5-YEAR REVIEW
Southern Sierra Nevada Distinct Population Segment of Fisher (*Pekania pennanti*)

GENERAL INFORMATION

Species: Southern Sierra Nevada Distinct Population Segment (DPS) of fisher (*Pekania pennanti*)
Date listed: June 15, 2020
Federal Register (FR) citation: 85 FR 29532 (Service 2020a)
Classification: Endangered

State Listing:
The southern Sierra Nevada evolutionarily significant unit of the fisher was listed as threatened by the State of California in 2019.

BACKGROUND

Species overview:
The fisher (*Pekania pennanti*) is a medium-sized, light brown to dark blackish brown mammal belonging to the weasel family (Mustelidae). The fisher is found primarily in mature conifer and mixed hardwood forests, with populations distributed across parts of California, Oregon, and Washington; the Rocky Mountains; the northeastern United States; and Canada. Fishers are obligate users of tree or snag cavities for denning, and they select denning and resting sites with a high proportion of characteristics associated with late-successional forests, such as snags, down wood, and vertical and horizontal diversity. The Southern Sierra Nevada DPS of fisher (southern Sierra Nevada fisher) is one of two DPSs on the west coast of North America and represents the southern-most population (Service 2016, pp. 26–29). The southern Sierra Nevada fisher occurs from the Tuolumne River in Yosemite National Park south through the forested lands abutting the Kern River Canyon (Service 2020b, p. 4). While the historical range of the southern Sierra Nevada fisher likely extended farther north, genetic evidence suggests the two DPSs of fisher on the west coast have been isolated from each other since prior to European settlement (Tucker *et al.* 2012, pp. 6, 7–8; Service 2020a, p. 29545; Service 2020b, p. 4).

Most recent status review:
There are no previous 5-year status reviews for the southern Sierra Nevada fisher. The 2020 final listing rule provided updated information on the species and its status.

[Service] U.S. Fish and Wildlife Service. 2020. Endangered Species Status for Southern Sierra Nevada Distinct Population Segment of Fisher. Federal Register 85: 66987–67006.

FR notice citation announcing this status review:
[Service] U.S. Fish and Wildlife Service. 2024. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 59 Pacific Southwest Species. Federal Register 89: 83510–83514.

We received information from the National Park Service regarding tracking and monitoring efforts for fishers in Yosemite National Park. These data are further discussed in the **Monitoring and Research** section.

ASSESSMENT

Information acquired since the last status review:
This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Sacramento Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on October 16, 2024. We also contacted species experts, performed a literature search, reviewed information from our own files, including a review of southern Sierra Nevada fisher 10(a)(1)(A) recovery permit annual reports, and obtained data from an occurrence search of the California Natural Diversity Database (Diversity Database) maintained by the California Department of Fish and Wildlife, and fisher observation and survey data from the U.S. Forest Service and National Park Service.

Since listing, the southern Sierra Nevada fisher has been detected in six counties, with new occurrences reported in Stanislaus National Forest within Tuolumne and Mariposa Counties (discussed in **Distribution**). The most recent putative abundance estimate, along with subpopulation estimates for fishers in Yosemite, Sequoia, and Kings Canyon National Parks, suggests there are between 100 and 500 individuals, as reported in the 2020 final listing rule (discussed in **Abundance**). Updates on threats to the population are addressed in **Threats**. Lastly, monitoring efforts and new research are summarized in **Monitoring and Research** and a brief overview of recovery actions is provided in **Recovery.**

Distribution:
At the time of listing, the southern Sierra Nevada fisher was known to occur within the Sierra Nevada mountain range in five counties in California: Mariposa, Madera, Fresno, Tulare, and Kern Counties (Service 2020a, p. 29562). The northern boundary of its range was thought to be the Tuolumne River in Mariposa County in Yosemite National Park (Service 2020a, p. 29562). The southern portion of the Stanislaus National Forest and northern portion of Yosemite National Park were largely unoccupied, with at least one confirmed detection north of the Merced River (Service 2020a, p. 29563). The southern limit of the range was the forested lands abutting the Kern River Canyon in Kern County, while the eastern limit was the high-elevation, granite-dominated mountains, and the western limit was the low-elevation extent of mixed-conifer forest.

Following listing, fishers continue to be detected across the five counties and the five federally managed lands (Inyo National Forest, Sierra National Forest, Sequoia National Forest, Sequoia and Kings Canyon National Parks, and Yosemite National Park) reported in the 2020 listing rule (Forest Service 2021, geospatial data; Sequoia and Kings Canyon National Parks 2021, geospatial data; Diversity Database 2025, geospatial data). In addition, new detections of fishers including denning female fishers and family groups have been reported north of the Merced River in Yosemite National Park in Tuolumne County and on the Stanislaus National Forest in Tuolumne County and Mariposa County (Forest Service 2021, geospatial data; Service 2022, p. 66998; H. Mackey, Yosemite National Park, *in litt.* 2025, unpaginated). These recent detections

indicate a fisher subpopulation has been established north of the Merced River resulting in a northward expansion of the current range of the species (Service 2022, p. 66998).

Abundance:
At the time of listing, the southern Sierra Nevada fisher was known to exist as a small and isolated population (Service 2020a, pp. 29570–29571). As summarized in Service (2016, p. 49), early population estimates for the southern Sierra Nevada fisher ranged from 100 to 500 individuals (Lamberson *et al.* 2000, p. 2; Spencer *et al.* 2011, pp. 801–802). More specifically, the estimated mean subpopulation size between 2008 and 2012 in the Sierra Nevada Adaptive Management Plan study area, spanning from southwestern Yosemite National Park to northwestern Sierra National Forest, was 48–62 individuals (Sweitzer *et al.* 2015, p. 1). Additionally, in the Kings River Fisher Project study area, located between the San Joaquin and Kings Rivers, the subpopulation was estimated at approximately 68 fishers (Spencer *et al.* 2015, p. 9). Furthermore, estimates of population growth rates for the surveyed portions of the southern Sierra Nevada fisher range did not definitively indicate a positive or negative trend overall (Service 2020a, pp. 29545, 29567).

