

# Targeted Management Recommendations to Address Idaho Sage-Grouse Habitat Loss and Population Declines

November 12, 2020

**Recommendations are made by the Idaho Adaptive Management Team** which is comprised of representatives of the Idaho Bureau of Land Management (BLM), US Forest Service (USFS), US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), US Geological Survey (USGS), Idaho Governor's Office of Species Conservation (OSC), Idaho Department of Fish and Game (IDFG), Idaho State Department of Agriculture (ISDA), and Idaho Department of Lands (IDL).

## Overview

This report provides management recommendations to improve habitat for greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse), with the goal of reversing population declines in regions of Idaho that have tripped adaptive management triggers (see Table 1, Figure 1). These recommendations address a suite of potential causal factors which were identified by the Idaho Adaptive Management Team and by working group meetings with local Idaho biologists (Ellsworth et al. 2019). Some of these actions were further informed and refined by additional analyses that are described later in this document. Although the reasons for population declines are not known with certainty, causal factors provide a foundation for a proactive conservation strategy to repair, protect, and improve sage-grouse habitat and stabilize sage-grouse populations in vulnerable portions of the state irrespective of the precise causal factor(s) involved.

This document should be used as a guide to help inform, prioritize, and develop sage-grouse management actions in specific areas of Idaho. To assist with planning efforts, we compiled a table of partner funding timelines and due dates for project proposals (Appendix A). The purpose of this table is to facilitate coordination within and among agencies to better plan sage-grouse habitat projects that are focused on the management recommendations in this document. This timeline will be updated as necessary to incorporate new processes and opportunities.

Likewise, our management recommendations document will be updated annually to incorporate new science and management tools to reprioritize restoration targets that arise as our understanding of sage-grouse populations and habitat change. Notably, the Team is supporting a USGS study that is using over 50 years of Idaho sage-grouse population data to examine the relationship between environmental variables and population dynamics. Expected variables to be used in this analysis will include weather, fire history, habitat condition, and anthropogenic disturbance. Results of this work will complement our current effort and provide a baseline for future adaptive management processes. In addition, the 2020

Western Association of Fish and Wildlife Agencies sage-grouse conservation assessment will include large-scale analyses of population and habitat trends. The results of these analyses are expected in early 2020 and will help us further refine Idaho’s causal factor analysis.

Table 1. Idaho Adaptive Management Triggers (2015-2019)

**Adaptive management triggers** were identified and described in the *Federal Alternative of Governor C.L. “Butch” Otter for Greater Sage-grouse Management in Idaho* (Governor’s Sage-Grouse Task Force 2012) and approved in the Bureau of Land Management (BLM) plan amendments for sage-grouse (BLM 2015, 2019). These plans direct the Idaho Adaptive Management Team (hereafter Team) to evaluate potential causal factors of tripped habitat and population triggers and to provide management recommendations to a Policy Team.

As of 2019, the following adaptive management triggers were tripped:

Habitat

- A soft habitat trigger was tripped in the Mountain Valley Important Habitat Management Area (IHMA) resulting primarily from the 2018 Grassy Ridge and Sharps fires.
- A hard habitat trigger is operational in West Owyhee IHMA due to the 2015 Soda Fire.

Population

- A soft population trigger was tripped in Mountain Valleys IHMA.
- Hard population triggers are operational in the Desert Priority Habitat Management Area (PHMA) and IHMA, Mountain Valleys PHMA, Southern IHMA, and West Owyhee IHMA.



