environmental review process." (*Id*.; Cal. Code Regs., tit. 14, § 15380.) Thus, a potentially substantial impact on a SSC, threatened species, or endangered species could be construed as "per se" significant under CEQA. (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449.) And under CEQA, when an effect is "significant," the lead agency approving the project must make a finding that changes or alterations have been incorporated into the project to avoid or mitigate its significant impacts, or that such changes are within the responsibility of another agency, or that mitigation is infeasible. (Cal. Pub. Res. Code § 21081(a).) These provisions therefore provide some protections to species that are listed as species of special concern, threatened, or endangered.

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[316] USFWS 2010

CEQA also requires a "mandatory finding of significance" if a project may "substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community." (Cal. Code Regs., tit. 14, § 15065.) Moreover, CEQA's "Environmental Checklist" in Appendix G of the CEQA Guidelines characterizes a project's effects as "significant" if the project would "interfere substantially with the movement of any native [] wildlife species or with established native resident or migratory wildlife corridors...."While these provisions might theoretically offer some protection for California's sage-grouse, in practice they have not provided sufficient protection. Sage-grouse are listed as a SSC, such that a project that has the potential to significantly impact one of these populations may qualify as having a "significant effect" under a lead agency's interpretation of CEQA. In such case, CEQA's substantive mandate to adopt all feasible alternatives or mitigation measures may be triggered.

However, even when a lead agency acknowledges that an effect is "significant," CEQA allows a lead agency to adopt a "statement of overriding considerations" and approve a project if the agency finds that other factors outweigh the environmental costs of the project or that further mitigation is infeasible. (Cal. Code Regs., tit. 14, § 15093(b); Cal. Pub. Res. Code § 21081.) This means that even if a project may have a significant effect on a "wildlife population", an agency could interpret CEQA as still allowing approval of the project. CEQA therefore cannot be relied on to consistently protect the greater sage-grouse populations in California.

6.1.4 Natural Community Conservation Plans

The Department's Natural Community Conservation Planning (NCCP) program is an effort by the State of California, and numerous private and public partners, to take a broad-based ecosystem approach to plan for the protection and perpetuation of biological diversity. The NCCP program began in 1991 as a cooperative effort to protect habitats and species. It is broader in its orientation and objectives than the California and Federal Endangered Species Acts, as these laws are designed to identify and protect individual species that have already declined in number significantly.

An NCCP identifies and provides for the regional protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. Working with landowners, environmental organizations, and other interested parties, a local agency oversees the numerous activities that create the development of an NCCP. CDFW and the U.S. Fish and Wildlife Service provide the necessary support, direction, and guidance to NCCP participants. Currently 17 approved NCCPs (includes 6 subarea plans) have been approved and implemented. More than nine NCCPs are in various stages of planning (includes two subarea plans). Together

these NCCPs will cover more than 8 million acres provide conservation for nearly 400 special status species and a wide diversity of natural community types throughout California.[317] However, no existing or planned NCCPs specifically address the protection of greater sage-grouse or its habitat in California.

6.1.5 Hunting Regulations

Sage-grouse have been managed primarily as an upland game bird by the California Fish and Game Commission and California Department of Fish and Game (now Wildlife) since the first hunting season was held in northeastern California in 1853.[318] Declines in sage-grouse populations have led to several closures of the sage-grouse season in California over the past decades.

The take and use of sage-grouse in California is regulated under 14 CCR § 300 and 716. As outlined under these provisions, a limited number of hunting permits may be issued annually for greater sage-grouse, and that number is based on annual population surveys. California's Fish and Game Commission annually sets the hunting bag limit for greater sage-grouse, with recommendations on annual bag limit numbers provided by the Department of Fish and Wildlife via its population monitoring efforts.[319]

Under the current regulations, licensed hunting of sage-grouse is limited to four Area Open Zones: East Lassen, Central Lassen, North Mono, and South Mono zones. In any given year, the number of permits that the Department proposes to the Commission for each hunt zone is based on the size and trend of the spring breeding population in each hunt zone as indicated by lek counts conducted in March and April and will not exceed 5% of the projected fall population size. If the allowable harvest in any zone is 5 or fewer permits, the Department will recommend that no permits be issued for that zone. In addition to population size, the Department considers population trajectory in its recommendation, and will not recommend any permits for populations that are in decline and below the long-term average for that hunt zone.

Based on these factors, the Department has recommended decreased or no hunting permit limits for nearly a decade. The Department has not recommended issuing any permits in the Lassen hunt zones since 2012, the South Mono Hunt Zone since 2014 and the North Mono Hunt Zone since 2017 because of concerns about downward population trajectories and to allow these populations time to recover from the effects of wildfire and drought. The Department's approach

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[317] https://wildlife.ca.gov/Conservation/Planning/NCCP
[318] Sage-grouse are classified as resident upland game birds under Part 2, Chapter 1, Section 3500
[319] §203 of the California Fish and Game Code (FGC)

to estimating spring populations and projecting fall populations is designed to avoid errors that could lead to an overestimation of the population size.

More specifically in 2012, the Commission took emergency action because of the Rush Fire, which encompassed more than 272,000 acres almost entirely within the East Lassen Hunt Zone. The Commission decided to reduce the number of sage-grouse permits for both Lassen hunt zones to zero. Because of substantial breeding population declines following the fire, the Department has not recommended issuing any permits for either of the Lassen hunt zones since 2012.

Hunting permits were issued for both of the Mono hunt zones through 2013. The Department recommended no permits in the South Mono Hunt Zone beginning in 2014 because of declines in the breeding population following several years of drought. Hunting permits were issued in the North Mono Hunt Zone through 2016. The Department recommended no permits for the North Mono Hunt Zone in 2017 because of declines in lek counts.

Since 2017, the Fish and Game Commission has adopted quotas of zero for all sage-grouse hunting zones due to declining population estimates (See Figure 10).[320] The zero quotas have remained in effect through 2022.

[320] https://wildlife.ca.gov/Hunting/Upland-Game-Birds/Sage-Grouse

Greater sage-grouse lek count trends for northern California (Lassen County) and the Bi-State Distinct Population Segment (Mono County)

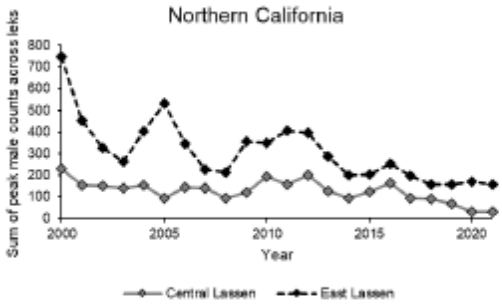

Figure 1: Sum of peak males per lek for the hunt zones in the northern California population of greater sage-grouse. Central Lassen (solid line) has declined from a recent peak of 199 males per lek in 2012 to 31 males per lek in 2021. East Lassen (dashed line) has declined from a peak of 404 males per lek in 2011 to 156 males per lek in 2021.

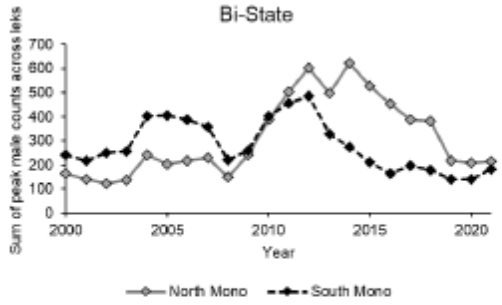

Figure 2: Sum of peak males per lek for the hunt zones in the Bi-State population of greater sage-grouse in California. North Mono (solid line) has declined from a recent peak of 624 males per lek in 2014 to 215 males per lek in 2021. South Mono (dashed line) has declined from a peak of 487 males per lek in 2012 to 180 males per lek in 2021.

Figure 10. Greater sage-grouse declines in Northern California and in the Bi-State area of California.[321]

If hunting resumes in the future due to increasing populations, it could still pose a threat to sage-grouse. Simply evaluating annual increases in sage-grouse populations is not an accurate indicator of overall species recovery, but must also factor in the years of significant population decline that the species has already occurred. Increasingly large fires in the northeastern range and ongoing drought throughout the range complicates the population dynamics, particularly when coupled with the other significant threats to California's sage-grouse discussed above.

[321] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=181983&inline

Therefore, current hunting regulations, even as recently administered, pose a threat to sage-grouse in California and do not provide adequate conservation protections.

6.2 Non-Regulatory State-level Actions

6.2.1 California Sagebrush Bird Conservation Plan

The Sagebrush Bird Conservation Plan was published in October 2005 by California Partners in Flight.[322] It has the following goals:

- Present an overview of the complex conservation issues affecting California's sagebrush habitats including altered fire regimes, loss of habitat, and woodland expansion.
- Promote the evaluation of impacts to landbirds when making planning decisions and carrying out management activities.
- Provide resources and technical support for land managers for the development of Resource Management Plans and updates and for the evaluation of management activities.
- Provide resources and technical support for foundations supporting conservation work, agencies, private land-owners, and conservation organizations.

The plan is located primarily in California's Great Basin, with a small portion in the Sierra Nevada. The plan provides recommendations to guide planning efforts and actions of land managers, expenditures of government and non-government organizations, and stimulate monitoring and research to support the conservation of landbirds, including the sage-grouse. However, the recommendations are all voluntary and unenforceable. It was also determined by the U.S. Fish and Wildlife Service to be inadequate to protect greater sage-grouse.[323]

6.3 Federal Regulatory Mechanisms

Greater sage-grouse population declines have been documented for years, which has spurred valuable research on causes of those declines, which are discussed above. Federal sage-grouse conservation regulations have been adopted and revised by various federal agencies with shifting political priorities. However effective federal-level conservation efforts for the greater sage-grouse across the United States, including in California is still inadequate as discussed below.

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[322] CalPIF 2005
[323] USFWS 2010

6.3.1 Federal ESA Listing Proposals for Greater Sage-Grouse

Federal listing for the greater sage-grouse and subpopulations including the Bi-State sage-grouse have been sought over the past two decades.[324] Currently the northeastern population in California has no federal ESA protections in place, and the Bi-State population is proposed to be listed as threatened with proposed critical habitat.

In 2013, the USFWS proposed to list the Bi-State sage grouse and designate critical habitat,[325] but USFWS withdrew that proposal in 2015. In 2018, a federal court found the withdrawal improper and reinstated the 2013 proposed listing.[326] In 2020, the USFWS again withdrew the proposed listing and on May 17, 2022, a federal court ruled that the USFWS illegally withdrew its proposal to list the bi-state sage-grouse as threatened under the Endangered Species Act. [327] The court again re-instated the USFWS' 2013 proposal to list the birds as threatened and ordered the USFWS to issue a new final listing decision.

6.3.2 BLM Mechanisms

6.3.2.1 Special Status Species

In California, sage-grouse have been designated by BLM as a BLM sensitive species.[328] BLM's Manual MS 6840 provides procedures to manage BLM sensitive species and their habitat.[329] Implementation includes:

> "On BLM-administered lands, the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat, by:
>
> 1. Determining, to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluating the significance of BLM-administered lands and actions undertaken by the BLM in conserving those species.

[324] See, e.g., USFWS 2010.
[325] USFWS 2013b
[326] USFWS 2015; *Survivors v. United States DOI*, 321 F. Supp. 3d 1011 (N.D. Cal. 2018).
[327] USFWS 2020; *Desert Survivors et al. v. US DOI et al.,* 2022 U.S. Dist. LEXIS 87794, 2022 WL 1539530, Case 3:20-cv-06787-JSC (N.D. Cal. May 16, 2022).
[328] BLM 2014
[329] BLM 2008

2. Ensuring that BLM activities affecting Bureau sensitive species are carried out in a way that is consistent with its objectives for managing those species and their habitats at the appropriate spatial scale.
3. Monitoring populations and habitats of Bureau sensitive species to determine whether species management objectives are being met.
4. Working with partners and stakeholders to develop species-specific or ecosystem-based conservation strategies (see .2D Agreements, Assessments and Cooperative Strategies for Conservation).
5. Prioritizing Bureau sensitive species and their habitats for conservation action based on considerations such as human and financial resource availability, immediacy of threats, and relationship to other BLM priority programs and activities.
6. Using Land and Water Conservation Funds, as well as other land tenure adjustment tools, to acquire habitats for Bureau sensitive species, as appropriate.
7. Considering ecosystem management and the conservation of native biodiversity to reduce the likelihood that any native species will require Bureau sensitive species status.
8. In the absence of conservation strategies, incorporate best management practices, standard operating procedures, conservation measures, and design criteria to mitigate specific threats to Bureau sensitive species during the planning of activities and projects. Land Health Standards should be used for managing Bureau sensitive species habitats until range-wide or site-specific management plans or conservation strategies are developed. Off-site mitigation may be used to reduce potential effects on Bureau sensitive species."

In California, BLM State Director designates all state-identified species of special concern (SSC) as BLM sensitive species which includes the greater sage-grouse.

In recognition of the greater sage-grouse as a special status species, the BLM Sage-grouse Habitat Conservation Strategy was published in 2004 to manage public land in such a manner as to maintain, enhance, and restore sage-grouse habitats while "providing for multiple uses of BLM administered land."[330] It was designed to support and promote range-wide conservation of sagebrush habitats for sage-grouse and other sagebrush-obligate wildlife species on public lands administered by the BLM. BLM has stated that this strategy no longer applies to California sage-grouse because the strategy only applies until the BLM and its partners (1) finalize and adopt the BLM State-Level Strategies and/or state wildlife agency-led Sage-grouse Conservation Plans, and/or (2) incorporate sage-grouse habitat objectives and conservation measures into appropriate

[330] BLM 2004

planning documents. In 2019, the BLM published its *Nevada and Northeastern California Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment*[331] which rolled back conservation from the 2015 Nevada and Northeastern California Resource Management Plan Amendment.[332] The 2019 plan was enjoined along with other plans that rolled back significant protections (see above). In November 2021, a Federal Register Notice of Intent To Amend Land Use Plans Regarding Greater Sage-Grouse Conservation and Prepare Associated Environmental Impact Statements was published that included northeastern California populations of the greater sage-grouse on BLM-managed lands.[333]

6.3.2.2 Bishop Resource Management Plan

While BLM's Bishop Resource Management Plan (RMP) was last revised in 1993, it specifically addresses the greater sage-grouse in the Bi-State area of California.[334] While it does provide some seasonal protection of leks, most of the RMP guidelines are vague, optional, open to interpretation and inadequate based on the science that has occurred in the last twenty-nine years. The Area Manager's Guidelines section states:

> "8. Actions that interfere significantly with efforts to maintain or enhance sage-grouse habitat will generally not be allowed."

Bishop RMP at pg.9

The Grazing Management Practices section states:

> "1. Salting and supplemental feeding locations will not be located within ¼ mile of riparian zones, aspen groves and meadows, or on sage-grouse strutting grounds, sensitive plant habitats or sites that are highly susceptible to soil erosion." …
> "3. Sheep bedding grounds will be designated, and will not be located within 1/4 mile of riparian zones, aspen groves, meadows and sage-grouse strutting grounds, or on sensitive plant habitats or sites that are highly susceptible to soil erosion."

Bishop RMP at pg. 11

The Range Improvement Project Development section states:

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[331] BLM 2019; BLM 2021a
[332] BLM 2015
[333] BLM 2021b
[334] BLM 1993

"1. Livestock watering and handling facilities (corrals, chutes, dipping vats, etc.) will normally not be located within 1/4 mile of riparian zones, aspen groves and meadows, or on sage-grouse strutting grounds, sensitive plant habitats or sites that are highly susceptible to soil erosion."
"2. Fences will not be located on sage-grouse strutting grounds or sites that are highly susceptible to soil erosion. Letdown fences will be constructed in areas where sage-grouse are susceptible to strikes on wire as they enter or leave a lek site."…
"11. Brush control will be prohibited on sage-grouse breeding complexes and wintering grounds."

Bishop RMP at pg. 11-12.

The Area Wide Decisions section states:

"Protect and enhance unique or important vegetation communities and wildlife habitats.
- Yearlong Protection within 1/3 mile of sage-grouse leks.
- Seasonal Protection within 2 miles of active sage-grouse leks from 5/1 to 6/30.
- No camping within 1/3 mile of sage-grouse leks from 3/1 to 6/30.
- Increase to 60% the amount of sagebrush habitat within 2 miles of leks that has optimum characteristics for sage-grouse. (Presently only 30% of sagebrush habitat has optimum characteristics for sage-grouse).
- Manage sagebrush-bitterbrush areas within 2 miles of sage-grouse leks to meet desired plant community goals." and

Bishop RMP at 17.

- Manage livestock use of sagebrush vegetation types within 2 miles of sage-grouse leks to achieve shrub structure and density characteristics more homogeneous (less patchy) than average. Horizontal cover (grass, forb and shrub combined) in these areas will range between 8 and 20%."

Bishop RMP at 22.

In the Bridgeport Valley Management Area Decisions section, the RMP states:

"Enhance wildlife habitat and watershed conditions with the following Desired Plant Community (DPC) prescriptions:
- Meet DPC goals on 1,780 acres (25%) of sagebrush-bitterbrush to provide cover and forage for mule deer and sage-grouse."

Bishop RMP at 27.

In the Bodie Hills Management Area Decisions section, the RMP states:

> "Seasonal Protection and no snowmobile use in sage-grouse wintering areas from 11/15 to 5/1.
> -Vehicle routes impacting sensitive plant habitats or areas where mule deer or sage grouse concentrate will be closed, seasonally closed or rerouted to improve and protect habitat.
> -Enhance wildlife habitat and watershed conditions with the following Desired Plant Community (DPC) prescriptions:
> - Meet DPC goals on 25,250 acres (50%) of sagebrush-bitterbrush to provide cover and forage for mule deer, pronghorn and sage-grouse."

Bishop RMP at 32

In the Bodie Hills Management Area Support Needs section, the RMP states:

> "Identify and implement closure or seasonal closure of vehicle routes impacting sensitive plant habitats or areas where mule deer or sage-grouse concentrate through the Coordinated Resource Management Planning process."

Bishop RMP at 33-34

In the Granite Mountain Management Area Decisions section, the RMP states:

> "Enhance habitat for sage-grouse, mule deer and pronghorn.
> -Enhance wildlife habitat and watershed conditions with the following Desired Plant Community (DPC) prescriptions:
> - Meet DPC goals on 8,570 acres (25%) of sagebrush-bitterbrush to provide cover and forage for mule deer, pronghorn and sage-grouse."

Bishop RMP at 36.

In the Granite Mountain Management Area Support Needs section, the RMP states:

> "Develop water sources in the Mono Basin and Granite Mountain areas for sage-grouse, mule deer and pronghorn.
> -Inventory sage-grouse wintering areas and strutting grounds."

Bishop RMP at 37.

In the Granite Mountain Management Area Rationale section, the RMP states:

> "The Granite Mountain Management Area has a number of significant resources including habitat for mule deer, sage-grouse and pronghorn, and an important visual background for the Mono Basin National Scenic Area. These decisions were selected because they will protect and improve wildlife habitat and watershed conditions enhance recreation opportunities, and protect visual resources near the Mono Basin National Scenic Area."

Bishop RMP at 37.

In the Long Valley Management Area Decisions section, the RMP states:

> "Protect crucial sage-grouse and mule deer habitats with the following measures:
> - Seasonal Protection and no snowmobile use in sage-grouse wintering areas from 11/15 to 5/1.
> - Manage livestock use to enhance meadow habitat for sage-grouse on the Hot Creek and Wilfred Creek allotments.
> - Acquire up to 475 acres of private land to protect sage-grouse habitat.
> Enhance wildlife habitat and watershed conditions with the following Desired Plant Community (DPC) prescriptions:
> - Meet DPC goals on 1,1 00 acres (25%) of sagebrush-bitterbrush to provide cover and forage for mule deer, pronghorn and sage-grouse."

Bishop RMP at 39.

In the Long Valley Management Area Support Needs section, the RMP states:

> "Prepare a Habitat Management Plan for sage-grouse in cooperation with the California Department of Fish and Game, Inyo National Forest, and City of Los Angeles Department of Water and Power.
> -Coordinate with Mono County to protect sage-grouse habitat."

Bishop RMP at 39.