Most recently, Martin *et al.* (2025a, entire) estimated the putative abundance of the southern Sierra Nevada fisher using a Royle-Nichols model framework (Royle and Nichols 2003, entire). The putative abundance estimate represents a modeled or inferred approximation of the total number of individuals in the population. Rather than being based on direct counts, it is derived from detection and non-detection data, habitat-based models, and assumptions regarding species occupancy and density. The estimate incorporated 12 years of presence-absence survey data and opportunistic point count data collected between 2011 and 2022 (Martin *et al.* 2025a, pp. 15–16). Due to data limitations including limited interannual survey data, the survey data from all 12 years were aggregated to produce a single estimate of the number of southern Sierra Nevada fisher on the landscape during the 12 years of data collection (Martin *et al.* 2025a, p. 10). The southern Sierra Nevada fisher was predicted to occur at a density of 6.95 (6.32–7.64) fishers per 38.6 square miles (100 square kilometers or 24,704 acres) during the 12-year period. Based on this density and the spatial extent of suitable habitat, Martin *et al.* (2025a, p. 16) calculated an aggregated estimated mean putative abundance of 995 (905–1,094) fishers over the 12-year period. This putative abundance estimate is expected to overestimate fisher abundance and occurrence in un-surveyed areas or areas with low survey effort, and therefore should not be interpreted as an estimate of population size without additional calibration (Martin *et al*. 2025a, pp. 26–27).

In addition to the broad 12-year putative abundance estimate, a focused mark-recapture study has been conducted in Yosemite, Sequoia, and Kings Canyon National Parks and neighboring U.S. Forest Service lands since 2021. This study aims to monitor these subpopulations and refine estimates of subpopulation size in these specific areas (M. Martin, Oregon State University, *in litt.* 2025, entire). Preliminary data from 2023–2024 indicate median estimated subpopulations of 56 (25–87) fishers in Yosemite National Park and 26 (6–40) fishers in Sequoia and Kings Canyon National Parks (Martin *in litt.* 2025, p. 2). Moreover, the Sequoia and Kings Canyon National Parks subpopulation has remained relatively stable over the years, with minimal variation, despite substantial habitat loss from recent wildfires (Green 2025, p. 4; see Table 4 and *Wildfire* subsection in **Threats**). While these studies have improved our understanding of

population abundance in parts of the range, the overall population size of the southern Sierra Nevada fisher is not known.

Occupancy trends show the southern Sierra Nevada fisher subpopulations on National Forests have remained stable overall since 2011 with some year-to-year variation (Forest Service 2025a, p. 11). However, fishers on the Sierra National Forest have experienced a dramatic decline following the Creek Fire in 2020 (Forest Service 2025a, p. 14). Additionally, fisher subpopulations in Sequoia and Kings Canyon National Parks have reportedly remained mostly stable since 2021 (Green 2025, p. 4); however, recent estimates suggest a slight decline in this subpopulation (M. Martin *in litt.* 2025, p. 2; **Table 1**). Conversely, fishers in Yosemite National Park are showing an increasing trend (Martin *in litt.* 2025, p. 2; **Table 1**). Monitoring efforts across these managed lands are discussed further in the **Monitoring and Research** section.

Table 1. Abundance estimates from spatial mark-recapture data for southern Sierra Nevada fishers in Yosemite National Park and Sequoia and Kings Canyon National Park (Martin *in litt.* 2025, p. 2).

Administrative Unit	Median (range) estimated abundance 2021–2022	Median (range) estimated abundance 2022–2023	Median (range) estimated abundance 2023–2024
Yosemite National Park	35 (18–50)	43 (18–65)	56 (25–87)
Sequoia and Kings Canyon National Park	34 (11–52)	36 (15–52)	26 (6–40)

Threats:
At the time of listing, multiple threats to the southern Sierra Nevada fisher and their habitat were identified, including climate change, tree mortality, wildfire and wildfire suppression, exposure to toxicants, vegetation management, disease and predation, and vehicle collisions (Service 2020a, pp. 29538–29546). These threats continue to pose significant risk to the species. The following section summarizes new information related to the previously identified threats of climate change, wildfire, vegetation management, toxicants, disease, and competition and predation.

Climate Change
Climate trends in the Sierra Nevada mountain range predict rising temperatures, more frequent extreme precipitation events (prolonged droughts punctuated by occasional heavy precipitation events), and less snowpack (Dettinger *et al.* 2018, entire). Though the overall response of fishers to changing climate conditions is not fully understood, contemporary research indicates warmer temperatures adversely affect fisher survival (Kuntze *et al.* 2024, pp. 18–19). Martin *et al.* (2025b, p. 4) found fishers selected against warmer microclimates and against areas far from streams, indicating that rising temperatures will decrease fisher habitat quality and availability. However, cool areas near streams, such as riparian zones, may offer a refugia in hot conditions. Warmer conditions have also been correlated with smaller litter sizes (Green *et al.* 2018, p. 545) and reduced prey availability due to diminishing winter microhabitats (Scott *et al.* 2022, entire). Additionally, the combination of warming temperatures and shifting seasonal precipitation regimes have led to severe drought conditions, which is driving large-scale tree mortality (Fettig

et al. 2019, entire; Goulden and Bales 2019, entire) and fire activity in recent years (Parks and Abatzoglou 2020, entire; Williams *et al.* 2023, entire). These changes will likely reduce habitat availability for fishers and are discussed in greater detail below in subsections *Tree Mortality* and *Wildfires* in **Threats**.

Conversely, fishers have been found to select den sites for their thermoregulatory properties to mitigate winter temperatures during early development of kits (Mathews *et al.* 2019, pp. 1, 3). Thus, warming temperatures may increase available denning opportunities by providing access to a wider variety of cavities that may not be currently suitable. Furthermore, reduced winter snowpack could be beneficial to female fishers, as deep snow negatively affects survival during parturition, or birthing, in late winter (Kuntze *et al.* 2024, pp. 19–20). Additionally, fisher habitat is projected to increase by 80 and 120 percent by 2070 under two future climate scenarios, Representative Concentration Pathways (RCP) 4.5 and RCP 8.5, respectively (Deb *et al.* 2020, p. 445, Table 2). However, these estimates are conducted at the continental scale, so while habitat in Canada and portions of Alaska may become available in the future, habitat in California and Oregon may see some decline in suitable habitat under both emission scenarios by 2070 (Deb *et al.* 2020, p. 446, Figure 3). In other words, although fisher habitat is predicted to increase in the northern regions of North America, habitat occupied by the southern Sierra Nevada fisher is predicted to decline. However, the model did not account for projections of wildfire frequency or intensity, which will likely influence the availability of fisher habitat under both emissions scenarios. Overall, more information is needed to evaluate the long-term impacts of climate change on fisher populations.