In the Long Valley Management Area Rationale section, the RMP states:

> "The Long Valley Management Area contains crucial habitats for mule deer, sage-grouse, and other wildlife. There is tremendous potential to enhance recreation opportunities and increase visitor use. These decisions will protect the Integrity of the mule deer migration corridor and sage grouse leks. The decisions were also selected to enhance recreation opportunities and reduce the Impacts of recreation and other activities on sensitive wildlife species."

Bishop RMP at 39-40.

In the Benton Management Area Decisions section, the RMP states:

> "Protect crucial sage-grouse and mule deer habitats with the following measures:
> - Seasonal Protection of sage-grouse wintering areas from 12/1 to 5/1."

Bishop RMP at 40.

In the Livestock Grazing Decisions – Grazing Management Practices section, the RMP states:

> "3. Sheep bedding grounds will be designated and will not be located within 1/4 mile of riparian zones, aspen groves, meadows, or on sage-grouse strutting grounds and sites that are highly susceptible to soil erosion."

Bishop RMP at 54.

In the Livestock Grazing Decisions – Grazing Management Practices for the Bridgeport Valley Management Area section, the RMP states:

> "1. The management goals for the Dog Creek and Green Creek allotments are to maintain a maximum sustained yield of livestock forage as well as to improve wildlife habitat (sage-grouse and mule deer) by reducing season of use conflicts. A deferred grazing system will be applied as part of a moderate amount of management concern (Class M). Allocation goals and conditions are identified in Table 4, Appendix 4."

Bishop RMP at 56.

In the Livestock Grazing Decisions – Grazing Management Practices for the Long Valley Management Area section, the RMP states:

> "4. The U.S. Forest Service will manage grazing on allotment 6018 to meet the following vegetative goals:
>
> d. Succulent plants will be adequately available to sage-grouse during the brood rearing period June 15 – July 31….
>
> 6. Manage allotment 6022 to obtain a good ecological condition of meadows for sage-grouse habitat; defer grazing of public lands in this allotment until June 1 of each year."

Bishop RMP at 60.

In Appendix A1 of the RMP, the parameters for the Desired Plant Community for Big Sagebrush/Bitterbrush in the Long Valley Management Area are defined as:

> "Desired plant community description for the big sagebrush *(Artemisia tridentata)/*bitterbrush *(Purshia tridentata)* vegetation type: The goal is to maximize vegetative habitat characteristics for sage-grouse, a management indicator species. The description applies to the various vegetative components within a 2 mile radius of a strutting ground (lek). The area up to 1 mile from a lek would be managed for 30-40% shrub canopy cover. The area from 1-2 miles from a lek would be managed for 20-50% shrub canopy cover. Within the 2 mile radius, big sagebrush and bitterbrush height would range between 12-14" over 60% of the area with a density of 1 plant for every 4-9 ft2 and include a grasslike understory of 1 plant per 0.75 ft2. Preference would be given to sage-grouse habitat needs where mule deer and sage-grouse habitat overlap."

Bishop RMP at Appendix A1-3.

In Appendix A1 of the RMP, the parameters for the Desired Plant Community for Big Sagebrush/Bitterbrush in the Bodie Hills and Bridgeport Valley Management Areas are defined as:

> "Desired plant community description for the big sagebrush *(Artemisia tridentata*)/bitterbrush *(Purshia tridentata)* or big sagebrush/bitterbrush/aspen *(Populus tremuloides)* vegetation type: The goal is to maximize vegetative habitat characteristics for management indicator species like sage-grouse and mule deer. The DPC will apply to those areas identified as habitat for sage-grouse and mule deer on the GIS resource maps. For sage-grouse the description applies to the various components of the vegetation within 2 miles of a strutting ground (lek). Dense brushy areas up to 1 mile from a lek would be managed for 30-40% shrub canopy cover. The area from 1-2 miles from a lek would be managed for 20-50% shrub canopy cover. Within the 2 mile radius, big sagebrush and bitterbrush height would range between 12-14" over 60% of the area with a density of 1 plant for every 4-9 ft2 and include a grasslike understory of 1 plant per 0.75 ft2. Preference would be given to sage-grouse habitat needs where mule deer and sage-grouse habitat overlap."

Bishop RMP at Appendix A1-3.

While the Bishop RMP provides guidance to help protect sage-grouse habitat, public records could not be located to ensure that habitat parameters are being regularly monitored and there are no triggers for actions if the habitat parameters are not meeting standards are identified. It is unclear if required yearlong and seasonal protections are enforced. The identified buffers for protection of sage-grouse require updating, based on the increase in scientifically available data that is currently available.

6.3.2.3 Eagle Lake Resource Management Plan

The Eagle Lake Resource Management Plan[335] and Record of Decision[336] adopted the following actions to benefit greater sage-grouse:

The Vegetation section states:

- "Restore Wyoming and mountain big sagebrush ecosystems containing sage-grouse habitat by treating no more than 20% of the habitat acres during a 30-year period, to protect important habitat areas."

Eagle Lake RMP at 10.

The *Sagebrush Ecosystems and Sagebrush Obligate/Associated Species* section states:

- "Implement actions from the 2006 *Conservation Strategy for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit.*
- Reduce the encroachment of western juniper and noxious weeds in sagebrush communities.
- Implement seasonal protection measures and buffer zones for ground disturbing practices, to protect habitats.
- Implement timber and fuels treatments to maintain and improve habitat.
- Avoid practices that permanently convert sagebrush habitat to non-native grassland or agricultural land."

Eagle Lake RMP at 13.

The Eagle Lake Approved RMP –Monitoring Plan identifies RMP Goals/Objectives that reference sage-grouse as follows:

In Vegetation – Native Plant Communities section, the RMP Goal/Objective states:

> "Restoration of degraded or decadent shrub-steppe communities will be prioritized in areas that will quickly recover to the desired plant community, and in areas where restoration would enhance important wildlife habitat (i.e. riparian areas, pronghorn kidding grounds, and sage-grouse brood rearing sites)."

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[335] BLM 2007a
[336] BLM 2008b

Eagle Lake RMP at Appendix A pg. A-7

In the Wildlife and Fisheries section, the RMP's Goal/Objectives states:

> "Habitats of federally listed (endangered, threatened, or candidate), state-listed and BLM sensitive wildlife will be protected, restored, and maintained so that species populations are maintained, or increased in size and stability, and occupy available habitats. The Eagle Lake Field Office will provide diverse and healthy habitats for native wildlife species. Habitats will conform to land health standards, guidelines for livestock grazing, and other BLM policies and guidelines. Habitat conditions will demonstrate fulfillment of life-cycle requirements for native species and their reproductive success."

The Methodology to be used section states:

> "Monitor BLM proposed and authorized actions to ensure they are consistent with the Bureau's Special Status Species Management Policy, BLM Manual 6840, and to ensure they are consistent with the objectives and guidelines outlined in the RMP. In conjunction with other federal, state, or private agencies, continue to monitor wildlife populations in the planning area. Do this for individual species such as bald and golden eagles, sage-grouse, deer, and pronghorn; and groups of species associated with source habitats such as sagebrush-steppe, juniper, and mixed conifer forest."

Eagle Lake RMP at Appendix A pg. A-9

While the Eagle Lake RMP provides some general guidance to help protect sage-grouse habitat, no quantifiable standards or triggers for actions are identified if the habitat parameters are not meeting standards. While the Eagle Lake RMP relies on the 2006 *Conservation Strategy for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit*, this plan also falls short of the necessary requirements to stop the ongoing decline of sage-grouse in this area (see below at 6.3.3.1).

6.3.2.4 Alturas Resource Management Plan

The 2007 Alturas RMP recognizes that "the decline of sage-grouse populations in the western United States has triggered BLM national, state, and local strategies with new guidance to

address habitat requirements of the species"[337], and the Record of Decision[338] incorporates the following Management Actions:

> "Incorporate guidelines from the *Sage-Grouse Conservation Strategy* to restore sage-grouse habitat in Wyoming and mountain big sagebrush ecosystems."

Alturas RMP at ES-10 and 1-2.

While important to sage-grouse other habitat types are important during specific phases of sage-grouse's lifecycle. For example, forbs and insects are important in late brooding.

The Sagebrush Ecosystems and Sagebrush-Obligate Species Management Actions section of the RMP states:

> "Restore natural disturbance processes (such as fire) by implementing fuels treatments, including prescribed fire and thinning projects, in accordance with conservation strategies for Sage-Grouse."

Alturas RMP at ES-13. And specifically for sage-grouse the Decision states:

> "Implement locally developed strategies found in *Conservation Strategies for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle, Likely Tablelands/Rocky Prairie and Devil's Garden/Clear Lake Population Management Units*. Utilize translocation to augment low populations in conjunction with habitat management projects."

Alturas ROD at 15.

Section 2.3.4 Leasable Minerals defines terms applicable to standards and restrictions applicable to leasable minerals as follows:

> "***Surface Use and Occupancy Requirements*:** These identify minimum standards and buffer distances for activities involving mechanical surface disturbance. Surface use and occupancy requirements (Appendix K) are designed to protect important natural resources (e.g., sage-grouse leks and nesting habitat) or manmade features (e.g., recreation sites)."

Alturas RMP at 2-14

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[337] BLM 2007b
[338] BLM 2008c

The Land Tenure Adjustment Program modified the Madeline disposal area to focus on acquisitions and retention of the southern half of the area, which at the time of the RMP had no public lands for the objective of acquiring important sage-grouse habitat. (Alturas RMP at 2-33.) It is unclear if any acquisitions in this area have occurred.

Regarding grazing practices the RMP states:

> "These [grazing] adjustments would be focused on improving the health, vigor, and reproduction of native rangelands and unique plant communities (aspen, curlleaf mountain mahogany, oak woodlands) and improving important wildlife habitat for identified species (e.g., sage-grouse, ungulates)."

Alturas RMP (at 2-39) and

> "Grazing practices that degrade key wildlife habitats and alter the natural vegetation would be avoided. An especially important area is the eastern portion of the Likely Tablelands. Livestock grazing practices would be modified in applicable allotments to improve sage-grouse habitat, based on guidelines set forth in BLM conservation strategies for the *Sage-Grouse and Sagebrush Ecosystems in the Buffalo-Skedaddle, Likely Tablelands/Rocky Prairie, and Devil's Garden/Clear Lake Population Management Units*."

Alturas RMP at 2-39.

While the Alturas RMP identifies some "Typical modifications to grazing strategies", none are specific to sage-grouse.

The RMP also states:

> "Motor vehicles would be 'Limited to Designated Routes' (on a total of 48,910 acres) in the Cold Springs area to protect sensitive sage-grouse habitat (especially brood-rearing areas) and old growth juniper."

Alturas RMP at 2-77, which appears to provide little or no additional protections because motorized use is already restricted to designated routes unless specific exceptions apply.

The RMP states:

> "The Hayden Hill sage-grouse territory (200 acres) would be 'Seasonally Closed' to motor vehicles from March 1 through May 15 to protect sage-grouse breeding habitat. The area would be 'Limited to Existing Routes' during the remainder of the year."

Alturas RMP at 2-79, which provides some limited protection for the lek and nearby habitat, but may not adequately protect the nesting and critical chick foraging areas.

In Section 2.17.2.4 one Management Action states:

> "Restore sagebrush communities on sites that have potential and where ecosystem fragmentation can be prevented. Incorporate guidelines from the sage-grouse conservation strategy in vegetation treatments and habitat restoration projects conducted in sage-grouse habitats."

Alturas RMP at 2-90, however as described in section 5.3.1.1 of this document, restoration of sagebrush is a very challenging and expensive action, so it is unclear where and when funding would be available.

The Alturas RMP commits to monitoring the sage-grouse in conjunction with state, federal and other conservation partners (Alturas RMP at 2-124), but it does not identify the frequency or effort for monitoring. Monitoring is useful but has been done inconsistently in the area, most importantly, monitoring alone does not provide the necessary increased protection of sage-grouse and its habitat.

In the Alturas RMP, Table 2.24-1 Juniper Management Strategy for Wildlife Habitat identifies varying desired ratios for "forage/cover" (i.e. percent wildlife foraging area versus juniper cover) for four areas specific for sage-grouse (Likely Tablelands [99/1], McDonald Mountain [90/10], Rocky Prairie [85/15]and East of 395 [90/10]) (at 2-127). It is unclear if the ratios have been implemented or achieved or the outcome for the benefit of sage-grouse use in the areas.

The Alturas RMP at Section 2.24.5 Group 4. Sagebrush Ecosystems and Sagebrush-Obligate/Associated Species provides Goals (2.24.5.2) at Objectives (2.24.5.3) that are admirable. Proposed Management Actions for Group 4 state:

> Management plans and actions for all resource areas must support BLM land health standards. With respect to the wildlife resource, Standard 5 (biodiversity) has the greatest practical significance. This standard requires that:
>
> • Wildlife habitats must include seral stages, structural diversity, and (habitat) patch size capable of supporting diverse and viable wildlife populations.
> • Variety in vegetation age class must be present for most species of wildlife.
> • Vegetation must be sufficiently vigorous to maintain desirable (wildlife) population levels, and ensure adequate reproduction and recruitment of plants and animals when favorable events occur.

• Habitat areas must be of sufficient overall size to support diverse and viable populations and must also be sufficiently interconnected with other, similar habitat areas to ensure genetic exchange between populations.
• Non-native plants and animals must not exceed acceptable levels.

Species-specific management for sagebrush-obligate wildlife would be as follows:

• **Sage-grouse:** Specific conservation measures have been developed for local sage-grouse populations and habitats; i.e., "Conservation Strategies for Sage-grouse and Sagebrush Ecosystems in the Buffalo- Skedaddle, Likely Tablelands/Rocky Prairie, and Devil's Garden/Clear Lake Population Management Units." The actions specified in this plan will be implemented, and some populations will be augmented following habitat rehabilitation."

Alturas RMP at 2-128 to 2-129. It is unclear if the actions in the Conservation Strategies have been implemented, and despite augmentation of some populations, the trend remains downward.

6.3.2.5 Surprise Resource Management Plan

The 2007 Surprise RMP recognizes that "the decline of sage-grouse populations in the western United States has triggered BLM national, state, and local strategies with new guidance to address habitat requirements of the species".[339] *The executive summary and the Record of Decision*[340] *includes some of the guidance specific to sage-grouse including:*

- Raptor perch sites would be minimized on fences and water developments in important *sage-grouse habitat.*

Surprise RMP at ES-6.

- *Locally developed conservation strategies or plans developed for sage-grouse, pygmy rabbit, burrowing owl and other special status species would be used to identify high-priority treatment and fire suppression areas.*

Surprise RMP at ES-12,

[339] BLM 2007c
[340] BLM 2008d

In "Issue Area 14: How will fish, wildlife, and special status species be managed?" the RMP only states, BLM will consider specific concerns including sage-grouse conservation strategies.

Surprise RMP at pg. 1-12.

For all issue areas, the 2007 Surprise RMP includes as guidance documents:

- Conservation Strategy for Sage-Grouse (Centrocercus urophasianus) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (Northern California Sage-Grouse Working Group, 2006); and
- Greater Sage-Grouse Conservation Plan for Nevada and Eastern California, First Edition (2004), including the Vya and Massacre Conservation Strategies

However, the Surprise RMP does not commit to comprehensive implementation of the recommendations in those documents, but just guidance.

Instead, some recommendations are included in the RMP as follows:

For Sagebrush Ecosystems and Sagebrush Obligate Species including sage-grouse, several additions were make including:

> • Clarification of text in how Sage-Grouse Conservation Strategies will be implemented to promote sage-grouse habitat.
> • Additional impact analysis of sage-grouse habitat.
> • Additional text describing how important sage-grouse habitats will be protected during fuels management projects.

Section 2.3.3 Leasable Minerals states:

> "Seasonal restrictions would apply on land with sensitive wildlife habitats (i.e., within 0.25 mile of greater sage-grouse leks, known raptor nesting sites, and pronghorn kidding grounds)."

Surprise RMP at pg. 2-12.

Section 2.4.5 Proposed Management Actions for Wildland fire management states

> "A full suppression AMR will be used in sage-grouse R-O habitat, as directed in the Sage-grouse Conservation Strategies for the Buffalo-Skedaddle, Vya, and Massacre Population Management Units."

Surprise RMP at pg. 2-20.

Section 2.6.5 Proposed Management Actions for Fuel Reduction states:

> "Fuels projects would not be undertaken in low sagebrush communities, particularly in known sage-grouse or pygmy rabbit habitats, unless needed to meet specific habitat objectives."

Surprise RMP at pg. 2-29.

Section 2.7.2.5 Proposed Management Actions For Right-of-Ways states:

> "all greater sage-grouse habitat and other species critical habitat would be designated as ROW exclusion zones, except ROWs needed to provide reasonable access to non-federal inholdings."

Surprise RMP at pg. 2-32.

While the Surprise RMP (at pg. 1-19) states "new language was added to assure consistency between livestock grazing and the Vya, Massacre, and Buffalo-Skedaddle Sage-grouse Conservation Strategies." The sage-grouse specific language in Section 2.8 Livestock Grazing only includes "Raptor perch sites would be minimized, especially on fences and water developments in important sage-grouse habitat."

Surprise RMP at pg. 2-39.

Two ACEC's include sage-grouse leks – the Bitner ACEC and the Rahilly-Gravelly ACEC – and both are open to grazing. The Rahilly-Gravelly ACEC "has one active sage-grouse breeding display sites (leks). If needed, restrictions would be placed within the ACEC to avoid disturbance of these birds during the breeding season and measures would be taken to preserve these and other habitats important to sage-grouse."

Surprise RMP at pg. 2-50.

Section 2.15.5 Proposed Management Actions for Vegetation states:

> "[vegetation] Treatments would be prioritized in areas where restoration would enhance special habitat, such as riparian areas, pronghorn kidding grounds, and sage-grouse brood rearing sites, and areas in which there is high potential to increase livestock grazing authorizations would be prioritized."

Surprise RMP at pg. 2-63.

Section 2.22.6.4 Proposed Management Actions for Group 4 includes the following actions for sage-grouse:

> • Use locally developed plans or conservation strategies to identify and manage high-priority treatment areas (including fire suppression areas, utilities and rights-of-way, land tenure decisions) for sage-grouse, pygmy rabbit, and other sagebrush-obligate special status species.
> • Implement the Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit (PMU) (Northeast California Sage-Grouse Working Group, 2006). Essential components of this document include protection, restoration, monitoring, research, and ongoing adaptive management for sage-grouse and sagebrush ecosystems within the management unit.
> • Implement the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California, First Edition (2004), including the Vya and Massacre Conservation Strategies.
> • Implement strategies and actions from "Partners in Flight—Birds in a Sagebrush Sea" and other BLM approved conservation plans specifically developed for this biome.
> • Conduct juniper reduction programs to enhance species composition and understory vegetation, and provide structural and age-class diversity in sagebrush ecosystems.

Surprise RMP at pg. 2-92.

Table 2.22-1 General Guidelines for Seasonal Restrictions and Distance Buffers in Special Wildlife Habitats includes specifically for sage-grouse:

- Within 2.0 miles of leks, Avoid/eliminate structural raptor perches & protect sagebrush cover, year round
- Within 0.3 mile of leks, Reduce human activity in early morning and late evening, Mar. 1 – May 15

With a footnote that states "Additional site-specific recommendations are found in local and national conservation plans and in other nationally approved guidance for sage-grouse."

Surprise RMP at pg. 2-98.

While all of these conservation measures are useful to preserve habitat and conserve the sage-grouse, they do not provide the required protections that the sage-grouse need in this area. Despite translocations and implementation of these measure over the last 14 years, the population is still in decline.