Tree Mortality

Forests in California are experiencing large-scale tree mortality due to prolonged drought and subsequent increased susceptibility to insect infestations (Young *et al.* 2017, p. 13). Tree mortality is reducing the amount of suitable habitat for fishers, particularly where canopy cover, a key predictor of fisher occupancy, is lost (Kordosky *et al.* 2021, p. 295; Olson *et al.* 2024, pp. 7–8). This trend is further supported by a recent study that found fishers selected for live forests and selected against open areas, regardless of availability (Martin *et al*. 2025b, pp. 6–7, Figure 4). However, both male and female fishers were also found to use patches of standing-dead tree forests within established territories (Martin *et al.* 2025b, pp. 4, 6). Standing dead-tree forests may act as corridors between patches of live-tree forests (Martin *et al.* 2025b, p. 6, Figure 1). Nonetheless, fisher avoidance of open areas became more pronounced as tree mortality intensified and the extent of open space increased (Martin *et al.* 2025b, p. 7, Figure 4).

Additionally, dietary research conducted in post-tree mortality landscapes indicates fishers shift from a primarily mammalian diet to increased consumption of plant (*Ribes* spp.) and fungi (*Suillus* spp.) materials (Pilgrim *et al.* 2023, pp. 4–6). While fishers exhibit considerable dietary flexibility, which may confer some level of resilience to ecological changes, reduced availability of some mammalian prey species may have long-term consequences for the southern Sierra Nevada fisher (Pilgrim *et al.* 2023, pp. 6, 8; discussed further in *Diet and Prey Management* subsection in **Monitoring and Research**). Further research is required to investigate potential fitness impacts of these dietary changes in light of ongoing drought conditions resulting in extensive tree mortality. Additionally, when plant biomass decreases and water becomes scarce during prolonged droughts, fishers exhibit greater consumption of fungi (Smith *et al.* 2022,

entire). This shift towards fungi raises concerns as male survival decreases with elevated fungi consumption (Kuntze *et al.* 2024, pp. 18, 21).

Wildfires

Since the species was listed in 2020, 29 large wildfires (i.e., greater than 1,000 acres) have been reported within the southern Sierra Nevada fisher range, cumulatively burning approximately 880,981 acres (Monitoring Trends in Burn Severity 2023, geospatial data; **Appendix 1**). A substantial portion of this area was affected by four megafires, each exceeding 80,000 acres, within Sierra National Forest, Sequoia National Park, and Sequoia National Forest: the 2020 Castle Fire, the 2020 Creek Fire, the 2021 Windy Fire, and the 2021 KNP Complex Fire (**Appendix 1**). Sequoia National Forest and Sierra National Forest collectively accounted for approximately 655,000 acres of the total area burned within the range of the species (**Table 2**). Notably, no large wildfires occurred in 2024.

Of the total area burned within the range of the southern Sierra Nevada fisher, 46 percent (409,304 acres) was classified as moderate to high severity (Monitoring Trends in Burn Severity 2023, geospatial data; **Appendix 2**). Areas burned at higher severity are unlikely to support fisher reproduction due to the loss of essential denning and resting structures (Service 2022, p. 66993). In contrast, most of the burned area was classified as low severity, which primarily affects understory vegetation and results in minimal loss to overstory canopy cover and is therefore unlikely to significantly impact fisher habitat (Hart *et al.* 2025, p. 10). Patches of unburned habitat and low severity burn sites are likely critical for maintaining important post-fire movement corridors for fishers. Moreover, low-severity fires may benefit fishers by creating important habitat features such as tree cavities used for denning and resting (Service 2020a, p. 29564).

Table 2. Summary of the total acres burned on federally managed lands within the southern Sierra Nevada fisher range from 2020 to 2024 (Thompson *et al.* 2021b, unpaginated; Monitoring Trends in Burn Severity 2023, geospatial data).

Administrative Unit	Total Acres Burned	Acres Burned at Moderate to High Severity
Inyo National Forest	16,947	412
Sequoia National Forest	259,587	56,408
Sierra National Forest	394,990	67,720
Stanislaus National Forest	0	0
Kings Canyon National Park	12,463	3,483
Sequoia National Park	101,101	7,684
Yosemite National Park	20,704	2,158

The wildfire activity from 2020 to 2024 has led to notable shifts in the estimated amount of suitable reproductive habitat for the southern Sierra Nevada fisher (**Appendix 3**). During this period, approximately 288,000 acres of the modeled reproductive habitat for the southern Sierra Nevada fisher burned at moderate to high severity, resulting in a substantial loss of essential denning habitat (Thompson *et al.* 2021b, unpaginated; Monitoring Trends in Burn Severity 2023, geospatial data; 3). This impact was especially severe in the southern portion of the range, where

151,000 acres of modeled reproductive habitat in Sequoia National Forest and Sequoia National Park burned at moderate to high severity, accounting for 86 percent of the modeled reproductive habitat in that region. This is consistent with recent findings that female fisher habitat declined substantially between 2012 and 2020 and is more susceptible to burning at moderate to high severity (Hart *et al.* 2025, p. 10).

Furthermore, a 2025 preliminary habitat model indicates that fisher habitat declined by approximately 84,000 acres between 2019 and 2022, representing an estimated 23 percent reduction (Forest Service 2025b, unpaginated; **Table 3**). The most pronounced habitat loss occurred in Sequoia National Forest where more than 39,000 acres of suitable habitat were lost within a 4-year period mostly as a result of the 2020 Castle Fire and 2021 Windy and KNP Complex Fires. Additionally, suitable habitat decreased by approximately 36,000 acres in the Sierra National Forest, largely as a result of the 2020 Creek Fire (Forest Service 2025b, unpaginated). Despite these substantial declines, the Sequoia National Forest and Sierra National Forest continue to support the largest proportion of habitat for the southern Sierra Nevada fisher. Conversely, the area of modeled suitable habitat in the Inyo National Forest, Stanislaus National Forest, and Yosemite National Park has collectively increased by 3,914 acres, which may be a result of minimal moderate to high severity fires within these areas, allowing for vegetation growth and continued maturation of forest conditions.