6.3.2.6 Nevada and Northeastern California Resource Management Plan Amendments

In response to the potential listing of the greater sage-grouse throughout its range, including in northeastern California, RMPs were amended to provide additional protections for sage-grouse. The amendments (RMPAs) affected the RMPs for BLM California Field Offices of Applegate (Alturas and Surprise) and Eagle Lake and were originally finalized in 2015.341 It identified Priority Habitat Management Areas (PHMAs), General Habitat Management Areas (GHMAs) and Other Habitat Management Areas (OHMAs) where Goals, Objectives and Management Decisions were identified for implementation through program areas including:

- Special Status Species **(SSS)**
  - – greater sage-grouse
  - – Disease
  - – Predation
  - – Adaptive Management
- Vegetation **(VEG)**
  - – Sagebrush Steppe
  - – Conifer Encroachment
  - – Invasive Species
  - – Riparian and Wetlands
- Fire and Fuels Management **(FIRE)**
  - – Pre-Suppression
  - – Suppression
  - – Fuels Management
  - – Post-Fire Management
- Livestock Grazing **(LG)**
- Wild Horses and Burros **(WHB)**
- Minerals Resources **(MR)**
  - – Fluid Minerals
  - – Locatable Minerals
  - – Salable Minerals
  - – Nonenergy Leasable Minerals
  - – Mineral Split-Estate
- Renewable Energy (Wind and Solar; **RE**)

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[341] BLM 2015

- Lands and Realty **(LR)**
  - – Utility Corridors and Communication Sites
  - – Land Use Authorizations
  - – Land Tenure
  - – Recommended Withdrawals
- Recreation and Visitor Services **(REC)**
- Travel and Transportation **(TTM)**
- Cultural Resources **(CUL)**
- Mitigation (MT)

RMPA at 2-2.

Table 2-1 of the RMPA provides a general overview of management in the HMAs

Table 2-1 is a summary of the allocation decisions presented for each GRSG habitat management area.

Table 2-1
Summary of Allocation Decisions by GRSG Habitat Management Areas

Resource	PHMA	GHMA	OHMA
Land tenure	Retain	Retain	Retain/dispose
Solar	Exclusion	Exclusion	Exclusion
Wind	Exclusion	Avoidance	Open
Major ROWs	Avoidance	Avoidance	Open
Minor ROWs	Avoidance	Open	Open
Oil and gas	Open with major stipulations	Open with minor stipulations	Open with standard stipulations
Geothermal	Open with major stipulations	Open with minor stipulations	Open with standard stipulations
Nonenergy leasables	Closed	Open	Open
Salable minerals	Closed	Open	Open
Locatable minerals	SFA = recommend withdrawal Other PHMA = open	Open	Open
Travel management	Limited	Limited	Open
Livestock grazing	Open	Open	Open

While the RMPA tried to standardize management throughout the range of the greater sage-grouse and incorporate recent science, it still fell short of the necessary habitat protections, and was subsequently challenged in federal court.

From 2015 through 2018, four "Plan maintenance actions" were applied to the 2015 RMPAs as follows:

1. Plan maintenance action 1 corrects Table 1-3 including increasing PHMA acres in Lassen County (from 278,800 to 282,100 acres) and decreasing PHMA acres in Modoc (from 93,400 acres to 56,900 acres)[342]
2. Plan maintenance action 2 replaces an incorrect Figure 2-2 in Appendix A of the RMPA with the correct Figure.[343]
3. Plan maintenance action 3 replaces the first paragraph of MD SSS 2 E.(PHMA) on page 2-8 and MD SSS 3 D (GHMA) on page 2-10 of the RMPA to include the following language for clarity:

   > "Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG**,** to prevent disturbances to GRSG during seasonal life-cycle periods. "

   Evidently, there was confusion in the original language about the application of seasonal restrictions.[344]
4. Plan maintenance action 4 adds a section on how Habitat Objective Tables are to be used as follows:

   > "The Habitat Objectives Tables are to be used:
   > • To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments
   > • To evaluate land use plan effectiveness for sage-grouse conservation, and
   > • As a basis to develop measurable project objectives for actions in SLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.
   > References:

   U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1.
   https://www.blm.gov/sites/blm.~ov/files/uploads/Media Library BLM Policy h4 l 80-l .pdf[345]

In 2019, a new set of RMPAs that included northeastern California were finalized.[346] The amendments rolled back many of the established protections from the 2015 RMPAs including rejecting compensatory mitigation for impacts to sage-grouse habitat along with other regressive management.

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[342] Plan maintenance Action #1
[343] Plan Maintenance Action #2
[344] Plain maintenance Action #3
[345] Plan maintenance Action #4
[346] BLM 2019

In 2019, conservation organizations challenged the 2019 RMPAs, and the federal court issued a preliminary injunction reverting back to the 2015 RMPAs. In late 2021, the Department of the Interior re-opened the amendment process and will be revisiting the plan amendments across ten states including northeastern California.[347] A series of public hearings commenced in early 2022. A Scoping Report for the Potential Amendments to Land Use Plans Regarding Greater Sage-Grouse Conservation was published at the end of June 2022.[348] The BLM intends to move forward analyzing seventeen issues in an Environmental Impact Statement in the future. With the on-going declines in the California populations, the outcome of this effort is unclear.

6.3.2.7 Greater Sage-grouse Plan Implementation

In 2021, the BLM produced the Greater Sage-grouse Plan Implementation – Rangewide Monitoring Report 2015-2020[349] using PHMAs within biologically significant units (BSUs) for plan implementation, data analysis, and reporting in California. The monitoring results are to answer the following four questions:

1. Is this plan meeting the sage-grouse habitat objectives?
2. Are sage-grouse areas within the land use plan [area] meeting, or making progress towards meeting, land health standards, including the Special Status Species/wildlife habitat standard?
3. Is the plan meeting the disturbance objective(s) within sage-grouse areas?
4. Are the sage-grouse populations within this plan boundary and within the sage-grouse areas increasing, stable, or declining? [350]

Appendix 7 of the report is specific to California. To address the four questions, BLM California used a four factor method:

1. Habitat Conditions, as Articulated in the Habitat Objectives for GRSG (table 2-2) and Adaptive Management Habitat Triggers
   1.1. Habitat conditions statewide
   1.2. Habitat conditions within GRSG seasonal habitats
   1.3. Habitat conditions – adaptive management habitat triggers
   1.4. Land Health Standards (LHS) Evaluations
2. Surface Disturbance in PHMA

[347] BLM 2021b
[348] BLM 2022
[349] Herren et al. 2021
[350] IBID

3. GRSG Population Trends (in cooperation with the California and Nevada state wildlife agencies)

The report concludes the following from the collected data, addressing the original four questions:

1. Are the plans meeting the GRSG habitat objectives?

- "For this monitoring report, the data have not been combined in a way that provides the opportunity for interpretation of the data with respect to habitat quality. BLM policy directs the field to use the data collected for these habitat indicators as a whole when assessing suitability of GRSG habitat."
- **"Nesting and Early Brood-Rearing**
  The indicators for nesting and early brood-rearing include sagebrush cover, perennial and annual grass cover, and total shrub cover. Monitoring data in PHMA shows that 80 percent of plots are not meeting desired conditions for shrub cover of 20 percent or higher. The majority of plots were also not meeting desired conditions for annual grass and total shrub cover."
- **"Late Brood-Rearing and Summer Habitat**
  Nearly half of the plots are meeting the desired condition for sagebrush cover (10-25%) and perennial forb and grass cover (>15%) in both PHMA and GHMA. However, over 90 percent of plots in PHMA and GHMA are not meeting perennial forb cover on mesic sites."
- **"Winter Habitat**
  Sagebrush cover is not meeting desired conditions on 80-90 percent of plots in PHMA and GHMA. Sagebrush height above annual snow is meeting desired conditions on approximately 50-65 percent of sites in PHMA and GHMA. This indicator will be variable dependent on yearly average snow falls and is being based on a model versus on the ground data collection."

Report at A7-26 to A7-27.

2. Are GRSG HMAs within the land use plan area meeting, or making progress towards meeting, land health standards, including the Special Status Species/Wildlife habitat standard?

"Of the six of allotments that contain GRSG habitat with completed Land Health Standard evaluations since 2015, four are meeting the land health standards and two are making progress towards meeting the standards."

Report at A7-28.

3. Is the plan meeting the disturbance objective(s) within GRSG HMAs?

> "The monitoring and disturbance data presented in the results section of this report indicates that BLM California did not authorize disturbance in PHMA from 2015-2019 and the amount of disturbance within the planning area has remained well below the 3 percent disturbance cap at the project level and BSU scales as described in the LUPA."

Report at A7-28.

4. Are the GRSG populations within this plan boundary and within the GRSG HMAs increasing, stable, or declining?

> "On BLM managed lands in northeastern California there has been a steady decline in GRSG populations from 2016 through 2019. Northern California populations have declined over 50 percent (per. Communication CDFW 2020)."

Report at A7-28.

Despite implementation of the 2015 RMPA in Northeastern California, the habitat is deficient in providing adequate resources for sage-grouse as documented by the plot data results and the population is in significant decline. The mechanisms envisioned to prevent further declines are not working and further protections are needed to prevent ongoing declines.

6.3.3 Forest Service Land (and Resource) Management Plans

In California, four national forests – Inyo, Humboldt-Toiyabe, Lassen and Modoc – have Land Management Plans that address sage-grouse in California

6.3.3.1 Humboldt-Toiyabe National Forest Land and Resource Management Plan

The Humboldt Toiyabe ("H-T") National Forest Land and Resource Management Plan (LRMP) was adopted in 1986[351], and amended specifically for the Bi-State sage-grouse in 2016 (Amendment 18)[352]. The Record of Decision at Table ROD-1. Standards and guidelines adopt 38 general and specific measures (at pgs. 13-16) to avoid and minimize impacts to Bi-State sage-grouse. The ROD also states:

> "Forest Service will require mitigation that provides for no net loss to the bi-state DPS habitat."

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[351] USFS 1986
[352] USFS 2016

H-T ROD at 8.

In the Humboldt-Toiyabe National Forest, off-road vehicle riding and driving in sage-grouse habitat in California (and Nevada) is allowed year-round including during breeding and rearing seasons, although organized events such as riding rallies and contests are prohibited as follows:

> AR-S-02: Between March 1 and June 30, off-highway vehicle events that pass within 4 miles of an active or pending lek shall not be authorized. Critical disturbance period dates may shift 2 weeks back or forward in atypically dry or wet years based on observations of breeding/nesting activity.
> AR-S-03: Do not authorize off-highway vehicle events within winter habitats November 1 to March 1.

USFS 2016 Bi-State Sage Grouse Amendments at 14.

However, the H-T ROD diverges from other greater sage-grouse plans by failing to adopt reasonable habitat safeguards that take into consideration future needs of the bi-state sage-grouse (BSSG):

- The ROD fails to withdraw areas from locatable mineral entry because "Hard rock mining operations do not occur in the bi-state habitat at the same scope or scale that is present in greater sage-grouse habitat. While some exploration may occur, it is a relatively minor disturbance that can be mitigated through seasonal restrictions and habitat restoration efforts." (at pg.9) However, this fails to safeguard sage-grouse habitat from future uncontemplated mining threats.
- The ROD fails to adopt the three percent anthropogenic disturbance cap in Biologically Significant Unit. Despite the fact that the ROD identifies that "All bi-state habitat is crucial for the persistence of the bi-state distinct population segment." (at pg. 8), the ROD adopts the three percent anthropogenic disturbance cap to habitat only within 4.7 miles of active and pending leks because the 4.7 mile buffer standard was adopted based on current scientific literature that finds that more than 95 percent of BSSG activity occurs within a 7.5 kilometer (4.7 mi) buffer around leks. (at pg.9). This disenfranchises sagebrush areas that the bi-state sage-grouse may use only occasionally for connectivity and movement.
- The ROD fails to adopt the 7" perennial grass height guideline for sage-grouse concealment during nesting and early brood rearing because "Peer-reviewed science specific to the bi-state DPS habitat indicates that perennial grass height is less important than sufficient shrub coverage for nesting and early brood rearing. Therefore, vegetation objectives for the bi-state DPS specify adequate lateral and overhead cover rather than a specific grass height for that season." (at pg. 9)

While these amendments to the LRMP are important, they have failed to stop the decline in population numbers since being adopted.

6.3.3.2 Inyo National Forest Land Management Plan

The Inyo National Forest Land Management Plan[353] includes the following management scheme for bi-state sage-grouse:

Desired Conditions (SPEC-SG-DC)

01 Suitable sage-grouse habitat includes breeding (nesting), brood-rearing, and wintering habitats that are distributed to allow for dispersal and genetic flow, with land cover dominated by sagebrush. Suitable habitat is predominantly sagebrush shrubland and sagebrush steppe, with associated mesic habitats. Specific vegetation conditions are closely tied to local conditions and ecological site potential.

02 High quality sage-grouse nesting cover including shrub and perennial grasses that provide for overhead and lateral concealment, conditions that support high levels of quality pre-laying hen habitat and dietary protein intake needs, and habitat supporting chick-rearing nutritional needs occur throughout breeding habitat in each population management unit based on local conditions and ecological site potential.

03 Sage-grouse brood-rearing habitat occurs in the population management units and includes an adequate range of shrub cover, perennial grass cover, forb density, and meadows to provide the necessary overhead and lateral concealment and nutritional needs, with specific desired conditions tied closely to local conditions and based on ecological site potential.

04 Sage-grouse winter habitat occurs in the population management units and includes an adequate range of sagebrush cover in sites such as wind-swept ridges or tall shrubs that provide necessary cover and nutritional needs during winter. Specific vegetation conditions are closely tied to local conditions and ecological site potential.

05 Sage-grouse habitats do not include overstory trees, such as pinyon pine, juniper, or Jeffrey pine outside the natural range of variability.

06 The extent and dominance of nonnative annual grass species, such as cheatgrass, is limited and does not lead toward reduction in the suitability of sage-grouse habitat.

07 Unwanted fire (more frequent, severe, or larger than the natural range of variation) in sage-grouse priority habitat is limited or prevented.

08 At the stand/site scale (10 to 100 acres), sagebrush and understory cover occur in a mosaic across the site, with 1-acre patches meeting the desired conditions for nest sites and brood-rearing areas, consistent with the site and the sagebrush species potential.

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[353] USFS 2019

09 Meadows within sage-grouse range provide suitable habitat for sage-grouse, including desirable foraging species (insects and plants), have suitable sagebrush cover around the meadows edge, are hydrologically fully functional and vegetation is within mid-seral conditions. Within livestock allotments in sage-grouse range, meadow condition is trending towards or rated at fully functional based on forest-wide range utilization standards.

Objective (SPEC-SG-OBJ)

01 Within 10 years of the plan approval, up to 14,900 acres of sage-grouse habitat, within and between population management units, will be improved or restored to meet sage-grouse priority habitat desired conditions.

Goals (SPEC-SG-GOAL)

01 Participate in collaborative forums such as the executive oversight committee, technical advisory committee, and local area working group to ensure agency interests are considered and to collaboratively implement the Bi-State Action Plan to further sage-grouse conservation.
02 Continue to work with researchers, scientists, and partners to collect data sufficient to establish quantitative desired conditions for sage-grouse habitats in the Bodie, South Mono, and White Mountain Population Management Units specific to sagebrush species and ecological sites.
03 Continue population and vegetation monitoring efforts within the Bodie, South Mono, and White Mountain Population Management Units with State and Federal partners.
04 Continue coordination and communication with the California Department of Fish and Wildlife, Nevada Department of Wildlife and the U.S. Fish and Wildlife Service during project development for all projects occurring within sage-grouse habitat.

Standards (SPEC-SG-STD)

01 Habitat restoration projects for the sage-grouse shall be designed to meet one or more of the following habitat needs:

a. Promote the maintenance of extensive, intact sagebrush communities;
b. Limit the expansion or dominance of invasive species, including cheatgrass, and the expansion of pine species, including pinyon-juniper and Jeffrey pine;
c. Maintain or improve soil site stability, hydrologic function, and biological integrity; and
d. Enhance the native plant community.

02 Habitat restoration projects for the sage-grouse must include measures to improve suitability of breeding, brood rearing, or wintering habitat.
03 Within sage-grouse habitat, ensure that habitat restoration activities, vegetation treatments, or other authorized uses on the national forest, maintain or move toward

vegetation desired conditions for sage-grouse. Short-term (1 to 10 year) impacts are allowed to deviate from these habitat standards, if the long-term (10 to 30 years) project objective is to achieve desired conditions.
04 Mitigate long-term negative impacts to sage-grouse habitat from activities, to the extent practicable and within agency authority.
05 Require site-specific project mitigation if needed to insure no net loss of habitat within the Inyo National Forest due to project disturbance.
06 Establish a limited operating period for the sage-grouse breeding season (which current best available science indicates is March 1 to May 15) within suitable breeding habitat for any activities that would cause disturbances during this time. These dates can be adjusted based on current nesting conditions or risk assessment.
07 Establish a limited operating period for the sage-grouse nesting season (which current best available science indicates is May 1 to June 15) within suitable nesting habitat for any activities that would lead to disturbances during this time. These dates can be adjusted based on current nesting conditions or risk assessment.
08 When conducting livestock grazing allotment assessments, establish key areas in meadow or upland habitats where absent in occupied sage-grouse habitat.
09 Within sage-grouse priority habitat, use genetically and climatically appropriate native plant and seed material when seeding the area.
10 Subject to valid and existing rights, no new tall utility-type structures (e.g., poles that support lights, telephone and electrical distribution, communication towers, meteorological towers, and high-tension transmission towers, wind or solar generators or other similar infrastructure), which could serve as predator perches, will be authorized within 4 miles of an active lek in suitable habitat except as needed to adequately maintain existing infrastructure and comply with state and federal regulations. If structures are needed within this area protective stipulations (e.g. perch deterrents, guy wire removal) or mitigation will be required to offset the impacts of those structures. During the permit renewal process for such existing structures within 4 miles of an active lek in suitable habitat, protective stipulations or mitigations will be required to offset the impacts of those structures.
11 Subject to valid and existing rights, no new tall non-utility structures (e.g. fences, barriers, signs, buildings, water tanks, other structures necessary for resource management) that protrude noticeably above the dominant shrub layer will be installed in suitable sage-grouse habitat within 4 miles of an active lek except where the structure is necessary for safety or improvement of habitat and ecological conditions. All fences and other barriers constructed or replaced within 4 miles of an active lek in suitable habitat must be wildlife friendly with features to reduce impacts to sage-grouse (e.g. let-down fences, marked with fence markers or other fence types such as buck and rail). Installing any new fences within 1.2 miles of an active lek should be avoided whenever possible.
12 Within suitable habitat, manage permitted watering facilities to prevent drowning or entrapment and provide mosquito control to reduce the risk of creating a vector for diseases.

13 Do not locate new salting, supplemental feeding locations, livestock watering, and handling facilities on sage-grouse leks.
14 After soil disturbance or seeding, subsequent soil-disturbing management activities shall not occur until desired habitat conditions have been met within sage-grouse habitat unless a resource team determines that disturbance will help achieve desired conditions.
15 Consult a resource advisor during wildfires in sagebrush to identify suitable sage-grouse habitat and to suggest opportunities for retaining and protecting sagebrush stands. When safe and feasible, protect highly valued suitable sage-grouse habitat ahead of burn operations using techniques such as targeted burning and providing direct protection.

Guidelines (SPEC-SG-GDL)

01 Minimize the creation of new rights-of-way where feasible and less impactful by using existing public or private utility rights-of-way to reduce impacts on other resources.
02 Where feasible and where net impacts to habitat will be less than overhead facilities, bury new or reconstructed utility lines to reduce negative effects on sage-grouse habitat and other resources.
03 Subject to valid and existing rights, where there would be a net benefit to habitat conditions, remove tall structures that protrude noticeably above the dominant shrub layer in suitable sage-grouse habitat within 4 miles of an active lek.
04 When agency personnel, contractors, and permit holders are driving off road and working in areas with known noxious weed infestation, the vehicles should be cleaned before entering a different area to reduce the spread of noxious weeds.
05 Vegetation treatments and disturbances that reduce connectivity should be seeded or transplanted with sagebrush to restore patches of sagebrush cover and connect existing patches to improve sage-grouse habitats within and between population management units.

Inyo LMP at pg. 37-40.

As adopted, many of the Standards and Guidelines use unenforceable language ("where feasible", "should", "subject to valid existing rights", "except", "if structures are needed", "to the extent practicable", "impacts are allowed to deviate from these habitat standards") that create large loopholes for application and implementation of conservation actions. As adopted, the forest plan provides no assurances that these conservation measures will be implemented and it is unclear how many, if any, have been implemented or how it has affected the Bi-State sage-grouse population.

Potential Management Approaches

• Prevent unwanted fire in priority habitat by managing sagebrush systems to be resilient, implementing proactive fire prevention, and limiting nonnative annual grass expansion.
• Use an adaptive management strategy when conducting vegetation treatments within sage-grouse habitat. Determine treatment methods and intensities based on the results of past treatments as information from those past treatments becomes available. If the

results of past treatments show that those treatments have caused an increase in nonnative annual grasses and poor sagebrush recruitment, do not use the same prescription for further treatments within sage-grouse habitat.
• When a right-of-way is no longer in use, relinquish the right-of-way and reclaim the site by removing powerlines, reclaiming roads, and removing other infrastructure.
• Where sage-grouse habitat is being degraded due to wild horse and burro use, determine site-specific measures to improve or restore sage-grouse habitat.
• The Inyo National Forest will participate in collaborative forums such as the executive oversight committee, technical advisory committee, and local area working group to attempt to create a voluntary mitigation strategy to benefit sage-grouse. If created, this strategy could be used to establish alternative mitigation tools to perch deterrents or other protective stipulations to help offset the impacts of tall structures or other issues that arise that impact suitable habitat (see SPEC-SG-STD 05 and 10).

Inyo LMP at pg. 41.

While many of the "Potential Management Approaches" have merit as actions to improve sage-grouse numbers and habitat, no requirement to implement them is adopted in the LMP.

6.3.3.3 Modoc National Forest Land and Resource Management Plan

The 1991 Modoc National Forest Land and Resource Management Plan[354] addresses greater sage-grouse in several places. First as a general "harvest species" the Land and Resource Management Plan (LRMP) states:

*"*Annually improve 100 acres of habitat for upland game species with emphasis on sage-grouse, quail and blue grouse."

Modoc LRMP at 4-12.

Then specifically in Section 4:

"F. (G[uideline]) Within designated sage-grouse habitat, manage big sagebrush and low sagebrush within an eight-mile radius of all identified leks (strutting grounds), in accordance with the habitat capability model for sage-grouse, at the moderate level. Manage meadows, seeps, springs, and riparian areas within a two-mile radius of leks

[354] USDA 1991

according to the Riparian Area Management Prescription to provide forbs desirable for sage-grouse, such as dandelion *(Taraxacum),* yarrow *(Achillea),* and aster *(Aster*)."

Modoc LRMP at 4-28.

The Grazing Management and the Range sections, the plan states:

"2. (G[uideline]) Within sage-grouse habitat:
a. Meadows within an eight-mile radius around each active lek will be managed to provide forbs desirable to sage-grouse, such as dandelion *(Taraxacum* spp.), yarrow *(Achillea* spp.), and aster *(Aster* spp.). Manage for high water tables, forbs, and hiding cover in meadows.
b. Delay sheep grazing until June 1."

Modoc LRMP at 4-95 and 4-100 (same).

Within the Range Section, the LRMP states:

6. Within sage-grouse habitat:
a. (S) Within an eight-mile radius around each lek, rejuvenation projects will not reduce big sagebrush to < 20% canopy cover. When present, sagebrush will be retained up to 100 yards from the edge of riparian areas, meadows, seeps, and springs.

Modoc LRMP t 4-102.
Similarly, at section 5:
5. (S) *Within sage-grouse habitat:*
a. When present, sagebrush will be retained up to 100 yards from the edge of riparian areas, meadows, seeps, and springs.

Modoc LRMP at 4-103.

The Wildlife and Fish section of the LRMP states:

3. Sage-grouse. Blue Grouse. Canada Goose. And Mallard
a. (G) Reference the respective Habitat Capability Models for suitable habitat conditions.

Modoc LRMP at 4-106.

In the Devil's Garden Ranger District Section, the MP states under Wildlife and Fish:

- Implement sage-grouse improvement projects based on needs identified through research.

Modoc LRMP at 4-195.

In the Clear Lake – Doublehead Ranger District Section, the MP states under Wildlife and Fish:

- Manage livestock and initiate improvements based on research results for sage-grouse populations in the Clear Lake area.

Modoc LRMP at 4-232.

The language of the Standards and Guidelines and area specific actions lacks the details necessary to ensure that the habitat for the sage-grouse and the sage-grouse itself are protected from harms.

6.3.3.4 Lassen National Forest Land and Resource Management Plan

The 1993 Lassen National Forest Land and Resource Management Plan[355] does not address the greater sage-grouse and no sage-grouse conservation measures are included.

6.3.4 Greater Sage Grouse Conservation Strategy

In response to USFWS's 2010 determination that existing regulatory mechanisms were not sufficient to protect greater sage-grouse populations range-wide, BLM and FS initiated their National Greater Sage-grouse Planning Strategy. The outcome of that Strategy was BLM adopted the 2015 Resource Management Plan Amendments (RMPAs) to address the declining populations of greater sage-grouse across the United States. The USFS used NEPA and Records of Decision to adopt regulatory frameworks. This joint conservation strategy was determined to be adequate to support FWS's determination to withdraw the proposed listing for the species in late 2015.[356] FWS again relied on these plans in its withdrawal of the proposed listing in 2020.[357] The 2015 BLM RMPAs are discussed above in section 6.3.2.6 and the USFS actions are discussed in 6.3.3.

Under the Trump administration, BLM and USFS priorities shifted. Protections for the greater sage-grouse in the 2015 Amendments that FWS relied upon in making its 2015 determination

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[355] USFS 1993
[356] USFWS 2015. As explained above, this decision was later overturned by in court.
[357] USFWS 2020. This decision was also overturned in court as discussed above.

were significantly altered to promote development interests. In 2017, then-interior Secretary Ryan Zinke ordered a review of the sage-grouse land-use plans that had been put into effect just two years prior. The 2015 Plan review called for recommendations on how to "increase state involvement in sage-grouse conservation." and ultimately ended up proposing amendments to the 2015 plans in Northeastern California (and Idaho, Colorado, UT, Nevada, and Oregon). After a 90-day public comment period, BLM finalized the amendments to the 2015 plans, including the Northeastern California plan, in 2019, and announcing that the amendments were effective immediately.

As noted above, in 2019 Environmental groups brought suit in the U.S. District Court for Idaho to challenge the BLM amendments arguing that the 2019 Amendments violate NEPA in several ways. The judge issued a temporary injunction preventing BLM from implementing the 2019 Sage-Grouse Plan Amendments on October 16, 2019. *W. Watersheds Project v. Schneider,* 417 F. Supp. 3d 1319 (D. Idaho 2019). The injunction prevented the 2019 Amendments from going into effect while the underlying litigation over whether the 2019 Amendments violated NEPA continued. While the injunction was in place, the 2015 Sage-grouse Conservation RMPAs remained in effect. The Record of Decision for the SEISs for sage-grouse plan in Nevada/Northeastern California was signed on December 31, 2020 (see Section 6.3.3 above). As detailed above, most of the land use plans provide no mandated, enforceable regulations promoting the protection of greater sage-grouse, in California (or across the west).

The shifting politics dictating federal conservation efforts and the lack of enforceable federal regulations protecting the greater sage-grouse on public lands is alarming and calls for state action to fill the void for the California sage-grouse.

6.4 Regional and Local Plans and Policies

County's General Plans constitute a comprehensive development plan for the respective county. County General Plans address the requirements of California Government Code Section 65300 et seq., and related provisions of California law pertaining to general plans. They can provide conservation planning for the private lands within the County's jurisdiction.

6.4.1 Lassen County General Plan

Lassen County generally recognizes the need to support and manage wildlife habitat within the county, including sagebrush habitat of the sage-grouse. While the County's General Plan recognizes the California Department of Fish and Wildlife's rating system for habitat types and recognizes sage-grouse leks as having "high habitat value rating", it only applies the ratings

system to lands “outside of recognized "planning areas"”[358]. The County’s General Plan has established Goal L-22 addressing the “protection and enhancement of important wildlife habitats to support healthy, abundant and diverse wildlife populations.” Policies developed to support this goal are:

> LU49 Policy: The County supports the management of wildlife resources in ways that enhance the health and abundance of wildlife populations and the diversity of species and their habitats and which, at the same time, balance management policies and program objectives with the range of social and economic needs for which the County is responsible.
>
> LU50 Policy: To support and protect the value and viability of areas having significant wildlife habitat resources, including migration corridors, such areas should remain in relatively large parcel units. County zoning and subdivision regulations should protect these resources by not allowing isolated subdivisions intended primarily for residential development (excepted in limited circumstances pursuant to the County’s zoning ordinance, e.g., segregation of home sites, parcels created in association with approved use permits, etc.) to be developed in areas which are not specifically designated in the General plan or an area plan for a community development land use (e.g., rural residential) and zoned accordingly.

Both LU49 and LU50 are not specifically designed to regulate or manage sage-grouse habitat or to regulate threats to sage-grouse that are widespread within the county, including livestock grazing practices and/or invasive species management. Therefore, these two policies fail to provide needed protections specific to California’s sage-grouse in Lassen County.

6.4.1.1 Lassen County Fish and Game Commission

The Lassen County Fish and Game Commission advises the Board of Supervisors on all policies and programs proposed in Lassen County on fish and game matters, including State Fish and Game Commission, State Department of Fish and Wildlife, BLM and USFW on programs and policies affecting wildlife issues in Lassen County. The Lassen County Fish and Game Commission has no administrative authority, cannot expand nor authorize the expenditure of public monies, or in any manner bind the County to a particular course of action or policy, so is advisory and can only recommend actions to the Board of Supervisors. Ultimately the Commission cannot provide protections to California’s sage-grouse population in Lassen County.

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[358] Lassen County 2000.

6.4.2 Modoc County General Plan

Modoc County has no ordinances or general plan requirements pertaining to preservation of sage-grouse or its habitat in its General Plan. The County's most recent Housing element from 2009 does not have any open space set-aside requirements for development or subdivisions but it does encourage locating open space on the south, southeast, and southwest portions of a site in support of energy conservation. The County's Area Plans do not identify sage-grouse presence or requirements for conservation of habitat, but some Area Plans identify important vegetation types that are habitat for sage-grouse including sagebrush scrub, wet meadows and dry meadow grasslands.[359] However, Modoc County does appear to recognize the status of sage-grouse and its habitat in its Request for Proposal (RFQ) #2018-_007 which states "The loss of sage brush has put considerable pressure on the endangered Sage-grouse."[360]

6.4.3 Mono County General Plan

The Mono County General Plan (2020)[361] establishes policies to guide decisions on future growth, development, and conservation of natural resources in the unincorporated area of the county. The plan reflects community-based planning and includes individual area plans for Mono County communities. Although the Mono County General Plan is not designed to regulate or manage Bi-State DPS sage-grouse or their habitat, it does include certain specific measures that help support sage-grouse conservation within the county. It addresses greater sage-grouse in its Conservation/Open Space Element recognizing the challenges to sage-grouse in the County:

> "4. The cumulative impacts of increased development and recreational usage on natural habitats and local wildlife are a major concern. In particular, the cumulative impacts of development on deer herds and sage-grouse are a concern throughout the county."

Mono General Plan at pg. V-3.

The General Plan Conservation/Open Space Element includes the following actions specifically for greater sage-grouse:

> **Action 2.A.1.b**. includes two suggested but not required avoidance and minimization measures**;**
>
> **"**c. encouraging fence designs that allow for the movement of wildlife and protect against mortality (e.g., sage-grouse)"

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[359] Modoc County 2018a
[360] Modoc County 2018b
[361] https://www.monocounty.ca.gov/generalplan/biological-resources-0

Mono General Plan at pg. V-11.

> "d. where necessary, requiring leash laws as a condition of project approval, in order to control domestic animals in developments in key wildlife habitat. Encourage monitoring and reporting of dog/wildlife problems in developments in deer and sage-grouse habitat;"

Mono General Plan at pg. V-12 (emphasis added).

Action 2.A.1.g. states:

> **"**Projects outside community areas within identified deer and sage-grouse habitat areas, (see the Biological Resources Section of the Master Environmental Assessment), which may have a significant effect on deer or sage-grouse resources shall submit a site-specific study performed by a recognized and experienced biologist in accordance with Action 1.1."

Mono General Plan at pg. V-12. This requirement would provide important data, but does not require conservation action.

Action 2.A.3.c. states

> **"**When applicable, revegetation and landscape plans should include provisions to retain and re-establish upland vegetation, especially bitterbrush and sagebrush, as important mule deer and sage-grouse habitat."

Mono General Plan at pg. V-14 (emphasis added).

Action 2.A.3.e. states

> **"**Projects within key sage-grouse habitat shall not be permitted unless a finding is made that potential impacts have been avoided or mitigated to a level of non-significance or a statement of overriding considerations is approved. Potential mitigation measures may include:
>
> • Minimizing site disturbance and limiting it to the poorest quality habitat on the parcel (e.g., near trees, away from leks and water, etc.);
>
> • Siting structures taller than 6 feet or above the sagebrush average height outside the line of sight of a lek;
>
> • Minimizing the installation of fencing and all fencing shall be of a wildlife friendly design, which may include the following specifications: not taller than 42", three strands, bottom strand a minimum of 16" from the ground, top wire marked for visibility, lay down and let-down fencing, and avoidance of posts serving as avian predator perches. Other designs may be warranted depending on the wildlife concerns of the areas, and the BLM, USFWS and/or CDFW should be consulted;

• Installing perch deterrents on structures taller than 6 feet or above the sagebrush average height;
• Controlling domestic animals on the property;
• Designating seasonal use restrictions;
• Restoring native vegetation or otherwise improving vegetative habitat, including removal of invasive trees and annual grasses, and reducing fire risk on nearby public lands;
• Contributing financially to an established program undertaking habitat restoration within Mono County; and
• Including other measures developed in consultation with key Bi-State sage-grouse partners (e.g., USFWS, CDFW, BLM, USFS), including considerations to mitigate impacts to reduced connectivity and fragmentation.
• To protect nesting and brood-rearing habitat, agricultural cultivation shall not disturb or remove sagebrush habitat within three miles of an active lek, or as determined through an informal consultation process with applicable Bi-State Conservation partners.

Mono General Plan at pg. V-14 (emphasis added).

Action 2.A.3.f. states:

> **"**Review ministerial permits in sage-grouse habitat for impacts and <u>make every effort to</u> work with the applicant to include mitigation measures, including those in Action 2.A.3.e."

Mono General Plan at pg. V-14 (emphasis added)

Action 2.A.15.a. states:

> **"**Prioritize projects benefitting sage-grouse habitat such as fence removal or retrofit (with markers and/or letdown features), perch deterrents on potential raptor perches, grading or road projects to improve hydrologic flow, and raven control at the Benton Crossing Landfill."

Mono General Plan at pg. V-17.

While the above policies and actions provide avoidance and minimization measures associated with the Bi-State DPS of the greater sage-grouse, all include language that does not <u>require</u> the actions to be implemented. Therefore, benefits to sage-grouse are not assured.

Policy 2.A.4. states:

> **"**Participate in the Bi-State Local Area Working Group on sage-grouse conservation and assist with the implementation of the Bi-State Action Plan." and includes the following actions:
>
> **"Action 2.A.4.a.** Assist with coordination, communication and administration of the working group and associated conservation efforts, including reporting, education events, and outreach.
>
> **Action 2.A.4.b.** Partner on sage-grouse conservation projects and monitoring, including habitat management and improvement, signage, drainage improvements, fence removal and modification, and annual lek counts.
>
> **Action 2.A.4.c.** Work with partners to implement the Bi-State Action Plan over the next 10 years, including responsibilities specific to Mono County such as the development of General Plan policies (included in this Element) and planning for the closure of Benton Crossing Landfill."

Mono General Plan at pg. V-15.

While this policy and associated actions provide certainty in participation in implementation of the Bi-State Action Plan, the plan itself is voluntary. Therefore, benefits to sage-grouse are not assured. In fact, the implementation of the Bi-State Action Plan has not resulted in increasing populations to a self-sustaining level, despite almost a decade of implementation.

6.4.4 Inyo County General Plan

The Inyo County General Plan[362] Goal GOV-8: Wildlife and Fisheries includes a single Policy that is not specific to greater sage-grouse, but has requirements that affect sage-grouse as follows:

> **"Policy Gov-8.1:** Management of Wildlife and Fisheries
> Management of wildlife, including fish, game animals, non-game animals, predatory animals and Threatened, Endangered, Sensitive, Candidate or Management Indicator Species, under all jurisdictions, must be grounded in peer-reviewed science and local input. Wildlife management plans should identify and plan for mitigation of negative impacts to the project area's economy and environment and to private property interests and customary usage rights of its citizens. Therefore, the following are the policies of the County.
>
> a. The County should cooperate with federal and state agencies who oversee the

[362] https://www.inyocounty.us/services/planning-department/inyo-county-general-plan

protection and recovery of federal and state listed threatened, endangered, sensitive or candidate species and their habitat.
b. The County may adopt local recovery plans as allowed under the Endangered Species Act.
c. Federal and state agencies shall prepare a plan in coordination with the County before the introduction or re-introduction of any species onto public or private land that is likely to impact the planning area.
d. The County supports wildlife management that:
1. Enhances populations of game and non-game species native to the project area.
2. Recognizes that enhancing non-native game and non-game species may negatively impact native species and rangeland ecosystems.
3. Increase wildlife numbers where practicable that is not in conflict with existing economic uses or ecosystem health.
4. Recognizes that large game animals compete for forage and water with other economic uses.
5. Supports the need for a private property compensation program for certain wildlife damages."

Inyo General Plan/Goals and Policies report at pg. 10.[363]

Much of the language is voluntary, aspirational, non-enforceable guidance that does not provide long-term assurance of protection and recovery for greater sage-grouse.

6.4.5 Los Angeles Water & Power

Los Angeles Water and Power (LADWP) lands occur within the boundary of three Bi-State DPS PMUs: Bodie, South Mono, and White Mountains.[364] The LADWP has drafted and/or adopted several plans for sage-grouse conservation on their lands.

In 2014, the LADWP adopted the Greater Sage-Grouse Lek Access Policy and Viewing Guidelines on City property in Mono County, California.[365] Also in 2014, LADWP drafted a Conservation Strategy (Strategy) for the Bi-State DPS on their lands in Mono County, California and entered into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife

[363] Inyo County 2001
[364] LADWP 2019
[365] LADWP 2014

Service to implement this Strategy.[366] The Strategy includes commitments to maintain sage-grouse lekking, nesting, and brood rearing habitat on LADWP lands in Mono County.

In 2015, the LADWP drafted a Habitat Conservation Plan (HCP) for its Operation and Maintenance Activities on its land in Mono and Inyo Counties, California. The draft was never finalized but proposed to manage activities including "habitat restoration, livestock grazing, recreation, control of noxious and invasive weeds, fire suppression, infrastructure maintenance, and the management of water gathering and power production/distribution". [367] LADWP states "Consistent with these documents, LADWP manages the activities on its lands".[368]

In April 2021, LADWP completed the Long Valley Adaptive Management Plan (Plan) for Bi-state sage-grouse, covering nearly 40,000 acres of sage-grouse habitat in Mono County. The Plan was developed "in partnership with" the USFWS. The Plan's completion commits LADWP to an Adaptive Management Plan for Bi-State Sage-grouse Brood-Rearing Habitat on Los Angeles Department of Water and Power Lands in Long Valley that includes LADWP staff determining "conservation activities by preparing an annual monitoring report about water availability and distribution for the year, as well as the habitat quality results."[369]

Sage-grouse use of LADWP lands in the South Mono PMU is high and includes two breeding complexes, while sage-grouse use of lands in the Bodie and White Mountains PMUs appears much more limited. LADWP's management practices are implemented only to the extent that such practices do not impact other priorities of LADWP. Therefore, LADWP actions cannot be considered permanent long-term conservation measures but should be seen as voluntary management practices. This approach does not assure conservation will be implemented for the BSDPS.

6.5 Non-Regulatory Planning

Plans have been created by local communities and stakeholders in specific areas to benefit local sage-grouse populations. While the plans are voluntary and non-binding, they identify some of the threats to sage-grouse and goals to improve habitat.