Table 3. A comparison of the estimated habitat area (in acres) for the southern Sierra Nevada fisher pre-listing (2019) and post-listing (2022) (Forest Service 2025b, unpaginated).

Administrative Unit	2019 Habitat Area	2022 Habitat Area	Difference in Habitat Area
Inyo National Forest	28,405	29,712	1,307
Sequoia National Forest	105,991	66,691	-39,300
Sierra National Forest	135,021	99,322	-35,699
Stanislaus National Forest	15,120	16,049	929
Kings Canyon National Park	6,603	4,263	-2,340
Sequoia National Park	29,252	22,605	-6,647
Yosemite National Park	40,814	42,492	1,678
Southern Sierra Nevada Fisher Range	**361,631**	**277,865**	**-83,766**

As summarized in the revised proposed critical habitat rule (Service 2022, p. 66993), available research on the short-term impacts of wildfires indicates that fisher abundance and density are significantly altered in post-fire landscapes (Green *et al.* 2022, pp. 9–10; Collier 2024, p. 53). Research shows that fishers continue to use low-severity burn areas but generally avoid those affected by moderate to high-severity fire and gradually recolonize mixed-severity burned areas within four years of ignition (Thompson *et al.* 2021a, pp. 235–236). This is supported by recent surveys documenting fisher presence along the edges and within the footprints of the 2020 Creek and Castle Fires the year following ignition (Forest Service 2021, geospatial data; Sequoia and Kings Canyon National Parks 2021, geospatial data; Monitoring Trends in Burn Severity 2023,

geospatial data; Diversity Database 2024, geospatial data; 3). However, the long-term impacts of wildfire on fisher abundance and reproductive success remain uncertain.

Fuels and Vegetation Management

To address the increasing frequency and intensity of wildfires within the southern Sierra Nevada fisher range, the National Park Service and the U.S. Forest Service have implemented various fuels and vegetation management activities. Key strategies include, but are not limited to, prescribed burning to reduce fuels loads, forest thinning, and hazardous tree removal. A recent study has shown that under a business-as-usual scenario, which includes extensive tree mortality and high-severity fires with minimal management intervention, fisher habitat is projected to decline by 64 percent by 2075 and 99 percent by 2100 (Jones *et al.* 2025, p. 4). However, under a simulated management scenario with increased forest restoration and fuels management, projections indicate that fisher habitat loss could be substantially reduced to less than 5 percent by 2075 and less than 20 percent by 2100.

Recent findings suggest fishers can tolerate a certain degree of disturbance caused by small-scale habitat modification due to management activities, such as forest thinning, commercial logging, prescribed burning, and restoration (Kordosky *et al.* 2021, p. 295). However, fishers exhibited reduced density in regions where salvage logging occurred (Green *et al.* 2022, p. 13). As such, it remains uncertain at what point silviculture activities begin to negatively impact the species and the extent to which fishers can tolerate disturbances caused by these activities. To minimize the effects of fuels and vegetation management activities on fishers and their habitat, conservation measures were established in Programmatic Biological Opinions for the Forest Service (Service 2021, entire) and the National Park Service (Service 2020, entire). These measures include limiting operating periods to avoid disturbance during the most critical portions of the denning period; retaining important habitat components such as high canopy cover, large trees, known den and rest structures, and snags and downed logs in potential denning habitat; and maintaining habitat suitability and connectivity.

Toxicants

A model was developed to predict the likelihood of illegal cannabis cultivation sites in forested regions of California and southwestern Oregon, including within the southern Sierra Nevada fisher range. The model analyzed data from 1,469 illegal grow locations and incorporated 22 environmental and human-influenced covariates (Wengert *et al.* 2021, entire). Overall, approximately 1,700,000 acres within the range of the southern Sierra Nevada fisher overlap areas with a moderate to high likelihood of cannabis cultivation, which accounts for slightly less than 20 percent of the species' range and 23 percent of the modeled suitable habitat (Wengert *et al.* 2021, geospatial data; **Appendix 4**). Modeled reproductive habitat shows an even higher risk of cannabis cultivation, with about 37 percent overlapping areas of moderate to high likelihood, suggesting that female fishers and their kits are more likely to occupy regions with a greater probability of cannabis cultivation. Furthermore, an evaluation of 134 female home ranges revealed that approximately 50 percent of each home range overlapped areas with moderate to high likelihood of cannabis cultivation (Wengert *et al.* 2021, p. 14). This finding is concerning, as preliminary research indicates that female fishers in areas with cannabis cultivation average fewer than one kit per year, compared to 2.25 kits per year in areas without cultivation (Wengert *et al.* 2023, p. 5). Additionally, a previous study found lower female survivorship in areas with cultivation sites (Thompson *et al.* 2014, p. 96). Thus, the presence of cultivation sites appears to

significantly impact fisher survival and reproduction as a result of direct and indirect exposure to hazardous pesticides, potentially leading to long-term population declines. However, further research is needed to fully understand long-term population-level impacts. Nonetheless, a majority of fisher habitat in the Sierra Nevada is predicted to be impacted by cannabis cultivation (Wengert *et al.* 2021, p. 14; Rich *et al.* 2023, p. 3198), particularly at lower and mid-elevations (G. Wengert, Integral Ecological Research Center, *in litt.* 2025).

There are an estimated 100 to 200 cannabis cultivation sites that still require restoration actions within the species' range (Wengert *in litt.* 2025). No remediation activities have taken place within occupied southern Sierra Nevada fisher habitat since 2018 due to limited funding and limited number of personnel eligible to participate in the extensive site remediation process (Wengert *in litt.* 2025). Moreover, remediation does not include the removal of contaminated soils, which means leached pesticides likely persist in the environment post-remediation (G. Wengert, Integral Ecology Research Center, *pers. comm.* 2024, p. 3).

Disease

Avian influenza is a highly pathogenic virus that affects the neurological system of various wildlife species, including fishers (Elsmo *et al.* 2023, entire; National Wildlife Health Center, 2023, unpaginated). Fishers, like most carnivores, likely contract avian influenza through consumption of diseased birds; however, there is some speculation that mammal-to-mammal transmission may also be possible (ENETWild 2024, p. 1). Since 2022, four individual cases of avian influenza have been reported, with two confirmed in California, including one male fisher in Mariposa County (Animal and Plant Health Service 2024, unpaginated; Green 2024, p. 3). Despite these documented cases, the full scope of this disease is not fully understood, as detections have been opportunistic. For instance, the male fisher found dead in Mariposa County was radio-collared as part of an ongoing monitoring effort (Green 2024, entire). As such, further research is needed to assess the magnitude of the threat to fishers and its potential impact on species' status.

Additionally, there is some concern fishers may be able to contract the coronavirus 2 (SARS-CoV-2). The coronavirus is a highly contagious, severe acute respiratory virus that has been documented in several species of mustelids, including the ferret (*Mustela furo*) and American mink (*Neogale vison*) (European Food Safety Authority and European Centre for Disease Prevention and Control *et al.* 2021, p. 3). Although the virus has been confirmed in several closely related species, there are no known positive cases of fishers with the coronavirus. However, in 2022, fisher scat tested positive for coronavirus RNA belonging to the *Luchacovivus* clade, which at the time had only been known to infect rodents and rabbits (Olarte-Castillo 2023, pp. 5, 8, 12, 17). It remains unclear whether the tissue sample from the fisher was indicative of the fisher itself being infected with coronavirus or whether it originated from an infected prey item that was consumed. Furthermore, the potential effects of coronavirus on fishers, should they become infected, are not known. Thus, additional research is needed to elucidate both infection dynamics and implications to fisher health, particularly in light of the potential risk of coronavirus spillover through the consumption of infected prey or interactions with researchers handling these animals.

Competition and Predation
A recent study in Oregon identified a strong negative relationship between fisher occupancy and the presence of bobcats (*Lynx rufus*), gray foxes (*Urocyon cinereoargenteus*), and coyotes (*Canis latrans*) (Barry *et al.* in prep., entire). Bobcat presence had the most pronounced negative impact on fisher occupancy, with their effect being 1.7 times greater than coyotes and 1.5 greater than that of gray foxes (Barry *et al.* in prep., p. 15). Fishers also demonstrated substantial dietary overlap with both bobcats and gray foxes, which may result in competition for prey (Barry *et al.* in prep., p. 17). Furthermore, fisher remains were detected in less than 1 percent of bobcat scat and 1.7 percent of coyote scat, indicating that infrequent predation on fishers in southern Oregon does occur (Barry *et al.* in prep., p. 17). Although this study was conducted on the Northern California and Southern Oregon DPS of fisher, the findings support our understanding that competition and predation by commonly occurring carnivores, particularly bobcats, may affect fisher occupancy in the southern Sierra Nevada DPS.

Additionally, previous research found that bobcats prefer open habitats and brush over late-seral forest with closed canopies (Wengert *et al.* 2013, p. 82). With the rise in moderate to high severity wildfires—resulting in reduced canopy cover and more open habitats—it is possible both bobcat and fisher distribution may shift and the frequency of interaction between the two species may change. This may be particularly concerning because earlier studies found that female fishers are more likely to be killed by smaller predators, specifically bobcats (Wengert *et al.* 2014, p. 1). Moreover, the abundance of gray foxes has been positively associated with high-severity wildfires, indicating wildfires alter density of competitors (Green *et al.* 2022, p. 13). Further research is needed to evaluate population-level effects of interspecific competition and predation on the southern Sierra Nevada fisher, especially in post-fire landscapes.

Monitoring and Research:
Fisher Monitoring
Fishers have been monitored in Yosemite National Park since 2021 through various methods, including deployment of remote cameras, trapping, and the use of GPS collars to document reproductive status, locate and monitor den sites, and confirm survival (Green 2024, entire; H. Mackey *in litt.* 2025, geospatial data). Biologists radio-collared and tracked 31 fishers (18 females and 13 males) in the park between 2021 and 2024 (H. Mackey *in litt.* 2025, geospatial data). The mean home range size for females was approximately 8,128 acres, whereas males had a significantly larger mean home range of 31,296 acres, nearly four times larger than that of females. There was considerable individual variation in home range size among both female and male fishers. Female home range size ranged from as small as 19 acres to as large as 26,835 acres, while males exhibited an even broader range, spanning from 256 acres to 65,600 acres. Furthermore, this study demonstrated significant overlap in home ranges, both between males and females and among individuals of the same sex. Specifically, 15 out of the 18 female home ranges fully overlapped with those of a male, and the three remaining female home ranges substantially overlapped (at least 78 percent) with those of a male (H. Mackey *in litt.* 2025, geospatial data). Additionally, about half of both male and female home ranges overlapped that of the same sex by at least 70 percent.

Fishers have also been monitored in Sequoia and Kings Canyon National Parks since 2021 through similar methods (Green 2025, entire; **Table 4**). Reproductive dens were reported for five females, four of which denned on U.S Forest Service lands adjacent to Kings Canyon National

Park and the KNP Complex fire footprint. Notably, the fifth female denned in Sequoia National Park, marking the first documented reproducing female in the park (Green 2025, pp. 3–5). This female also denned within the KNP Complex Fire footprint four years after the fire, in an area characterized by low burn severity.

Table 4. Summary of trapping efforts in Sequoia and Kings Canyon National Park within the Kings-Kaweah River study area (Green 2025, p. 4).

Trapping and Captures	2021 – 2022	2022 – 2023	2023 – 2024	2024 – 2025
Number of Female Fishers	8	9	10	11
Number of Male Fishers	5	7	5	6
Total	**13**	**16**	**15**	**17**

Additionally, the U.S. Forest Service, Pacific Southwest Region, has been monitoring the southern Sierra Nevada fisher since 2002 as part of their Sierra Nevada Carnivore Monitoring Program, which is a long-term initiative aimed at detecting potential population declines. The program initially focused on monitoring occupancy (see **Abundance**), but over time it has been expanded to assess genetic diversity, connectivity, species interactions, and dietary composition. By monitoring fixed locations, the program can correlate changes in species presence with environmental conditions such as wildfire, drought, and tree mortality (Service 2020a, p. 8).