6.5.1 Local Area Working Groups

[366] LADWP 2019
[367] IBID
[368] IBID
[369] https://www.ladwpnews.com/protecting-the-bi-state-sage-grouse-ladwp-announces-completion-of-the-long-valley-adaptive-management-plan-for-bi-state-sage-grouse/

Community-based management of sage-grouse habitat is an approach to sage-grouse conservation. Community-based management is carried out via Local Area Working Groups (LAWGs), voluntary coalitions of stakeholders that attempt to address sage-grouse conservation concerns specific to a given area. LAWG members typically represent a range of stakeholders including farmers, ranchers, state and federal agency staff, tribal and local governments, energy industry, environmental groups, non-governmental organizations, and other concerned citizens. Generally, LAWGs have frameworks for conservation planning that identify projects suggested by statewide plans. Additionally, each LAWG is responsible for developing a conservation plan to address the threats to sage-grouse populations and habitats in their area. LAWG conservation plans are drafted and implemented by voluntary stakeholders. California has three LAWGs, as listed in the table below.

Table 3. Local Area Working Group Information

Local Area Working Group	Area Managed (by County)	Conservation Plans in Place
Northeast California Sage-grouse Working Group (Buffalo-Skedaddle Working Group)	Lassen County Modoc County Washoe County (NV – part)	Conservation Strategy for Sage-grouse (*Centrocercus urophasianus*) in the Buffalo-Skedaddle Population Management Unit. (2021)[370]
Bi-state area Working Group	Mono County Alpine County Inyo County Douglas County (NV) Lyon County (NV) Mineral County (NV) Carson City County (NV) Esmeralda County (NV)	Bi-State Sage-grouse Action Plan (2012)[371]
Devil's Garden/Clear Lake Sage-grouse Working Group	Modoc County Siskiyou County	Devil's Garden-Clear Lake PMU Sage-grouse Conservation Plan (2010)

LAWGs lead the implementation of their conservation plans and adapt them as needed locally to be successful. These plans provide guidance for identifying threats and prescriptions for addressing threats. They also outline the need for monitoring the effectiveness of conservation actions and the need for adaptive management. Each of the California LAWGs has completed conservation plans which are detailed below.

[370] Elher et al. 2021
[371] Bi-State Technical Advisory Committee Nevada and California 2012

6.5.1.1 Buffalo-Skedaddle Local Area Working Group

The Buffalo-Skedaddle LAWG focuses on sage-grouse populations located in Lassen and Modoc counties in California (and in Washoe County, Nevada). A Conservation Strategy was developed in 2006 and recently revised in 2021 to include the most recent science and address threats that developed after 2006.

The Conservation Strategy for greater Sage-grouse (*Centrocercus urophasianus*) in the Buffalo-Skedaddle Population Management Unit (2021)[372] includes the following goals:

1. Remove Western Juniper (*Juniperus occidentalis*) in GRSG habitat, prioritizing removal near leks and brood-rearing areas on both public and private land
2. Restore burned areas
3. Reduce the chances of large wildfires
4. Restore degraded streams and meadows within GRSG brood-rearing habitat
5. Improve livestock grazing management for sagebrush ecosystem resilience
6. Treat noxious and invasive weeds that threaten GRSG habitat
7. Where possible, remove or reduce anthropogenic subsidies that attract GRSG predators such as trash, roadkill, and tall structures
8. Continue researching new techniques and locally adapted solutions, and report on results

Buffalo-Skedaddle CS at pg. 9.

The Short and Long-term goals and objectives for the Conservation Strategy include:

1. Remove western juniper near leks and brood-rearing areas on both public and private land
    a. Treat 900 acres per year of Phase I western juniper using fire crews, Cal-Fire crews, private lands with NRCS and private contractors
    b. Treat specifically around Shinn area leks, Sage Hen Spring, nesting polygons shown from pre-fire telemetry work, one-mile radius around Little Black's, Pete's Valley, Horse Lake, and Spanish Springs, Horse Lake Springs, and riparian areas

2. Restore burned areas. Percent area restored will vary based on site accessibility, funding available, timing of funding, site conditions and weather

[372] Ehlers et al. 2021

a. Plant appropriate ecological site species in burned areas within five years, with the goal of one year or before an annual grass monoculture is established preventing future restoration efforts

3. Prevent risk of large fires in the future
    a. Implement fuel and/or fire breaks
    b. Reduce western juniper cover in areas that could fuel a fire spreading into GRSG habitat
    c. Prioritize road maintenance near GRSG habitat to facilitate fire suppression access

4. Restore degraded streams, springs, and meadows within GRSG brood-rearing habitat
    a. Identify and prioritize list of potential sites
    b. Implement some demonstration sites to increase local knowledge about mesic site restoration
    c. Treat three to five mesic sites annually

5. Improve grazing management for sagebrush ecosystem resilience
    a. Repair and improve livestock water developments to enhance grazing management capabilities
    b. Use monitoring on allotments to help guide grazing management. Increase monitoring when funding and opportunity arise
    c. When grazing permits are renewed, broaden the season of use to accommodate annual variability in seasonal conditions
    d. Add flexibility of livestock grazing permits to allow for fuel reduction, targeted grazing, restoring mesic areas and dormant season use

6. Treat approximately 400 acres of weeds per year including Scotch thistle (*Onopordum acanthium*), Russian Knapweed (*Rhaponticum repens*), Canada thistle (*Cirsium arvense*), Mediterranean sage (*Salvia aethiopis*), perennial pepperweed (*Lepidium latifolium*), and annual grasses that threaten GRSG habitat

7. Where possible, remove or reduce anthropogenic subsidies such as trash, roadkill and tall structures that attract predators of GRSG
    a. Assess risk of raven predation through field data and observations
    b. Identify anthropogenic subsidies

8. Continue researching new techniques and locally adapted solutions, and report on results
    a. Fuel breaks/seeding/herbicide trials
    b. Sagebrush seedling plantings

Buffalo-Skedaddle CS at 29-30.

In addition, the Conservation Strategy includes information each of the nine Lek Population Planning Areas (LPPAs) and priority conservation action for each area.

While this strategy provides specific conservation actions, it still does not provide timelines for implementation despite the fact that the 14 recently monitored leks indicate a downward trend in the LPPAs.

6.5.1.2 Bi-State Local Area Working Group

The Bi-state Local Area Working Group (LAWG), comprised of federal, state, and local governments, Native American tribes, non-profit organizations, ranchers, and private landowners, was formed in 2002. By 2004, it had developed the first edition of the *Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California*, which "identified a strategy for sage-grouse conservation, identified and prioritized risks, and specified projects to address the risks as they were known at that time."[373]

The Executive Oversight Committee (EOC) was formed in 2011 and was comprised of resource agency directors from CDFW, FWS, BLM, USFS, NRCS, USGS, and the Nevada Department of Fish and Wildlife. The EOC signed a formal MOU in 2012 codifying the EOC's purpose as "provide[ing] a framework to facilitate interagency cooperation among the parties that will ensure a consistent and coordinated multi-jurisdictional effort to conserve greater sage-grouse populations and habitats based on population and habitat conservation goals rather than land ownership or jurisdictional boundaries."[374]

In late 2011, the EOC assigned biologists from each of the participating agencies to form the Bi-State Technical Advisory Committee (TAC)**.** The TAC provides technical expertise and guidance for BSDPS conservation.

The Bi-State LAWG also includes a Bi-State Tribal Natural Resources Committee (BTNRC) whose mission is to "promote, protect, and preserve good management of lands in the Bi-State through advocacy and education using a holistic approach" and to "educate and facilitate communication between Tribes and land management agencies".[375] It is comprised of Tribal representatives, individual tribal members, and land and wildlife management agency liaisons.

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[373] Bi-State Technical Advisory Committee Nevada and California 2012
[374] IBID
[375] https://bistatesagegrouse.com/general/page/tribal-natural-resources-committee

The TAC developed the Bi-State Action Plan, which was adopted in 2012 and is still being implemented. It continues the collaborative voluntary approach for conservation of the Bi-State greater sage-grouse that was initiated in 2002 by the Bi-State LAWG under the guidance of the Nevada Governor's Sage-grouse Conservation Team.

Greater sage-grouse within the Bi-state DPS (BSDPS) has been given explicit attention at the federal level. May 2022, USFWS' proposed decision to list the Bi-State sage-grouse as threatened and the designation of critical habitat was re-instated by a federal court and remanded back to the USFWS for a final decision under the federal ESA. To date, the Bi-State DPS have not secured any ESA protections.

The Bi-State Action Plan[376] which was adopted in 2012 identifies the populations within the Bi-state area by Population Management Units (PMUs) of which five occur wholly or partially within California: South Mono and Bodie PMUs are wholly within California while Pine Nut, Fales and White Mountains overlap into western Nevada (see Figure 11). The Neighborhood Clusters used by the USGS that were used most recently to evaluate distribution and range, refines the range for the Bi-state sage-grouse while maintaining the generally areas identified as PMUs. Notable differences between the "Neighborhood Clusters" and the PMU's in California are 1) the reduction in the overall amount of habitat in the "Neighborhood Cluster" compared to the PMUs; 2) the reduction in adjacency between the "Neighborhood Cluster" compared to the PMUs and 3) the division of the South Mono PMU into five "Neighborhood Clusters" with three "Neighborhood Clusters" apparently non-contiguous (see Figure 12). The refined mapping of habitat using "Neighborhood Clusters" emphasizes the uniqueness of the localized populations and their stressors and is an improvement over the more generalized PMU approach.

[376] bistatesagegrouse.com

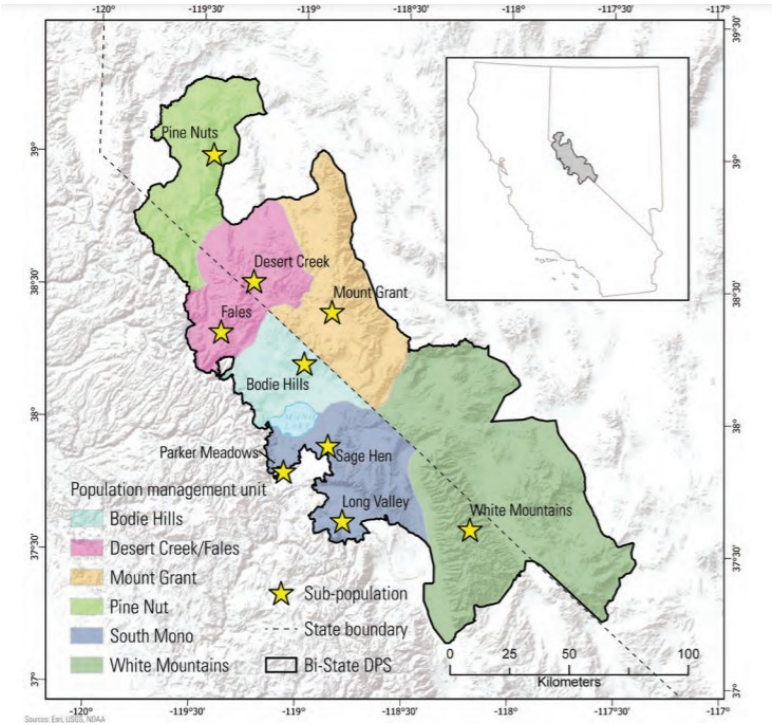


Figure 1. The Bi-State Distinct Population Segment (DPS) of greater sage-grouse (*Centrocercus urophasianus)* identified by population management units (PMUs) across Nevada and California. Stars indicate approximate center-points of subpopulations monitored: Pine Nut Mountains, Desert Creek, Fales, Mount Grant, Bodie Hills, Parker Meadows, Sagehen, Long Valley, and White Mountains.

Figure 11. The Bi-State Distinct Population Segment (DPS) of greater sage-grouse identified by population management units (PMUs) across Nevada and California.[377] Stars indicate approximate center-points of subpopulations monitored: Pine Nut Mountain, Desert Creek, Fales, Mount Grant, Bodie Hills, Parker Meadows, Sagehen, Long Valley, and White Mountains.

[377] Bi-State Technical Advisory Committee Nevada and California 2012

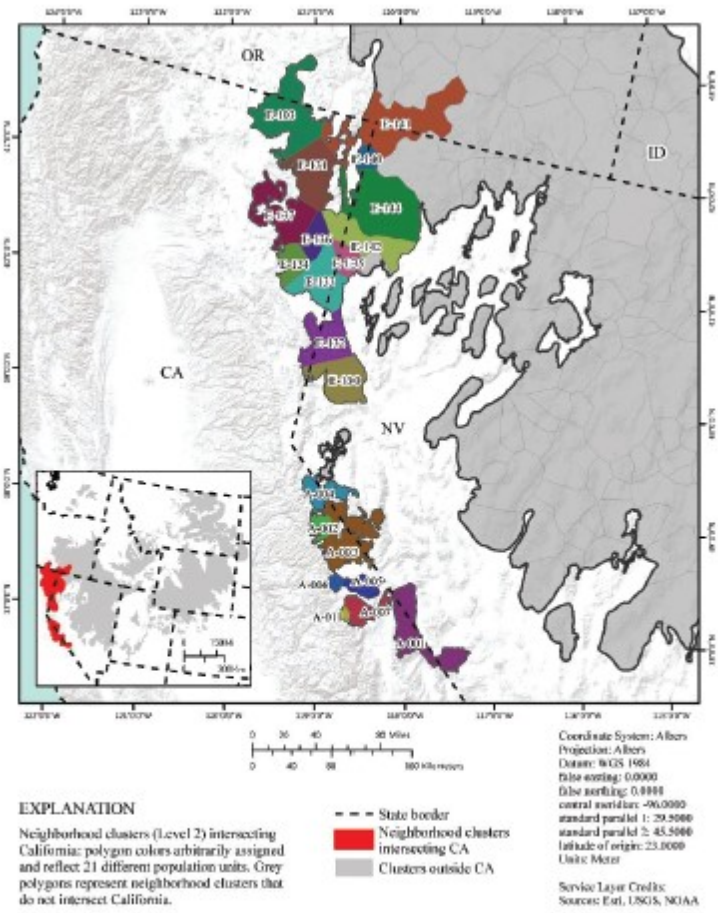


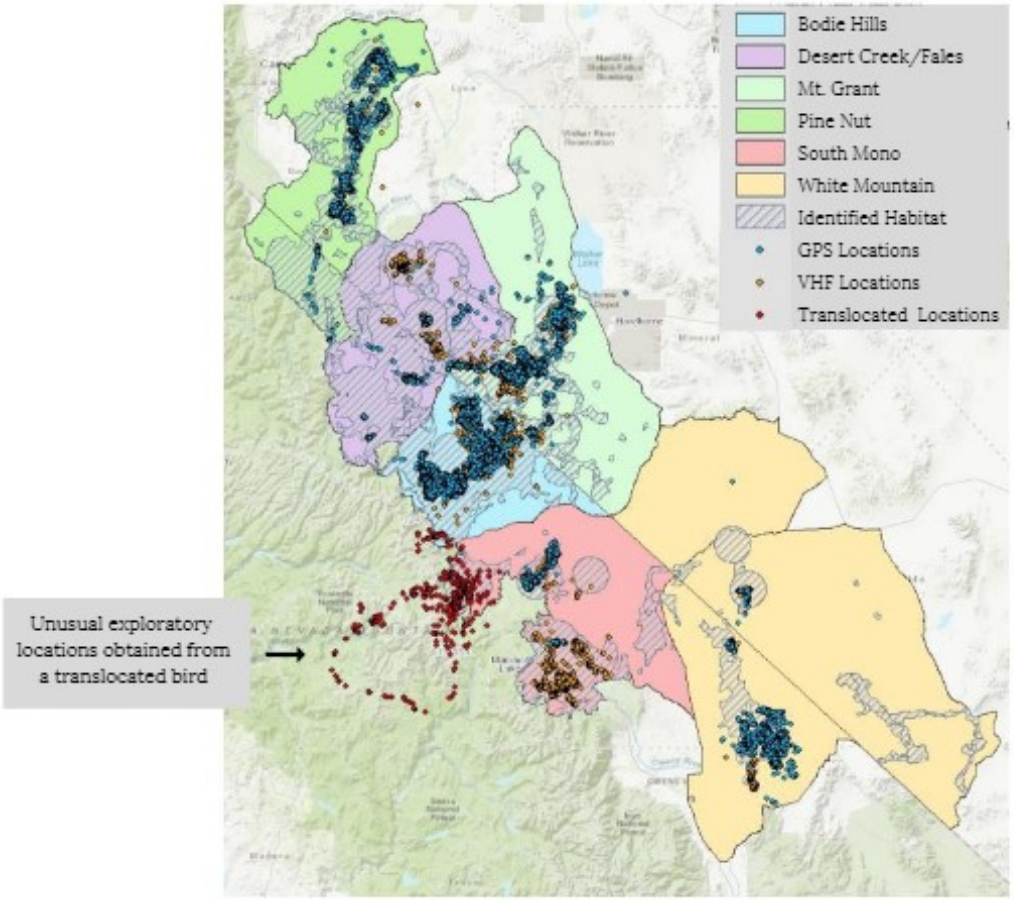
Figure 4.1. Greater sage-grouse (*Centrocercus urophasianus*) hierarchical population monitoring framework for neighborhood clusters that intersect the state of California. Map image is the intellectual property of Esri and is used herein under license. Copyright © 2020 Esri and its licensors. All rights reserved.

Figure 12. Neighborhood clusters[378] used to evaluate distribution and range, refines the range for the Bi-state sage-grouse while maintaining the generally areas identified as PMUs.

Although the need for additional funding is outlined in the plan no specific guaranteed funding strategy was identified. Resource management agencies and stakeholders have implemented many actions for long-term conservation of greater sage-grouse in the Bi-State area, guided first

[378] Coates et al. 2021b

by the 2004 Greater Sage-Grouse Conservation Plan and now by the adopted 2012 Bi-State Sage-Grouse Conservation Action Plan (BSAP).[379]
CDFW is currently coordinating and engaged with the Bi-State LAWG. Each year, the Bi-State LAWG's completed work is summarized in Annual Implementation Reports and partners develop an updated scope of work for the upcoming year.[380] For example, monitoring of radio-collared sage-grouse indicates areas of high use and actions of translocated birds (see Figure 13). These data help to refine the PHMAs and neighborhood clusters, and can be analyzed by different timeframes.



[379] Bi-State Technical Advisory Committee Nevada and California 2012
[380] https://bistatesagegrouse.com/general/page/annual-implementation-reports

Figure 13. Key habitat identified by utilization distribution and resource selection function models and locations of all captured birds 2012-2018[381]

Since 2004, voluntary conservation measures have been implemented under the Bi-State Action Plan to mitigate threats to the Bi-State DPS. They include land acquisitions; temporary and permanent road closures; removal/modification of fencing; modified livestock grazing; wild horse gathers; pinyon and juniper removals; vegetation removal to reduce wildfire ignition; and additional monitoring and research. [382] These actions were being implemented within the "short" timeframe from 2002-2019 (17 years or two oscillations) during which the sage-grouse population has declined in the Bi-state area.[383] While the objective of the BSAP was to develop a comprehensive set of strategies, objectives and actions to be implemented over a 10-year span to attain long-term conservation of the Bi-State DPS and their habitats, and the recently issued *Bi-State Sage-Grouse, 10-Year Accomplishment Report, 2012-2021*[384] shows that many of the actions in the plan have been implemented, nonetheless declines continue in all but one of California's populations in the Bi-state area. Regardless of these efforts, the Bi-State sage-grouse in California continue its range contraction and population declines (λ less than one).[385]

6.5.1.3 Devil's Garden-Clear Lake PMU Sage-grouse Conservation Plan

In 2008, BLM, CDFG, FS, USFW, NRCS, University of California Cooperative Extension (UCCE), and local landowners worked together to draft the Devil's Garden-Clear Lake PMU Sage-Grouse Conservation Plan. These stakeholders also constitute the primary participants in the Devil's Garden/Clear Lake Sage-grouse Working Group (DG/CL SGWG). This conservation plan is to guide sage-grouse management within the Devil's Garden PMU. The Devil's Garden PMU is located in the northeast corner of California, covering roughly one quarter of Modoc County and a portion of eastern Siskiyou County (see Figure 14). The entire PMU is approximately 1,140,000 acres in size. This Conservation Plan was modeled on the 2004 Buffalo-Skedaddle Sage-Grouse Conservation Strategy, borrowing some of the general content from that document and adapting selections from other sage-grouse plans where appropriate.