Fishers were also radio-collared as part of the Sierra Nevada Adaptive Management Project and the Kern River Fisher Project. Researchers collared 41 unique female fishers between 2014–2016, with some individuals trapped multiple years, producing 68 annual home ranges for female fishers. The estimated mean (± standard deviation) female home range was 5,376 ± 4,480 acres (Kordosky *et al.* 2021, p. 293), which is smaller than the mean home range size for female fishers tracked in Yosemite National Park (see above discussion of monitoring in Yosemite). Female fisher home ranges exhibit a higher proportion of conifer forest, dense canopy cover, and lower building density within their core area of use (Kordosky *et al.* 2021, p. 293). Therefore, Kordosky *et al.* (2021) recommends maintaining patches of conifer forests with dense canopy cover (≥ 60 percent) and minimal human disturbance (i.e., few roads and low building density) covering an area of at least 493 acres to maintain critical core areas within female fisher home ranges.

Diet and Prey Management

Contemporary research indicates that the diet of the southern Sierra Nevada fisher is highly diverse, encompassing a wide variety of plant and animal species, as well as fungi (Pilgrim *et al.* 2023, entire; see also **Tree Mortality** section). Douglas squirrel (*Tamiasciurus douglasii*) and Humboldt's flying squirrel (*Glaucomys oregonensis*) were the most frequently detected prey species in fisher scat prior to the severe 2012–2015 drought, comprising approximately 30 percent and 20 percent of diet items, respectively (Pilgrim *et al.* 2023, p. 4). However, following the drought and subsequent tree mortality, the occurrence of Douglas squirrel and Humboldt's flying squirrel in fisher scat declined sharply to 12 percent and 3 percent, respectively (Pilgrim *et al.* 2023, pp. 4, 6). The western gray squirrel (*Sciurus griseus*) was the most frequently detected large prey species in fisher scat (Pilgrim *et al.* 2023, p. 6). Notably, the proportion of western gray squirrel (*Sciurus griseus*) in the fisher diet, detected in 7 percent of all scat samples,

remained unchanged following the severe drought and tree die-offs (Pilgrim *et al.* 2023, pp. 4, 6). Due to its relatively large body size, the western gray squirrel may serve as an important prey item for female fishers raising young (Pilgrim *et al.* 2023, p. 6).

Additionally, Raley and Aubry (2020, p. 149) observed that male fishers in southern Oregon were 26 times more likely to consume very large prey species, such as porcupines (*Erethizon dorsatum*), while female fishers consumed a larger proportion of prey that ranged from small to large sizes. Given the prey size preferences of fishers in southern Oregon described by Raley and Aubry (2020, p. 150, Figure 1), and the diet described in Pilgrim *et al.* (2023, p. 6), medium sized mammals are likely key prey items for female fishers in the southern Sierra Nevada range. Moreover, there is currently no documented evidence of porcupine consumption—the species believed to be a potentially important prey resource (Service 2020b, p. 12)—in the southern Sierra Nevada fisher. Additionally, very few porcupines have been detected within the central or southern Sierra Nevada mountain range (Appel *et al.* 2021, p. 24, Figure 3), which supports our current understanding that porcupines are largely extirpated from the southern Sierra Nevada range and are therefore not a readily available prey resource for the southern Sierra Nevada fishers across their range (Pilgrim *et al.* 2023, p. 2).

Recovery:
There is currently no recovery plan for the southern Sierra Nevada fisher. However, general recovery recommendations are outlined in the Recovery Outline for Southern Sierra Nevada Distinct Population Segment (recovery outline; Service 2020b, entire). These interim recovery recommendations outline a broadscale approach to conserve and manage suitable fisher habitat, including the retention and restoration of (1) important habitat elements, (2) corridor areas for dispersal and population expansion, and (3) landscape heterogeneity. Additionally, the recovery outline identifies six key elements for the conservation and recovery of the southern Sierra Nevada fisher that include habitat protection, research, adaptive habitat management and monitoring, mortality factor management, prey management, and population intervention. Since listing in 2020, actions have been initiated or completed on many of these key elements. Notably:

- Programmatic Biological Opinions for federal partners that outline measures to minimize and avoid impacts to fishers and their habitat from land management activities (Forest Service 2021, entire; National Park Service 2020, entire), which are largely derived from the guidance in the 2020 Conservation Strategy Interim Recommendations (Thompson *et al.* 2020, entire);
- Updated habitat models to inform additional recovery actions;
- Development of a predictive model for trespass cannabis cultivation;
- Research focused on dietary habits of fishers to refine prey management strategies; and,
- Research to understand fisher ecology (e.g., predator-prey dynamics), use of post-fire habitats and impacts from climate change.

Further information about these studies is discussed in greater detail in previous sections. Additionally, efforts are underway to revise the Southern Sierra Nevada Fisher Conservation Assessment (Spencer *et al.* 2015, entire) and the Southern Sierra Nevada Fisher Conservation

Strategy (Spencer *et al.* 2016, entire) to account for recent changes to fisher habitat and ecology due to landscape altering disturbances (i.e., tree mortality and large wildfires).

Conclusion:
After reviewing the best available scientific information, we conclude that southern Sierra Nevada fisher remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the species in the 2020 listing rule (Service 2020a, entire) remain an accurate reflection of the species' current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

In this section we propose recommendations which will aid in the recovery and conservation of the southern Sierra Nevada fisher. The recommendations put forth in the recovery outline (Service 2020b, pp. 9–13) are still relevant and are expanded upon in this section. Additional recommendations have been identified based on communication with species experts, a literature search, and a review of existing records.