[381] Bi-State Technical Advisory Committee Nevada and California 2018
[382] IBID
[383] Coates et al. 2021b
[384] https://www.bistatesagegrouse.com/general/page/bi-state-sage-grouse-10-year-accomplishment-report
[385] Coates et al. 2021b

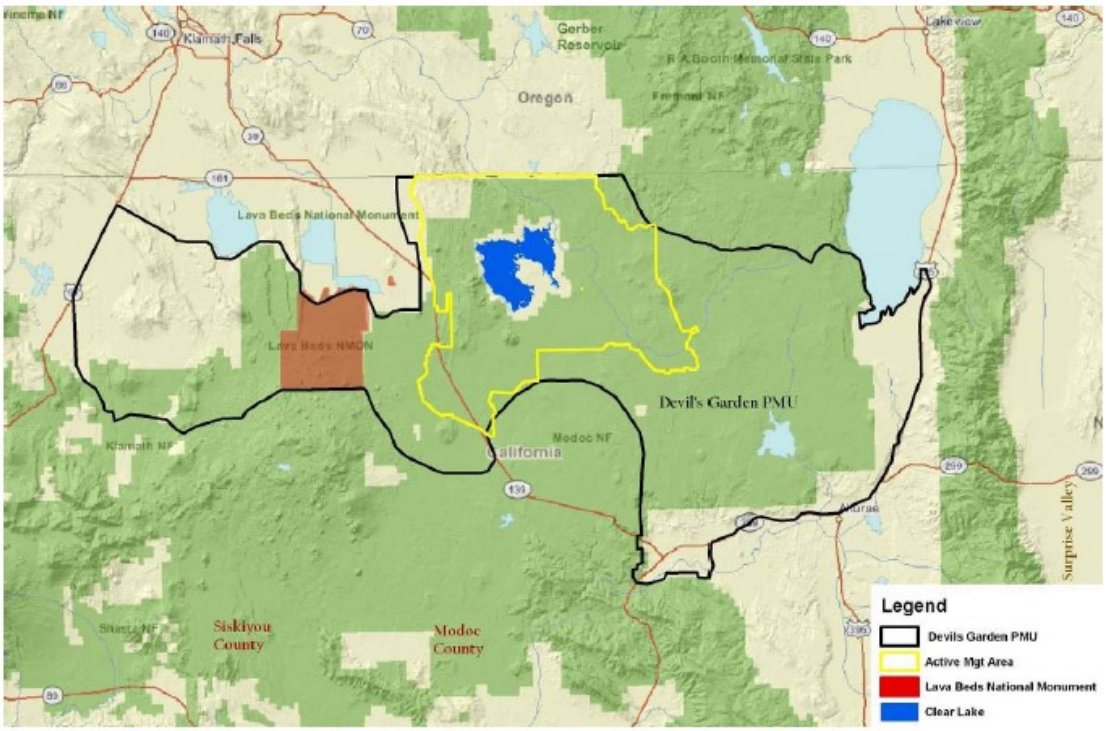


Figure 2. Devil's Garden PMU and Clear Lake Active Management Area

Figure 14. Area Covered by Devil's Garden-Clear Lake Sage Grouse Conservation Plan[386]

The Devil's Garden-Clear Lake PMU Sage-Grouse Conservation Plan[387] established a series of goals and goal-specific actions that needed to be implemented to achieve the goals. The Goals include:

Habitat Goals

Goal 1: Restore 28,000 Acres (11% of the AMA) of R3 Habitats and Ecological Sites to Healthy Sagebrush Communities (R0).

Goal 2: Restore 34,000 Acres (14% of the AMA) of R1 Habitats and Ecological Sites to Healthy Sagebrush Communities (R0).

Goal 3: Prevent Wildfire from Damaging Habitats Near Existing Sage-Grouse Populations in the PMU.

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[386] Horney 2008
[387] Horney, M.R. et al. 2008

Goal 4: Collaborate with MNF to establish procedures for juniper treatment that can accomplish habitat management objectives in a timely manner and still protect cultural heritage resources.

Goal 5: Manage Grazing to Maintain and Enhance Sage-Grouse Habitat.

Population Goals

Goal 6: Achieve a self-sustaining population at Clear Lake, and the eventual production of satellite populations by: (1) preventing immediate population extirpation; and (2) growing population to a minimum of 500 birds within 10 years through a combination of translocation and natural recruitment.

Goal 7: Establish an effective population management process in the AMA.

Goal 8: Manage Risk of West Nile Virus (WNv).

DG-CL Plan at 75-76 (summary).

While these Goals and the goal-specific actions include many science-based actions, it is unclear if they have been implemented and if so, the success of the efforts.

With the science and habitat for California sage-grouse changing significantly in the intervening fourteen years, it is unclear if updates to the 2008 Devil's Garden-Clear Lake PMU Sage-Grouse Conservation Plan have been done.

LAWGs have been implementing conservation strategies at the local level but as described above, the sage-grouse populations are still declining despite this implementation. LAWGs are not responsible for greater sage-grouse management efforts state-wide. Each LAWG focuses on a portion of the species' range with stakeholder input. Actions or commitments by private landowners and/or public land managers are not legally enforceable via these conservation plans. While laudable, these Conservation Plan efforts are not adequate to protect sage-grouse in California from ongoing declines and the slide towards extinction.

6.5.2 USDA Sage-grouse Initiative

The Sage-Grouse Initiative ("SGI") was launched by the US Department of Agriculture ("USDA") Natural Resources Conservation Service ("NRCS") in 2010. NRCS works with partners and private landowners to focus voluntary conservation in sage-grouse habitat. NRCS provides technical and financial assistance to agricultural producers, helping them plan and implement conservation practices that benefit sage-grouse and priority landscapes. It is part of the Working Lands for Wildlife ("WLFW") program. SGI uses existing federal conservation

programs, including the Environmental Quality Incentives Program (EQIP),[388] Wildlife Habitat Incentives Program (WHIP),[389] and the Agricultural Conservation Easement Program (ACEP)[390], which help to speed up beneficial sage-grouse conservation practices. The initiative is offered in the eleven western states with areas of high sage-grouse populations, including California. The primary goals of SGI are to "prevent working ranches from being subdivided, implementing sustainable grazing systems to improve hiding cover for birds, removing invasive conifers from grasslands to allow birds to re-colonize otherwise suitable habitat, and marking or moving 'high-risk' fences near breeding sites to reduce bird collisions".[391] In addition to financial and technical assistance, WLFW ensures that participants that continue to maintain NRCS conservation practices to benefit the targeted species will be considered compliant with ESA for periods as long as 30 years, even if the species is subsequently listed under ESA. As of 2018, under the EQIP in California, 8,810 acres under 4 contracts worth almost $1.4 million had been spent on actions in support of the SGI goals.[392]

While SGI is a robust and well-funded program, its conservation goals are focused on cooperative land management plans guided by NRCS and voluntarily implemented by individual landowners. Conservation actions are developed with individual landowners and implemented. While agreed upon conservation practices must meet NRCS standards and specifications, the landowner is the ultimate decision-maker. Such voluntary efforts by individual landowners are insufficient to protect California's sage-grouse, as the ongoing sage-grouse populations declines confirm.

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[388] Environmental Quality Incentives Program (EQIP) was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill) to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

[389] Wildlife Habitat Incentives Program (WHIP) is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through this program the Natural Resources Conservation Service (NRCS) provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from 5 to 10 years from the date the agreement is signed. WHIP has proven to be a highly effective and widely accepted program across the country. By targeting wildlife habitat projects on all lands and aquatic areas, WHIP provides assistance to conservation minded landowners who are unable to meet the specific eligibility requirements of other USDA conservation programs.

[390] Agricultural Conservation Easement Program (ACEP) has two components: 1) Agricultural Land Easements that help private, tribal, local and state governments protect croplands and grasslands on farms and ranches through conservation easements and 2) Wetland Reserve Easements that help private and tribal landowners protect and restore wetlands that have been degraded by past agricultural uses.

[391] USDA-NRCS 2018

[392] Ibid

6.6 Interstate and International Efforts

6.6.1 Western Association of Fish & Wildlife Agencies

The Western Association of Fish & Wildlife Agencies (WAFWA) is an organization of 23 state and provincial agencies, including representatives from the Department, charged with the protection and management of fish and wildlife resources in the western United States and Canada. Leaders from dozens of participating state and federal agencies meet quarterly to work toward achieving shared conservation goals. Greater sage-grouse in one of the species that WAFWA focuses on for conservation.

6.6.1.1 Greater Sage-grouse Comprehensive Conservation Strategy

Concern regarding the decline of greater sage-grouse across the western United States, prompted the WAFWA to engage in conservation planning including:

- Securing a Memorandum of Understanding (MOU) between the BLM and WAFWA on August 14, 2000 to undertake conservation planning to improve populations, reverse habitat declines, and perhaps, to preclude the need to list sage-grouse as threatened or endangered.
- Conservation Assessment of greater Sage-grouse and Sagebrush Habitats in 2004.[393]
- Greater Sage-grouse Comprehensive Conservation Strategy in 2006[394] – a framework for long-term conservation of the greater sage-grouse and the sagebrush ecosystem. The framework is most well-known for delineating seven Management Zones based primarily on geographic areas with relatively uniform composition of plant species. California sage-grouse fall within management zones 3 and 5, as visually depicted in Figure 14 below. These management zones have been used by state, federal, and local authorities. The plan relies on the voluntary support and execution of its conservation goals. Moreover, it is a framework for states to consider rather than enforceable directives to achieve such conservation goals.

[393] Connelly et al. 2004
[394] Stiver et al. 2006

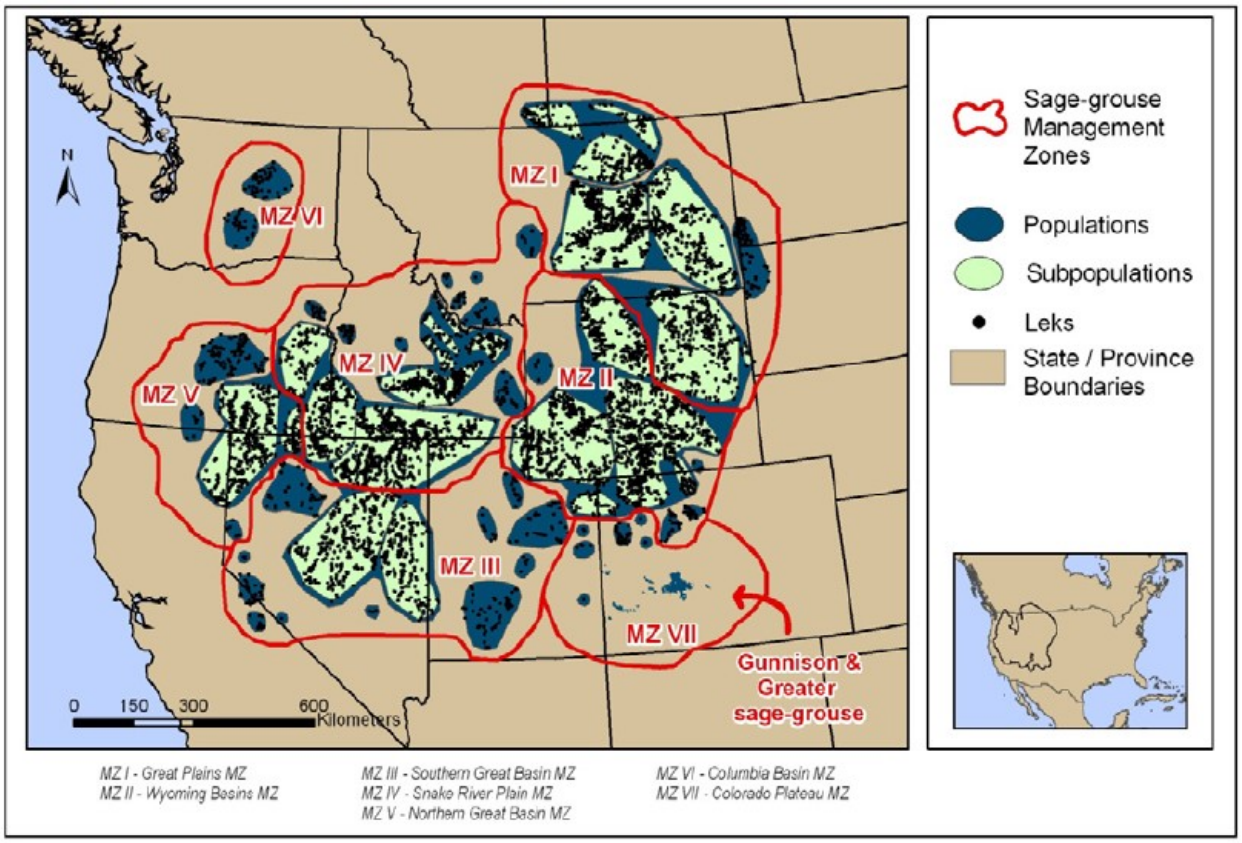

Figure 15. Greater and Gunnison's sage-grouse Mangement Zones outlined in North America.[395]

The state and federal regulatory mechanisms for greater sage-grouse protection that existed on or prior to 2010, including this conservation plan created in 2006, were evaluated by FWS which concluded that "existing regulatory mechanisms are inadequate to protect the species."[396]

6.6.1.2 Sagebrush Conservation Strategy

The Sagebrush Conservation Strategy[397] evaluates the benefits and challenges of conserving the sagebrush biome across the west including California. While not focused solely on sage-grouse, the Strategy identifies where sage-grouse conservation measures are likely to fall short (both where and how) for other sagebrush obligates and evaluate management or conservation options

[395] IBID
[396] USFS 2010
[397] Remington et al. 2021

to address these gaps. Because the Strategy and its associated Sagebrush Ecosystem Initiative are voluntary, they do not assure effective implementation to preclude further declines in California's sage-grouse.

6.6.1.3 Greater Sage Grouse Conservation Plan for Nevada and Eastern California

Published in 2004, the Greater Sage Grouse Conservation Plan for Nevada and Eastern California[398] laid out the framework that the LAWGs (called Local Area Conservation Planning groups in the plan) would use to craft conservation plans. It included Conservation Strategies and actions, planning and implementation, and an annual work plan. However, it was not well funded and relied on state and federal agencies and the public to implement. It did, however, spin off all of the current LAWG's that created local conservation plans as discussed above.

6.7 Need for Greater Sage-Grouse Legal Protections on Private Land

While there are some local, state, and federal level protections for the California's sage-grouse, a large gap still exists in in sage-grouse conservation on private lands. Privately owned land makes up a significant portion of sage-grouse habitat in California. For example, in the California portion of the Buffalo/Skedaddle PMU, 8 of the 21 active leks (2003) are on or immediately adjacent to private land, and most of the late brood rearing and forb-rich summer habitats are on private lands within this PMU. Therefore, any meaningful conservation strategy for sage-grouse must include additional conservation measures that apply to private land.

Regulations and management guidelines applied to public lands cannot be implemented on adjacent private lands without substantial economic incentives for private owners. Even with such incentives, it is unlikely that conservation measures would take the same form or be consistently applied due to the desires of individual landowners. Species listed under CESA, however, receive state-level protection that applies on both private and public land. This designation would facilitate conservation of the species by unifying conservation measures under an enforceable conservation strategy applicable to the threats that exist on both private and public land.

7. CESA PROTECTION IS WARRANTED FOR CALIFORNIA'S SAGE-GROUSE

[398] Nevada Governor Sage-Grouse Conservation Team 2004

Existing state, local, and federal regulations of California's sage-grouse have not been successful or sufficient in protecting the sage-grouse in California from population declines. As Garton et al. (2015) states based on the results of their analysis that included California sage-grouse:

> "Concerted efforts across both public and private land ownerships that are intended to benefit Greater Sage-Grouse show little current evidence of success but more will be required to stabilize these declining populations and ensure their continued persistence in the face of ongoing development and habitat modification in the broad sagebrush region of western North America."[399]

The threats to California sage-grouse are numerous, multi-faceted, and require enforceable measures specific to each threat with a cohesive and legally mandated strategy on how to avoid, minimize and if necessary, mitigate such threats. Therefore, it is incumbent upon the State of California to provide protections under the CESA for the dwindling populations of sage-grouse that persist in California. Listing will further efforts to stabilize populations and move towards recovery. Once listed, the following recommendations need to be implemented:

Recommendations

In this context, recommendations for the management and recovery of California's sage-grouse are as follows:

1. CDFW prepare a recovery plan for California's sage-grouse pursuant to Cal. Fish & Game Code § 2079.1.
2. CDFW recommends to CFGC to change the hunting regulations to preclude hunting of sage-grouse in California until recovery goals have been met.
3. CDFW work with local jurisdictions within the range of sage-grouse to develop NCCPs that protect all sage-grouse habitat from development on private lands.
4. The California Department of Parks and Recreation (CDPR) develop and implement management plans (including fire management plans) focused on sage-grouse protection for state park units within their range.
5. The CDPR seek to acquire habitat to establish new parks/natural reserves for protection and restoration of sage-grouse habitat and opportunities to expand and connect existing state parks and natural reserves for protection and restoration of sage-grouse habitat as part of California's 30x30 conservation goals.
6. CDFW expand its cooperative work with relevant federal agencies (NPS, BLM, USFS, USFWS) to protect California's sage-grouse and its habitat on federal land.
7. CDFW work with CAL-FIRE to develop protocols for appropriate fire suppression activities within the range of sage-grouse that maximize protection of the species, while

[399] Garton et al. 2015

minimizing ground disturbance that may foster the spread of non-native grasses and other invasive species.

8. CDFW work with relevant agencies and entities to identify potential sites for assisted migration/translocation and develop protocols for successfully carrying out such activities.

Appendices:

Appendix A: Livestock Grazing Allotments Overlap with Neighborhood Clusters

Appendix B: Fire Overlap with Neighborhood Clusters

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Appendix A

Appendix A. Federal grazing allotments that overlay “neighborhood clusters” of sage-grouse. Source: https://gbp-blm-egis.hub.arcgis.com/, https://data.fs.usda.gov/geodata/

ALLOTMENT_NAME	GIS_ACRES	Agency
LONG VALLEY C&H	12706.99274	USFS
TRAIL CANYON C&H	2199.950372	USFS
DAVIS CREEK C&H	4292.327293	USFS
BLACK CANYON	11987.03538	USFS
BLOODY CANYON	5256.732528	USFS
COTTONWOOD	22048.16643	USFS
ALPER'S CANYON C&H	336.552792	USFS
ANTELOPE C&H	10283.25072	USFS
INDIAN CREEK C&H	10895.82148	USFS
CLOVER PATCH C&H	8231.880932	USFS
SHERWIN/DEADMAN S&G	5676.667518	USFS
GLASS MOUNTAIN C&H	2707.030313	USFS
WILFRED CREEK C&H	5287.497754	USFS
CLARK CANYON C&H	3890.526828	USFS
MONO MILLS S&G	9774.455976	USFS
CASA DIABLO S&G	17208.78941	USFS
ALGER LAKE S&G	1424.879302	USFS
HORSE MEADOW S&G	1928.80516	USFS
MCGEE S&G	2911.272374	USFS
CROOKED CREEK C&H	37064.17382	USFS
HOT CREEK C&H	13327.18706	USFS
ROCK CREEK S&G	1335.624306	USFS
TURNER C&H	10865.39081	USFS
WATTERSON MEADOW C&H	1855.410914	USFS
MONO SAND FLAT C&H	22572.88151	USFS
TOBACCO FLAT C&H	1568.258823	USFS
BEAR VALLEY	1584.447646	USFS
DIXIE VALLEY	6043.678114	USFS
NORTH EAGLE LAKE	6846.132112	USFS
GOOCH VALLEY	5124.261628	USFS
SOUTH EAGLE LAKE	608.128214	USFS
TRES PLUMAS	40237.90715	USFS
DEXTER CREEK S&G	15994.95898	USFS
DEEP SPRINGS C&H	1854.673648	USFS
PERRY AIKEN C&H	26548.27662	USFS
JUNE LAKE S&G	10596.1062	USFS
DOUBLE SPRINGS C&H	30.449488	USFS
CAMPBELL-LOOPE S&G	7203.803953	USFS

SIERRA BLANCA C&H	7457.797648	USFS
HUNEWILL C&H	1189.071006	USFS
EAGLE CREEK C&H	42.852376	USFS
ROBINSON CREEK C&H	851.199519	USFS
SUMMERS MEADOW S&G	2105.408628	USFS
TAMARACK S&G	591.074834	USFS
MOUNT JACKSON C&H	6113.522121	USFS
SILVER KING C&H	2556.911206	USFS
LOST CANNON C&H	5176.166422	USFS
SLINKARD C&H	4358.081735	USFS
NORTH SWAUGER S&G	3908.026845	USFS
WILDHORSE C&H	447.831591	USFS
SILVER CREEK S&G	7001.589426	USFS
BULL CANYON C&H	5755.612067	USFS
MASONIC C&H	7813.402773	USFS
BAGLEY VALLEY S&G	9147.686797	USFS
BURCHAM S&G	9953.897499	USFS
DOG VALLEY S&G	3790.173893	USFS
BALLS CANYON S&G	129.44947	USFS
EVANS CANYON S&G	104.305943	USFS
JUNCTION C&H	3743.660857	USFS
DUMONT S&G	3612.062138	USFS
DUNDERBERG S&G	4848.16929	USFS
CAMERON CANYON S&G	3407.008994	USFS
FRYINGPAN-MURPHY CREEK C&H	19216.94062	USFS
COTTONWOOD S&G	11693.32473	USFS
BUCKEYE C&H	2948.271169	USFS
VIRGINIA CREEK C&H (VACANT)	807.120158	USFS
MILL CANYON S&G	2290.516801	USFS
LARKIN LAKE C&H	2.534767	USFS
GREEN CREEK S&G	1306.045496	USFS
POISON CREEK S&G	7145.162049	USFS
RICKEY S&G	7005.22278	USFS
SOUTH SWAUGER S&G	8647.343443	USFS
LITTLE WALKER C&H	18771.34968	USFS
SWEETWATER C&H	32398.46364	USFS
ROUGH CREEK C&H	1869.074369	USFS
AURORA S&G	23.314254	USFS
COTTONWOOD S & G	13880.6434	USFS
LEVIATHAN S&G	9213.406788	USFS

FANDANGO	8276.298304	USFS
CEDAR CANYON	10729.44509	USFS
CLEAR LAKE	55696.69636	USFS
WEST VALLEY	5351.154976	USFS
BLUE LAKE	1631.225673	USFS
WILLOW CREEK	13716.47065	USFS
CRYSTAL PEAK	182.392692	USFS
PIT RIVER	117.542307	USFS
MT. BIDWELL	6641.907963	USFS
NORTH CREEK	4023.099977	USFS
CARR	108550.9916	USFS
GERIG	94.860053	USFS
OXENDINE	2811.827417	USFS
SNOW LAKE	2619.998383	USFS
JOSEPH CREEK	299.764253	USFS
BAIRD	986.48572	USFS
CRANK SPRINGS	1.208996	USFS
BALLARD RIDGE	2068.986865	USFS
EAST BIEBER	31822.13825	USFS
WEST BIEBER	30314.20442	USFS
HOWARD'S GULCH	42982.52794	USFS
BIDWELL	1370.561956	USFS
ROUND VALLEY	14965.07507	USFS
ASH VALLEY	2360.479016	USFS
THOMS CREEK	3381.840209	USFS
BALD MOUNTAIN	13865.43908	USFS
PARKS PASTURE	302.370052	USFS
BARBER CANYON	8949.904148	USFS
DERNER	852.066727	USFS
SPLAWN MOUNTAIN	48.23648	USFS
139	1016.429968	USFS
GRANGER	10379.06223	USFS
LAVAS	38334.42139	USFS
TIMBER MOUNTAIN	704.257719	USFS
EAST GRIZZLIE	21094.39999	USFS
EMIGRANT SPRINGS	45967.3008	USFS
BLUE LAKE SHEEP	1140.453244	USFS
WEST GRIZZLIE	9145.359767	USFS
WILDERNESS SHEEP	5899.012957	USFS
SHAWVILLE	156.506661	USFS
PARSNIP	6225.174606	USFS

SPRING CREEK	1621.520684	USFS
DELTA LAKE	16048.5028	USFS
DAVIS CREEK	10690.16483	USFS
BLUE MOUNTAIN	52662.88129	USFS
CANYON CREEK	2660.52805	USFS
HENDERSON MEADOW	14870.88468	USFS
SPRING HILL	7971.63455	USFS
MYRTLE CREEK	465.228806	USFS
BIG SAGE	87798.25217	USFS
BEAR CAMP	2706.034586	USFS
LASSEN CREEK	23073.86318	USFS
TRIANGLE	18779.10117	USFS
MAMMOTH	9586.566928	USFS
NORTH PARKER	3431.887075	USFS
RUSH CREEK	36.106942	USFS
SURVEYOR'S VALLEY	23799.00615	USFS
TUCKER	29292.7555	USFS
RED ROCK	5903.858866	USFS
EMERSON	8390.864682	USFS
PINE SPRINGS	45203.20861	USFS
OUTLET	5605.734667	USFS
YANKEE JIM	10551.60568	USFS
TIMBERED MOUNTAIN	60626.71701	USFS
CENTERVILLE	6132.539175	USFS
SELIC	1923.665785	USFS
BUCK CREEK	1046.172981	USFS
COYOTE	2185.474883	USFS
HAPPY CAMP	23852.69269	USFS
ROCKY PRAIRIE	3339.789086	USFS
MOWITZ	12697.07696	USFS
WILLOW CREEK RANCH	2780.944209	USFS
STONE COAL	3189.99086	USFS
AVANZINO	4671.576164	USFS
WARM SPRINGS	15300.78718	USFS
POTTERS	23436.07596	USFS
YOCUM	4.516007	USFS
WILDHORSE	8.4997	USFS
FORT SPRING	0.353814	USFS
North Cowhead	5054.801965	BLM
Lartirogoyen	3620.605432	BLM
12 Mile	1999.029775	BLM

North Bloody Point	78.481185	BLM
Scammon	1894.16006	BLM
West	7348.142679	BLM
Bloody Point	947.703152	BLM
Cloud	957.883371	BLM
Perry	1267.209855	BLM
Sternes	548.512957	BLM
Casuse Mountain	200.133933	BLM
Brunnemer	40.860246	BLM
Lakeshore	670.108725	BLM
Roberts Creek	364.646332	BLM
Russell Slough/Capik	2147.059264	BLM
Strip	7890.942894	BLM
Upper Sand Creek	699.747824	BLM
Gardner #1	1295.722142	BLM
Crowder	2972.359158	BLM
Russell	223.614324	BLM
XL	4442.917397	BLM
Thomas Creek	502.964561	BLM
Prock	2380.128669	BLM
Ramos	131.324313	BLM
Meng	205.735796	BLM
Polson	579.19236	BLM
Blacks Canyon Rim	781.81735	BLM
S-X	1067.618868	BLM
Fisher	1704.436171	BLM
Rimrock	2705.490624	BLM
Kelley	970.635745	BLM
Bacon	455.386	BLM
Brown Field	1360.114696	BLM
Pine Creek Mesa	2229.52876	BLM
Hagge	794.690548	BLM
Westside	6655.164881	BLM
Hughes	1100.834242	BLM
Pine Creek Field	509.490901	BLM
Corbie Field	243.182134	BLM
Portuguese Flat	3470.599841	BLM
Home Camp	0.914005	BLM
North Graves/Mackey	5447.594493	BLM
Neer	3066.377528	BLM
South Graves	19596.37065	BLM

Bicondoa	5504.312089	BLM
South Tablelands	18046.40099	BLM
Lower Lake	3950.296503	BLM
Ryegrass Swale	4969.855291	BLM
Rocky Prairie	17759.32748	BLM
East Field	4675.726652	BLM
Roberts Reservoir	0.400468	BLM
Turner Canyon	1411.932186	BLM
Big Valley Mountain	1698.544506	BLM
Harper Hill	1664.722587	BLM
Round Valley	347.356683	BLM
Piper	332.486635	BLM
Eicholz	2290.728994	BLM
West Field	3412.985674	BLM
Hayes Spring	806.542751	BLM
Mamath	2734.740718	BLM
Reclamation	208.846718	BLM
Barrows II	289.622336	BLM
Major	477.272079	BLM
Tule Mountain	60726.47648	BLM
North Dibble	1142.104688	BLM
Flournoy Individual	3303.578043	BLM
Deep Canyon	3304.693318	BLM
Pilot Butte	195.488639	BLM
Warm Springs	4044.034079	BLM
Radio Hill	77.917189	BLM
Dibble Hill	1308.04268	BLM
Kramer	1181.389832	BLM
Clark	158.357946	BLM
South Fork	5333.060501	BLM
Chase Valley	1986.431172	BLM
Butte Creek	492.050137	BLM
Nelson Corral	16422.71158	BLM
Indian Peak	1004.174236	BLM
North Juniper	2029.580623	BLM
Selic-Alaska	9641.161172	BLM
Babcock	2509.977512	BLM
South Juniper	523.462687	BLM
Muck Valley	8935.049101	BLM
Clarks Valley	512.113857	BLM
Summit Field	4483.45739	BLM

Thompson	8183.340242	BLM
Loomis	3022.689612	BLM
Williams	1981.254985	BLM
Dry Cow	6320.985231	BLM
South Ash Valley	25184.54854	BLM
Red Rock Lake	2571.984748	BLM
Hall Field	2838.917457	BLM
Mcdonald Mountain	19979.21793	BLM
Lower Highway	641.047032	BLM
Observation	243098.7197	BLM
Daisy Dean Spring	3025.478179	BLM
Cold Springs	314.369803	BLM
Anderson	1249.853241	BLM
Silva Flat	18929.81238	BLM
Wing	4149.249691	BLM
Bald Mountain	13999.45519	BLM
Hencraft Field	10906.30042	BLM
Brockman	6110.146497	BLM
Dry Valley	5419.895163	BLM
Dixie Valley	22886.74964	BLM
Said Valley	1883.795065	BLM
Said Valley	3617.295233	BLM
Fillman-Diablo	5702.949957	BLM
Crabtree	695.059318	BLM
Walton Individual	6546.233695	BLM
Coffin	2294.866482	BLM
New Bailey Creek	33066.86044	BLM
Grasshopper Ridge	3909.116735	BLM
Dry Valley	1001.345483	BLM
Slate Creek AMP	38798.51594	BLM
Williams Individual	5327.720336	BLM
Ravendale Amp	39436.88265	BLM
North Horse Lake	38824.26102	BLM
Spanish Springs Ind	2008.869705	BLM
Twin Buttes	2167.091824	BLM
Bucks Bay	6808.84246	BLM
Spanish Springs Amp	7983.305945	BLM
Crest	12745.73301	BLM
Shinn Peak	4610.355931	BLM
Hansen (Coon Camp)	1912.118985	BLM
Stone Individual	2982.820417	BLM

Cottonwood	2371.498278	BLM
Wood Individual	4349.190855	BLM
Snowstorm	49778.37729	BLM
Erick Allot.	3442.558221	BLM
Walsh Mountain	6722.999227	BLM
Barron Individual	3995.227033	BLM
Humphrey 3-C	3466.218364	BLM
Deep Cut	62610.42421	BLM
Tablelands	19194.32607	BLM
South Horse Lake	48068.16429	BLM
Shaffer Mtn.	31116.27257	BLM
Willow Creek	7904.33211	BLM
Rice Canyon	12754.29075	BLM
Coffin	1134.986148	BLM
Ulch	1125.881931	BLM
Slinkard	12530.93402	BLM
Dry Canyon	1445.063357	BLM
Aristo Ranch	1171.135675	BLM
Aurora Canyon	12545.46493	BLM
Bodie Mountain	55513.13003	BLM
West Reservoir	771.374355	BLM
Walters Ranch	518.753568	BLM
Travertine Hills	8814.173136	BLM
Potato Peak	14669.18595	BLM
Mount Biedeman	4952.663765	BLM
Mono Sand Flat	23670.61561	BLM
Green Creek	4383.688077	BLM
Rancheria Gulch	24381.39559	BLM
Little Mormon	9973.432171	BLM
Mormon Ranch	3321.733453	BLM
Dog Creek	7673.886271	BLM
Mono Mills	24958.54172	BLM
Mono Lake	3096.391015	BLM
Adobe Valley	10947.76646	BLM
Adobe Lake	92.14296	BLM
Granite Mountain	11956.92314	BLM
Bramlette	20072.00607	BLM
Symons	3897.920948	BLM
Mathiew	1977.553313	BLM
Marble Creek	764.254553	BLM
Blind Spring	1745.758945	BLM

Hammil Valley	7499.699525	BLM
Hot Creek	10292.24698	BLM
Wilfred Creek	13259.53023	BLM
White Wolf	11885.62295	BLM
Casa Diablo	3163.284917	BLM
Long Valley	13091.93639	BLM
Tobacco Flat	602.997926	BLM
Little Round Valley	1810.780702	BLM
Oasis Ranch	19437.5044	BLM
South Oasis	9776.77394	BLM
Deep Springs Valley	339.69399	BLM
Ninemile	2851.231408	BLM
Bull Creek	8436.128677	BLM
Tuledad	71883.9398	BLM
South McDonald	12887.7075	BLM
Fandango	1461.219866	BLM
Upper	1053.370168	BLM
Goose Creek	38.917312	BLM
Buck Mountain	120.240771	BLM
McCulley	1085.396622	BLM
Granger	1309.162497	BLM
North Ash Valley	24487.14109	BLM
Last Chance	18390.15151	BLM
Cold Springs	18774.70161	BLM
North Mitchell Hill	4259.346987	BLM
South Mitchell Hill	3875.000185	BLM
Yankee Jim	1723.020713	BLM
North Tablelands	27203.36107	BLM
Hitchens	880.710017	BLM
Huary	2539.003568	BLM
Cramer	1076.924182	BLM
Barrows	2013.870524	BLM
Winter Range CA	9462.550338	BLM
Twin Peaks	125573.97	BLM
Bryant Mountain	2823.519573	BLM
Loveness	660.99247	BLM
North Fort Sage	4120.912258	BLM
West Fort Sage	9521.342951	BLM
South Fort Sage	4994.09484	BLM
McQueen	212.215085	BLM
Willow Creek Grade	983.188734	BLM

Rowland	101.965661	BLM
East Bald Mountain	2815.626658	BLM
Dellera	410.081967	BLM
Chilcoot Community	2038.731255	BLM
Stefan	166.885556	BLM
Jacks Valley	431.747089	BLM
Nevada Cowhead	91.622524	BLM
East	10996.36077	BLM
North Larkspur	5736.496336	BLM
South Larkspur	15901.08679	BLM
Boggs	14371.94981	BLM
Sand Creek	22577.48166	BLM
Crooks Lake	9704.197646	BLM
Total	**3627806.708**	

Appendix B

Appendix B. Fires occurring within sage-grouse Neighborhood Clusters in California (1910-2021). Includes areas that burned more than once.

Source: CalFire/FRAP https://frap.fire.ca.gov/mapping/gis-data/

YEAR_	FIRE_NAME	GIS_ACRES
2021	ROUND	1.7
2021	4-3 PUMA	132.5
2021	FLAT	22.0
2021	ANTELOPE	111.5
2021	SUGAR	14,836.1
2021	JUNIPER	882.0
2021	COYOTE	132.3
2021	FAIRCHILD	19.5
2021	GRAVEL	169.5
2021	CHICKEN	117.7
2021	R-1 ROCK	12.3
2021	R-1 RYE	64.7
2021	WILLOW VALLEY	21.9
2021	TAMARACK	12,123.0
2021	DIXIE	434.8
2020	DALTON	1,367.1
2020	BEACH	1,653.6
2020	LOYALTON	25,422.4
2020	SHEEP	300.2
2020	ADAMS	901.7
2020	FLAT	13.6
2020	CALDWELL	37,611.5
2020	AURORA	238.3
2020	BACCARAT	18.0
2020	HILL	63.2
2020	HORN	25.2
2020	LAURA 2	2,729.0
2020	MOUNTAIN VIEW	9,928.9
2020	NORTH	2,734.2
2020	R-1 MAPES	259.0
2020	R-3 LITTLE FREDOYNER	187.3
2020	R-2 TRUMBULL	576.7
2020	R-3 SKEDDADLE	197.5
2020	R-5 SNOWSTORM	471.7
2020	R-5 DRY	45.5

2020	R-8 PINECODE	566.5
2020	RAILROAD	131.9
2020	SLINK	14,434.1
2020	W-4 TERMO	265.6
2020	W-5 COLD SPRINGS	69,074.9
2020	WOOD	54.4
2020	R-6 TUNNISON	175.1
2020	GOLD	5,729.2
2019	BORDER	11.5
2019	PINENUT	12.4
2019	W-1 MCDONALD	1,020.3
2019	HORSE	54.6
2019	HORSE	123.1
2019	R1 JUNIPER	130.1
2019	R2 RAVEN	10.8
2019	R1 RANCH	3,379.3
2019	R4 RAILROAD	24.1
2019	R3 RYE PATCH	14.1
2019	R6 CREEK	66.5
2019	R2 SNOWSTORM	23.7
2019	SNOWSTORM	264.3
2019	LONG VALLEY	555.1
2019	SPRINGS	1,741.8
2019	GOOSE2	131.6
2019	LONE	5,737.2
2019	TUCKER	14,184.7
2019	FOX	13.2
2019	MCGINTY	26.8
2019	NORTH	28.3
2019	TELEPHONE	25.5
2019	GOOSE	22.7
2018	3-10 VALLEY	57.0
2018	3-13 MUCK	9.7
2018	3-18 SNAG	30.4
2018	HYATT	431.5
2018	RICE	13.5
2018	TERMO	13.9
2018	COYOTE	15.4
2018	OWENS	308.8
2018	MEADOW	60.6

2018	KELLY	52.8
2018	JUNIPER	79.8
2018	STONE	16,948.6
2018	ESSEX	19.3
2018	BATTLE	220.3
2018	BOOT	6,972.3
2018	WHALEBACK	1,225.6
2018	HOT CREEK	436.2
2018	TUMBLEWEED	645.4
2018	EAGLE	2,097.9
2018	LIKELY	16.2
2018	MCGEE	11.7
2018	CONSTANTIA	11.7
2017	CENTERVILLE	15.6
2017	PINE	21.2
2017	JONES	43.6
2017	JOESPH	28.7
2017	R-4 PARSNIP	605.8
2017	W-2 LIKELY	10.3
2017	WEST	401.3
2017	RIVER	71.2
2017	SHAFFER	59.0
2017	LONG VALLEY	15,917.0
2017	R-10 PAINTER	83.8
2017	R-2 SCHAFFER	26.5
2017	R-9 SHINN	278.1
2017	R-4 RANCH	58.3
2017	R-3 MUD	99.6
2017	R-5 STONEY	204.0
2017	R-9 FREDONYER	22.0
2017	PEG	148.6
2017	CHERRY	24.9
2017	MUD	6,036.1
2017	R-5 SPANISH	166.9
2017	R-2 BUTTE WELL	17.4
2017	W4 ROMERO	13.8
2017	COWHEAD	31.7
2017	SLINKARD	8,593.0
2017	DRY VALLEY	28.9
2017	CHILCOOT	1,020.0
2017	POSLIN	855.2

2017	VALLEY	78.2
2017	ROCK2	16.4
2017	DOBE	381.0
2017	RIMROCK	1,492.4
2017	RIMROCK2	29.4
2017	COVE	10,923.8
2017	CLARK	254.9
2017	STEELE	45,652.3
2017	LAKE	4,490.6
2017	DIAMOND4	18.7
2017	TANK	11.4
2017	JONES	281.3
2017	BOLES	313.2
2017	RADAR	13.9
2017	MOWITZ	15.7
2017	ROCK	17.1
2017	JIM	13.1
2017	WEST	64.0
2017	BLUE2	33.4
2017	CANTRALL	121.0
2017	BATTLE	653.5
2017	DAVIS	51.1
2017	SHALE	28.7
2017	PARKER2	2,535.7
2016	HOWARD	379.6
2016	CLARK	242.1
2016	WILSON	16.0
2016	MARINA	183.0
2016	OWENS RIVER	3,840.9
2016	SOUP 1	133.1
2015	DODGE	10,517.5
2015	GREEN CREEK	26.9
2015	S2 COAL	30.0
2015	SHINN	110.8
2015	S1 DUCK	30.1
2015	VAN DYKE	398.3
2015	WASHINGTON	10,467.8
2015	MASON	43.3
2015	COLD	14.2
2015	TWIN	67.9
2015	WHITE	15.4