1. **Conduct research on the impact of threats and associated management actions on southern Sierra Nevada fishers:**

    a. Investigate and assess the long-term impacts of tree mortality on fishers. This should include documenting changes in habitat and prey resource availability, as well as evaluating the potential effects on individual fitness.

    b. Continue monitoring fishers in post-fire landscapes to evaluate their long-term responses to varying levels of burn severity and changes in habitat characteristics. This should also include assessing their ability to adapt to these new conditions, establish new territories, and successfully reproduce.

    c. Assess potential exposure routes and rates, as well as the broader effects of illegal cannabis cultivation sites, including the long-term impacts to fisher survival and reproduction following site remediation.

    d. Evaluate disease prevalence in southern Sierra Nevada fishers, including monitoring individuals for signs of infection, identifying potential transmission pathways, and assessing implications to individual health.

    e. Conduct studies to monitor carnivore populations, particularly bobcats and gray foxes, to assess their influence on the distribution and abundance of southern Sierra Nevada fishers.

    f. Assess fisher responses and tolerance to disturbance factors (e.g. noise, smoke, and other disturbances from fuels reduction activities), particularly in relation to their distance from these disturbances during denning, and their ability to adapt to these management practices.

2. **Develop and Implement a Fisher Monitoring and Adaptive Management Plan.** This plan should establish a comprehensive, science-based monitoring framework to guide monitoring and management of the southern Sierra Nevada fisher. Key components should include:

    a. *Population Monitoring*—Implement standardized survey protocols to assess fisher abundance, population trends, and distribution across potentially suitable habitats, with particular attention to areas affected by extensive tree mortality and wildfire-driven landscape change. Specific actions may include;

        - Targeted surveys of suitable habitat in the Stanislaus National Forest to determine the northernmost extent of the species' current range; and,
        - Establish a long-term monitoring program for female fishers in the Kern Plateau to assess home range size, habitat use for denning and foraging, and resource needs. This information will support the development of site-specific conservation objectives for the Kern Plateau.

    b. *Habitat Evaluation and Prioritization*—Use updated habitat models and burn severity mapping to identify, evaluate, and prioritize areas for restoration and fuels management. This includes locating and protecting key core habitat areas used by denning females and identifying unburned or low severity burn patches that may function as corridors that facilitate movement and dispersal, particularly in the southern portion of the range.

    c. *Genetic and Connectivity Assessments*—Conduct genetic analyses to evaluate diversity, connectivity, and dispersal patterns. These data will inform development of translocation plans and help prioritize management actions to maintain landscape connectivity and genetic exchange.

3. **Identify illegal cannabis cultivation sites and initiate remediation to restore ecosystem health.** Collaborate with partners and law enforcement to locate illegal grow sites. Develop a prioritization framework to guide remediation efforts and establish a monitoring program to assess habitat recovery and overall ecosystem health following remediation.

4. **Integrate new findings on the southern Sierra Nevada fisher into future recovery planning and management activities.** Use new information such as home range size and core area size to refine management strategies, particularly in regard to fuels and vegetation management activities that may alter fisher habitat conditions.

Acting Field Supervisor, Sacramento Fish and Wildlife Office

Approve AMBER AGUILERA Digitally signed by AMBER AGUILERA Date: 2025.09.30 15:03:19 -07'00' **Date** _____

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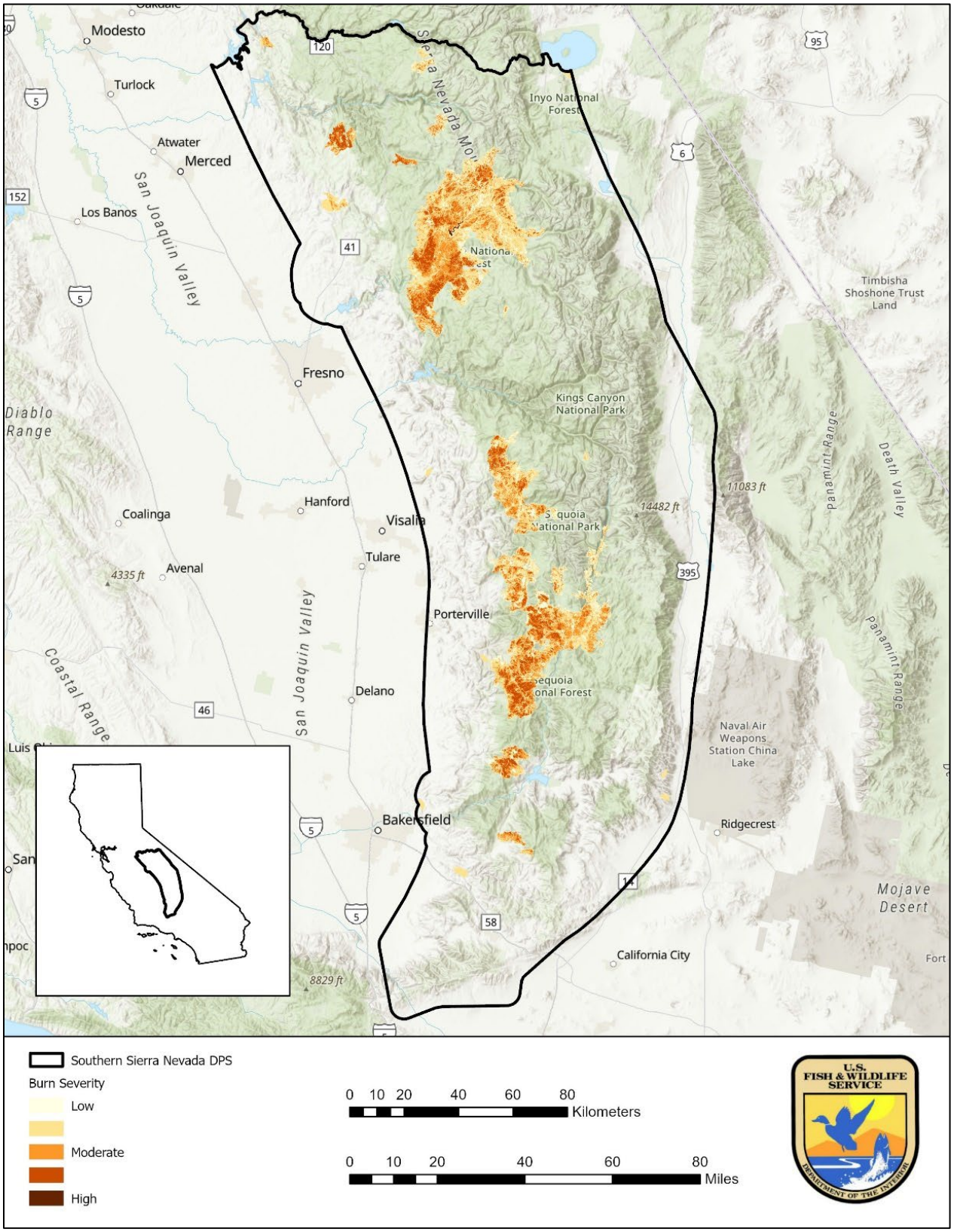
Appendix 1

Summary of large wildfires (greater than 1,000 acres) that occurred within the southern Sierra Nevada fisher range from 2020 to 2023 (Monitoring Trends in Burn Severity 2023, geospatial data). No wildfires occurred within the range in 2024.