2015	WALKER	3,367.3
2014	HOWARDS	45.0
2014	DOBIE	456.0
2014	NORTHERN	117.4
2014	LAKE	58.1
2014	DALTON	641.1
2014	GULCH	1,397.3
2014	GULCH3	58.0
2014	GULCH4	14.7
2014	CONWAY	46.1
2014	BODIE	93.0
2013	RED ROCK	522.8
2013	DAVIS	97.1
2013	RAIL	67.9
2013	WHITTEMORE	51.8
2013	CLARKS	65.5
2013	SPRING PEAK	4,442.8
2012	LIKLEY	9,965.6
2012	BIEDERMAN	20.0
2012	INDIAN	11,775.6
2012	SAGE HEN	12.5
2012	ANTELOPE	622.3
2012	LAKE	1,664.8
2012	SALISBURY	41.8
2012	SISTERS	76.0
2012	40	39.1
2012	CONSTANIA	97.2
2012	MARR	227.1
2012	NELSON (W-1)	3,659.5
2012	RED	12.4
2012	RUSH	270,279.3
2012	SCHALER	65.7
2012	SPANISH	1,150.9
2012	STONE	17.1
2012	TERMO	38.6
2012	BARRY POINT	8,389.2
2011	BUCKEYE	1,045.6
2011	MAMMOTH	1,193.3
2011	SCORPION	1,417.5
2011	ANNIE	2,075.8
2011	DEPOT	19.6

2011	HERLONG	324.9
2011	HOG	267.4
2011	HOLBROOK 2	84.1
2010	BRAMLETTE	98.1
2010	POTATO	631.7
2010	MONO	1,204.5
2010	SUNNYSIDE	231.1
2010	WITCHER	78.6
2010	RUSSELL COMPLEX	72.2
2010	HAGER	22.0
2010	DALTON	17.1
2010	BIRTHDAY	146.9
2010	PATTERSON	10.8
2010	CONSTANTIA	1,103.1
2010	MCDONALD	9,406.0
2010	ANNIE	249.1
2009	FLAT	62.1
2009	RAIL	68.3
2009	DODGE	81.6
2009	MENDIBOUREAU	1,426.5
2009	SNOWSTORM	17.6
2008	PAINTERS	14.7
2008	CORRAL FIRE	6,484.8
2008	LOOKOUT FIRE	14.4
2008	TIOGA	22.1
2008	SHERWIN	273.1
2008	WILLOW	14.4
2008	JACK	2,845.3
2007	LOOKOUT	64.5
2007	ROCK BSFMU A6	267.3
2007	LARSON	1,076.0
2007	TWIN	30.3
2007	DANHAUSER	145.1
2007	SCHOTT	60.6
2007	OHAREL	9.3
2007	COYOTE	15.9
2007	FLETCHER	74.9
2007	HARVEY	15.2
2007	HOWARDS GULCH	22.0
2007	POT HOLE	13.8

2007	BULL	168.8
2007	CONWAY	89.1
2007	BACKSCATTER	68.5
2007	BLACK	14.9
2007	PAST	85.0
2007	JUNE	679.6
2007	LOOKOUT	73.0
2007	CLEAR	25.7
2006	OBSERVATION COMPLEX	4,078.6
2006	SAGE	239.8
2006	LAVER	145.2
2006	DOYLE	25.5
2006	LGT #22 (3-9)	504.6
2006	LGT #17 (3-5)	224.7
2006	MILLER DIV Z	99.5
2006	BUMP	523.7
2006	RED	38.6
2006	PINNACLE	50.2
2006	SAGE	4,853.7
2006	YOUNG 1	14.0
2006	SHOOTING	18.3
2006	CLEAR LAKE	554.3
2006	SAWMILL	342.0
2006	STEELE	34.9
2006	WILLOW	34.6
2006	BLUE 2	25.4
2006	SAGEBRUSH	52.1
2006	WILDLIFE	158.1
2005	BSFMU 2	12.0
2005	BUCK	204.4
2005	COUGAR	114.8
2004	GATES COMPLEX	8,850.9
2004	CRATER MOUNTAIN	148.4
2004	DECHAMBEAU	27.5
2004	RED ROCK	10.3
2004	STONEY	954.5
2004	BELFAST	447.1
2004	SKEDADDLE	367.5
2004	SNAKE	471.4
2004	SUNFLOWER FLAT	9.6

2004	LMU DIXIE	118.6
2004	STRAYLOR	1,316.9
2004	BSFMU10	14.6
2004	MAMMOTH	146.7
2004	CCD BORDER	267.6
2004	DANA	3,161.5
2003	ACKLEY	9,599.0
2003	ROCK	19.1
2003	CHILCOOT	5,641.6
2003	DEXTER	632.7
2003	JUNE	50.4
2003	LIGHTNING 55	18.4
2003	A-3	1,047.1
2003	DIANE	181.3
2003	MCGEE	8.0
2003	SMOKE	4,812.1
2003	RAM	182.8
2003	BRUBECK	41.5
2003	SHINN	594.6
2003	SKEDADDLE	285.8
2003	TURTLE	137.1
2003	VALLEY	135.2
2003	LUNDY FIRE	739.7
2003	STEEP	5.6
2003	PETE	29.6
2003	BARBER	1,267.0
2003	DODGE	40.2
2003	SNOWSTORM	24.2
2003	SECRET	1,195.1
2002	MENDIBOURE	22.3
2002	KNOX	20.1
2002	BLACK	1,511.9
2002	HORSE	91.2
2002	ANNIE	292.1
2002	TWENTY-NINE	76.7
2002	CANNON	13,525.5
2002	DEEP CREEK	24.5
2002	HILL	13.0
2002	BSFMU5	16.5
2002	BSFMU7	36.3
2002	PIUTE	391.6

2002	RUSH	4,846.3
2001	GRASSHOPPER	992.2
2001	PARSNIP	72.4
2001	BLUE	8,920.2
2001	CLEAR	4,318.9
2001	CANYON	225.0
2001	FERN	16.1
2001	BSFMU48	26.0
2001	BSFMU25	125.9
2001	BSFMU31	712.9
2001	COWHEAD	710.5
2001	FANDANGO	30.7
2001	MCLAUGHLIN	2,543.9
2001	BSFMU17	145.4
2001	BSFMU34	120.8
2001	KELLOGG	187.7
2001	FOURMILE	82.3
2001	BSFMU27	17.1
2001	ROCK	1,313.1
2001	BELL	1,568.6
2001	CRATER	4,623.1
2001	DOUBLEHEAD	24.0
2000		1,527.6
2000	POINT	22.3
2000	AZUSA	207.6
1999	GOOSE	30.0
1999	BSFMU STEELE	7.9
1999	VALLEY	112.3
1999		246.5
1999		3,625.1
1999	PINE	30,437.3
1999	F	51.4
1999	BSFMU HOG	72.7
1999	BSFMU XL	25.8
1999	COPPER	12.2
1999	CHANDLER	83.4
1999	LAKE	8.5
1999	LAKE2	2,516.7
1999	ERQUIAGA	8.8
1999	ANNIE	638.7
1999	DOW	79.5

1999	WILLOW	6,861.1
1999	DECHAMBEAU	11.4
1998	BUCHER	11.1
1998	NORTH CROWDER	2,693.1
1998	COYOTE	61.0
1997	WILSON	63.2
1997	RESEARCH	54.3
1997	BOOT	16.0
1997	DECHAMBEAU	42.1
1997	BOOT	3.4
1997	BOOT	1.1
1997	CLARKS	16.4
1997	BOOT	17.1
1997	CDF #8	7.8
1997	CDF #6	15.1
1996	ROCK (BSFMU #3)	189.0
1996	CLEAR LAKE	70.6
1996	BSFMU#9	21.2
1996	TIOGA	13.8
1996	COLEVILLE	2,581.5
1996		29.5
1996	CENTER FIRE	125.9
1996	DIXIE FIRE	216.2
1996	PASS FIRE	87.5
1996	MT. JACKSON	856.8
1996		575.1
1996	MARTINECK	330.6
1996	DALTON 3	2,378.6
1996	MOWITZ 1	18.9
1996	SURVEYORS	135.7
1996	JACKS #3 (BSFMU)	27.0
1996	RAVE	139.6
1996	OBSERVA	32.0
1996	BYERS FIRE	1,019.1
1996		156.5
1996		49.1
1996	DALTON 2	90.2
1996	HORSE	2,764.0
1996	SAND	10.1
1996	YOUNG	6.9
1996	LAKE	237.1

1996	SUGAR	4.9
1995		302.4
1995		49.3
1995		103.2
1995	DEMO	446.7
1995		349.6
1995	SHAFFER FIRE	274.8
1995	LOST	127.3
1995	BYERS	251.8
1995	LARSEN	80.8
1994	COTTONWOOD	2,855.6
1994	DOYLE	539.0
1994		154.9
1994	RIMROCK	70.3
1994		44.2
1994	WILLOW	99.7
1994	LASSEN	6.0
1994	HEATH	13.3
1993	WIDOW INC.	208.2
1993		544.1
1992	AIRPORT	9.5
1992		359.5
1992	TRIANGLE	703.2
1992		84.9
1992	ESSEX	14.2
1992	SCOTT	13.8
1992	MAMMOTH	7.8
1991	DUTCH	268.7
1991		461.8
1991	GRAVES	136.7
1991	JACKS	21.8
1991		22.5
1990		1,562.5
1990	TWIN	80.3
1990		26.4
1990	CROWDER MT.	1,481.8
1990	LAKESHORE	185.8
1990		121.5
1990		36.3
1990		381.7
1990	RATTLESNAKE	80.0

1990		55.5
1990	DEAD	3.3
1990		8,504.4
1990		14,471.3
1990		8.0
1990		112.4
1989		76.7
1989		115.0
1989	FRENCH	44.2
1988	PUPPY	17.1
1988		35.1
1988		57.3
1988		577.7
1988	LIGHTNING #97 (BISON)	2,263.7
1988	HORSE	7.6
1988		2,054.8
1988		123.1
1987	HIGHROCK	841.4
1987		31.7
1987	PLUMAS NF #531 (CLARK)	2,228.2
1987	BLM #D-430	619.2
1987		375.6
1987	TRIANGLE	68.0
1987	CEDAR	350.2
1987	EAST SAND	2.1
1987		1,071.1
1987		903.9
1987		38.8
1987	LAUREL	1,018.1
1986	BIRD	25.0
1986	SAND	9.5
1986		23.3
1986		510.0
1986		20.5
1986		10.8
1986		790.9
1986	DRY CREEK	3,422.5
1986	LAVER	812.8
1986		1,123.8
1986		47.9

1985	MURRER	1,072.5
1985		88.0
1985		13.9
1985		64.7
1985	F	33.4
1985		797.7
1985	OWENS	3,036.1
1985		16.8
1985	BASS	2,366.9
1985		490.1
1985		1,140.5
1985		55.1
1985		225.0
1984	GREEN GULCH	788.0
1984		1.1
1984	BECKWITH (TAHOE NF)	343.8
1984	BLM D-354	309.6
1984	COW	2,501.6
1984		228.4
1984		2,455.0
1984	DRY	12.7
1984	CABIN	58.0
1984	HILL	155.1
1984	MOUNTAIN	19.5
1984	EAGLE	1,791.0
1984	SECOND	829.3
1984		17.5
1984		24.8
1983		60.4
1983	TWO	7.3
1983	BLM #365	303.2
1982	BLUE	316.9
1981	DEADHORSE	51.9
1981	EAST	423.3
1981	COYOTE	396.8
1981	THREE	688.6
1981	BLUE	84.6
1981	LIGHTNING #20 (WEBBER)	1,763.8
1981	RICE CANYON RD.	268.9
1980		18.2

1980		15.1
1980	HEATH	28.4
1979	CRAIG	18.2
1979	SHARTELL	30.6
1979		1,452.0
1979		24.8
1978	SCORPION	110.7
1978	DOBIE	282.5
1978	HAWK	143.2
1978	LIGHTNING #51	2,041.9
1978		70.8
1978		43.2
1977	LIGHTNING #127	376.6
1977	GERIGCOUGAR	21,163.8
1977	JANES	92.7
1977	BUCHER	18.4
1977	WATERBOX	4.8
1977	SCARFACE	394.0
1976	FENDER	17.1
1974		9.4
1974		661.8
1974		758.9
1974		22.2
1974		108.2
1974	BEAVER	0.4
1974	LITTLE	9.3
1974	DOUBLEHEAD	17.1
1974	DAVIS	28.2
1974		9.7
1974	JUNCTION	1,135.6
1973	ADIN	37.8
1973		22.5
1973	9 MILE	18,727.0
1973		376.0
1973		189.3
1973	SUNNYSIDE DUMP #3	394.2
1973	LAVA	528.7
1973	CASUSE	167.8
1973		63.6
1973		95.0

1973	LANDS	167.4
1973	CALABRESE	241.1
1972		120.0
1972		145.6
1972		156.2
1972	WEST LAKE	105.5
1972		150.5
1972		114.3
1972		698.3
1972		12.6
1972		16.4
1971	TIONESTA	427.5
1971		71.5
1971	CASUSE	1,568.4
1971	TWIN	3,358.9
1970	BRILES	2.1
1970		63.5
1969	RENO	640.8
1969	PUTR PLANTING	2,582.0
1968	RAIDER	62.7
1968	NELSON SPRINGS #15	465.8
1966		2,509.1
1966		268.1
1966	DORSEY BUTTE	476.2
1965	CLEAR	17.1
1965	MILEPOST#47	6.8
1964	LIGHTNING #37	1,561.8
1964		368.0
1964		682.4
1964		27.0
1964		67.1
1964	HOWARD'S	18.6
1964	HORSE	400.6
1964	CASUSE	8.3
1964	HARRISON SPRINGS	1,176.5
1964	HIGHWAY 395	633.9
1964		221.2
1964	SHIELDS	1.2
1963		866.8
1963	PANHANDLE	439.5

1963	BEN	366.6
1963		151.3
1962	MODOC #1	307.9
1962		70.5
1962	DOBIE	8.4
1961	LIGHTNING #20	13,003.1
1961	NORTH CREEK	845.0
1961		44.5
1961		2.6
1961	SISTER	8.6
1960	SUMMIT	610.9
1960		1,808.5
1959	MADELINE LTNG #13	684.4
1959		100.9
1959	MCGINTY	19.6
1959	RIM ROCK	173.2
1959	THREE PEAKS	12,250.5
1958	SNOWSTORM	2,282.1
1958	FORT SAGE	516.4
1958	S.P.R.R.	760.9
1958	S.P.R.R. #2	829.4
1958	PARKER CR.	597.3
1957	MILEPOST 40	12,182.7
1957	DEAD HORSE	10.9
1957	DEEP CR.	13.5
1957	SPRR MAINLINE #20	11,667.7
1956		242.8
1956		122.5
1955		206.8
1955		70.7
1955	WELL RIG	39.8
1955	HOWARDS GULCH	515.3
1955		892.7
1954	TWIN SISTER	2,429.2
1954	CASUSE RIDGE	1,063.2
1954		358.2
1954	HALLELUJAH	2,749.8
1954		254.0
1954	MYERS	617.9
1954		119.9

1953	ORDNANCE BLM #4	966.3
1953	HALLELUJAH BLM #6	961.2
1953		335.9
1953		122.1
1952	HAY	241.3
1951	BOARD	21.5
1951	WILLOW CREEK	1,829.6
1951	MCCLELLAN	86.9
1951		115.3
1951		165.5
1951		22.8
1951	BLUE MT.	263.1
1951	MOWITZ	16.7
1951	MEARS	20,509.5
1950	BAGGETT GULCH	335.4
1950	PEAVINE JCT.	151.0
1950	PUMICE MILL	6,455.3
1950		60.3
1950	GARNIER	115.6
1950	DRY LAKE	224.7
1950	PANHANDLE	586.4
1950	POLE 1-55	6.1
1950	PEREZ	4.8
1950	PLUM RIDGE	62.7
1950	MAMMOTH	7,061.2
1949	CINDERPITSPU	7.0
1949		228.9
1949		7,062.7
1949		1,303.4
1949	COVE RANCH	51.9
1949	W. BLACK ROC	84.4
1949		467.7
1949	COLD SPRINGS	2,416.2
1948		515.1
1948		66.8
1948	CUMMINS	16.0
1948		9,163.4
1947		32.0
1947		5,035.4
1947		277.3

1946		227.4
1946		24.2
1946		30.8
1946		183.9
1946	BLUE LAKE	32.9
1945	STATE LINE	68.6
1945	BOLES	28.0
1945	JAP CAMP	341.9
1945	MUD LAKE	6.4
1945	BARE CR.	309.6
1945		76.7
1944	HOWARDS GULCH	111.0
1944	HARTER	525.8
1944	SCORPION POI	1,072.9
1944	TWIN SISTER	4,497.2
1944	JONES LAKE	15.4
1944	GLEASON CR.	726.2
1944		23.1
1944	CLARKS VALLEY	634.4
1943		1,010.1
1943		573.7
1943		36.5
1943	GOOSE BAY	494.9
1943		4,830.6
1942		1,026.2
1942		2,762.3
1942		208.9
1942	DEEP CANYON	794.4
1941		228.8
1941	KOWOLOSKI	138.3
1941	MAMMOTH	15,607.0
1940		196.7
1940	LOG CORRAL	18.7
1940	BRYANT MT.	897.3
1940	TUCKERBUTTE	3.6
1940	SUGAR HILL2	2,796.0
1940	SUGAR HILL3	16,818.7
1940	MIDDLE FORK	4,116.9
1939		26.6
1939		745.0
1939	LAKESHORE	97.0

1939	SAND BUTTE	852.0
1939	CRANE CR.	618.8
1938	BIG SAND BUT	856.1
1938	LAVA BEDS	3,072.6
1938	HOSPITAL ROC	14,213.7
1938	ANTELOPE CR	27.2
1938	MASON PLACE	34.1
1938	PEREZ	48.5
1937	MAMMOTH#2	45.1
1936		2,733.7
1936		91.9
1936		467.4
1936		558.0
1936	SAGEHORN	19.7
1936	CORNELL	22,050.2
1936	KILGORE	227.9
1936	QUICKSILVER	381.9
1935		18.5
1935	SUGAR HILL	58.2
1934		76.1
1934		43.1
1934	MOUSE SPR.	13.4
1934	RELEFORD	471.7
1934	ZAMBONI	1,560.1
1933	SUGAR HILL	161.5
1933		597.9
1932	BUCK SPRING	28.4
1931		729.6
1931		28.1
1931		22.7
1931		269.6
1931		3,373.1
1931	GREAT NORTHE	22.5
1931	CAMP#42	7.7
1931	SUGAR HILL	375.5
1931	CAMP 1	271.5
1931	FANDANGO PS	350.0
1930		40.9
1929	PAGE PLACE	427.4
1929	SUGAR HILL	8,824.7
1929	SUGARHILL2	298.8

1929		301.4
1928		180.4
1928	BLUE MT. 3	248.0
1928	BLUE MT. 3	241.8
1927	BUTCHER SWP.	44.4
1926	MISTLETOE CP	15.3
1926	FORT BIDWELL	13,100.9
1925		206.2
1924	SAND BUTTE	92.6
1922	FANDANGO PK	201.9
1921		8.8
1920		6,838.1
1920	TIMBERED MT.	14.3
1920	ROSS CREEK	1.9
1919		33.5
1919	HOUSEHOLDER	20.6
1918		26.3
1918		417.4
1918	MILL CREEK	261.3
1918	N.DAVIS CR.	2.2
1917	WATKINS MILL	1.8
1917	MILL CR.	53.2
1917		878.3
1917		63.4
1917		514.6
1915	HOG LAKE 3	21.8
1914		76.3
1912		13.8
1910		133.2
1910	WILLOWRANCH	21.1
1910	HAT MT.	288.3
1910		235.4
	TOTAL	**1,346,029.5**