Fire Name	Year	Acres Burned
Grade	2020	1,119
Bena	2020	3,117
Bluejay	2020	7,016
Stagecoach	2020	7,713
Wolf	2020	2,289
Rattlesnake	2020	9,090
Beach	2020	3,630
Castle	2020	174,424
MOC	2020	3,152
Moraine	2020	1,204
Creek	2020	381,441
Bullfrog	2020	1,168
Owens	2021	1,548
Nettle	2021	1,372
River	2021	10,183
Dexter	2021	2,977
Peak	2021	2,317
Walkers	2021	9,011
French	2021	27,331
Windy	2021	97,831
KNP Complex	2021	89,960
Washburn	2022	4,980
Oak	2022	19,408
Summit	2022	2,266
Red	2022	8,495
East	2023	1,687
No Name	2023	1,063
Redwood	2023	2,233
Rabbit	2023	2,866
Total area burned		**880,891**

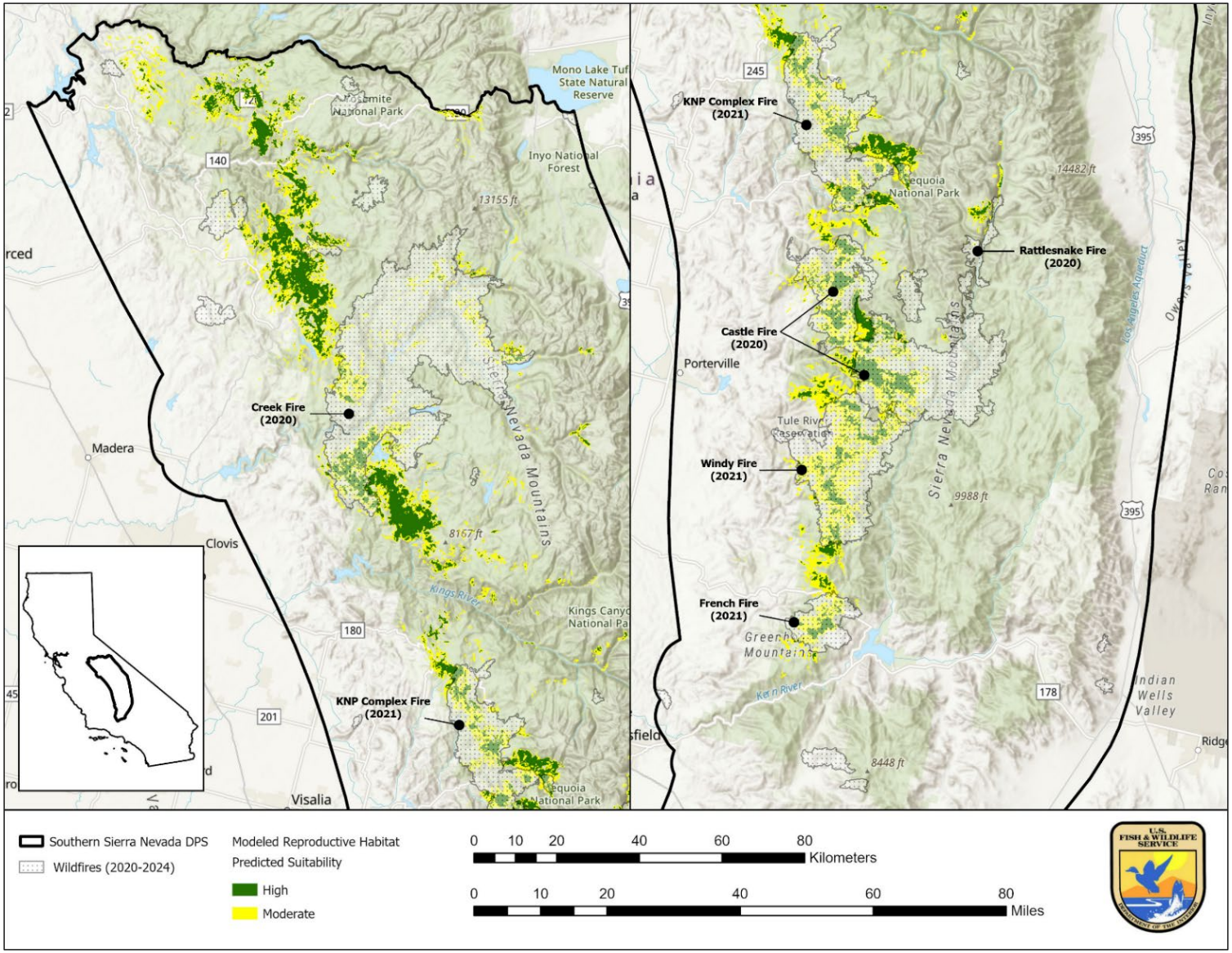
Appendix 2

The spatial distribution of wildfires that occurred in the southern Sierra Nevada fisher range from 2020 to 2024 and corresponding burn severity classification (Monitoring Trends in Burn Severity 2023, geospatial data).



Appendix 3

Spatial analysis of modeled reproductive habitat for the southern Sierra Nevada fisher in relation to wildfires that occurred within the species' range from 2020 to 2024. The six large and high severity wildfires that occurred in 2020 and 2021 are labeled (Thompson *et al.* 2021b, unpaginated; Monitoring Trends in Burn Severity 2023, geospatial data).



Appendix 4

Modeled likelihood of cannabis cultivation within the southern Sierra Nevada fisher range (Wengert *et al.* 2023, geospatial data).