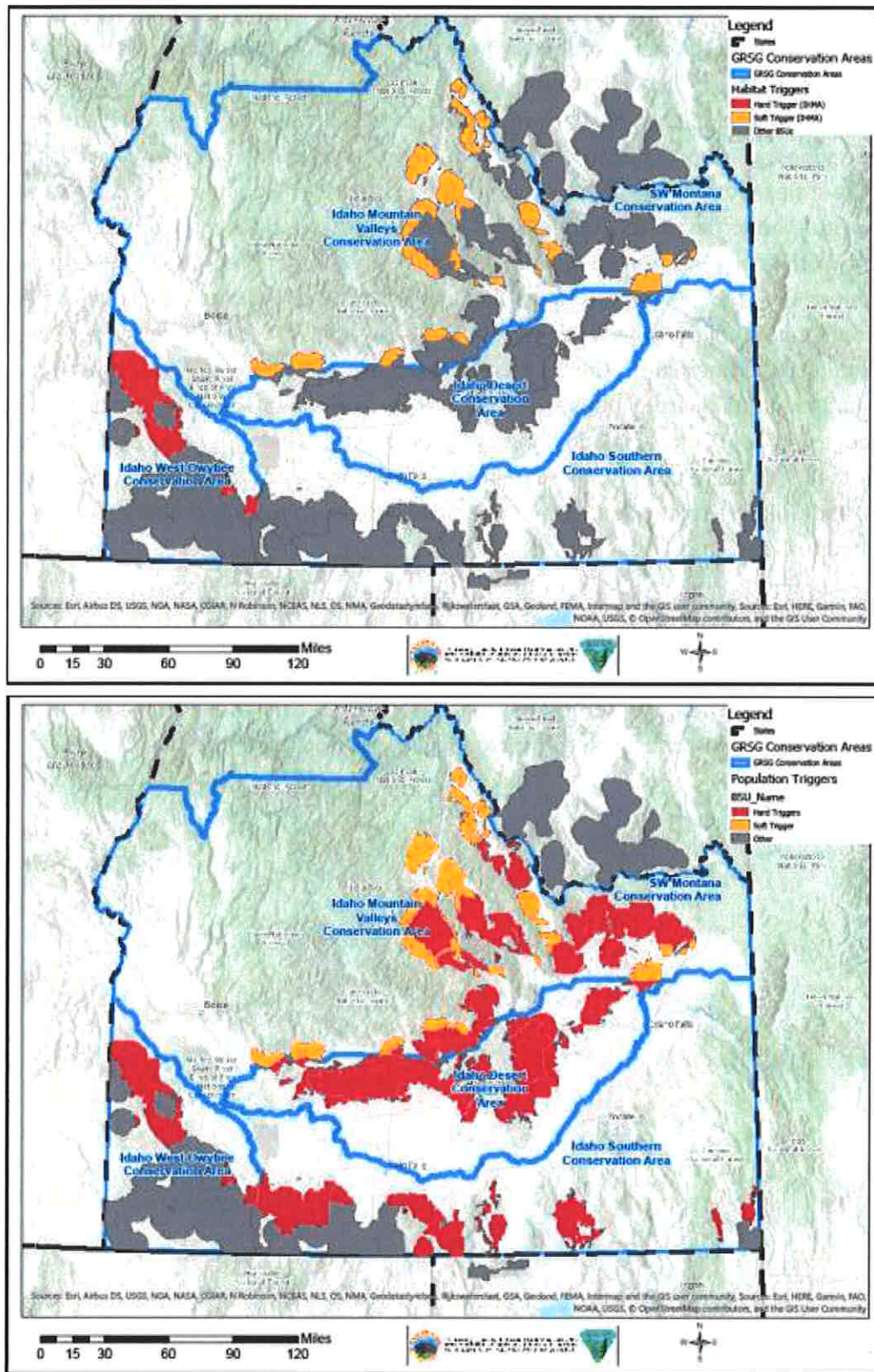


Figure 1. Idaho Conservation Areas and Habitat Management Areas where adaptive management habitat and population triggers have been tripped, 2018-2019.

## Identifying Management Areas of Concern: Target Fine Scale Areas

Although population declines were observed broadly across all of Idaho's four Conservation Areas (CAs; Desert, Mountain Valleys, Southern, and West Owyhee), we focus our recommendations at smaller spatial scales that generally align with the third-order fine scale area (Figure 2; Stiver et al. 2015). Fine scale areas are delineated to encompass all seasonal habitats (nesting, brood-rearing, and winter) within a sage-grouse subpopulation, or "cluster" of leks. In Idaho, the BLM and partners have designated a total of 27 fine scale areas, but we focus our current management recommendations on a smaller set of 8 Target Fine Scale Areas (hereafter, Target Areas) that demonstrated the most pronounced declines (Figure 2; Ellsworth et al. 2019; IDFG, unpublished data). Most Target Areas are in the Desert CA (Twin Buttes, Craters of the Moon, Big Desert) and Mountain Valleys CA (Medicine Lodge and Lemhi River). We also recommend actions for the Sand Creek (Mountain Valleys CA), Cow Lakes (West Owyhee CA), and Greater Curlew (Southern CA). The Sand Creek Fine Scale has not experienced substantial declines, but we encourage efforts to protect this area because seasonal habitats overlap substantially with Medicine Lodge and Twin Buttes. In addition, sage-grouse in the Sand Creek Fine Scale Area were impacted by the 99,000 acre Grassy Ridge Fire in 2018. Actions are warranted in Cow Lakes (West Owyhee CA) and Greater Curlew (Southern CA) because both areas have declining populations and significant areas of sagebrush loss.

Note that management recommendations do not necessarily apply to the entire fine scale area. Instead, management targets are refined to certain areas of concern within fine scale areas. Local areas of concern include certain lek routes or groups of leks where substantial declines occurred (Ellsworth et al. 2019), and/or places where fires, anthropogenic disturbances, conifer encroachment, invasive plants, or other localized environmental impacts threaten sage-grouse populations.



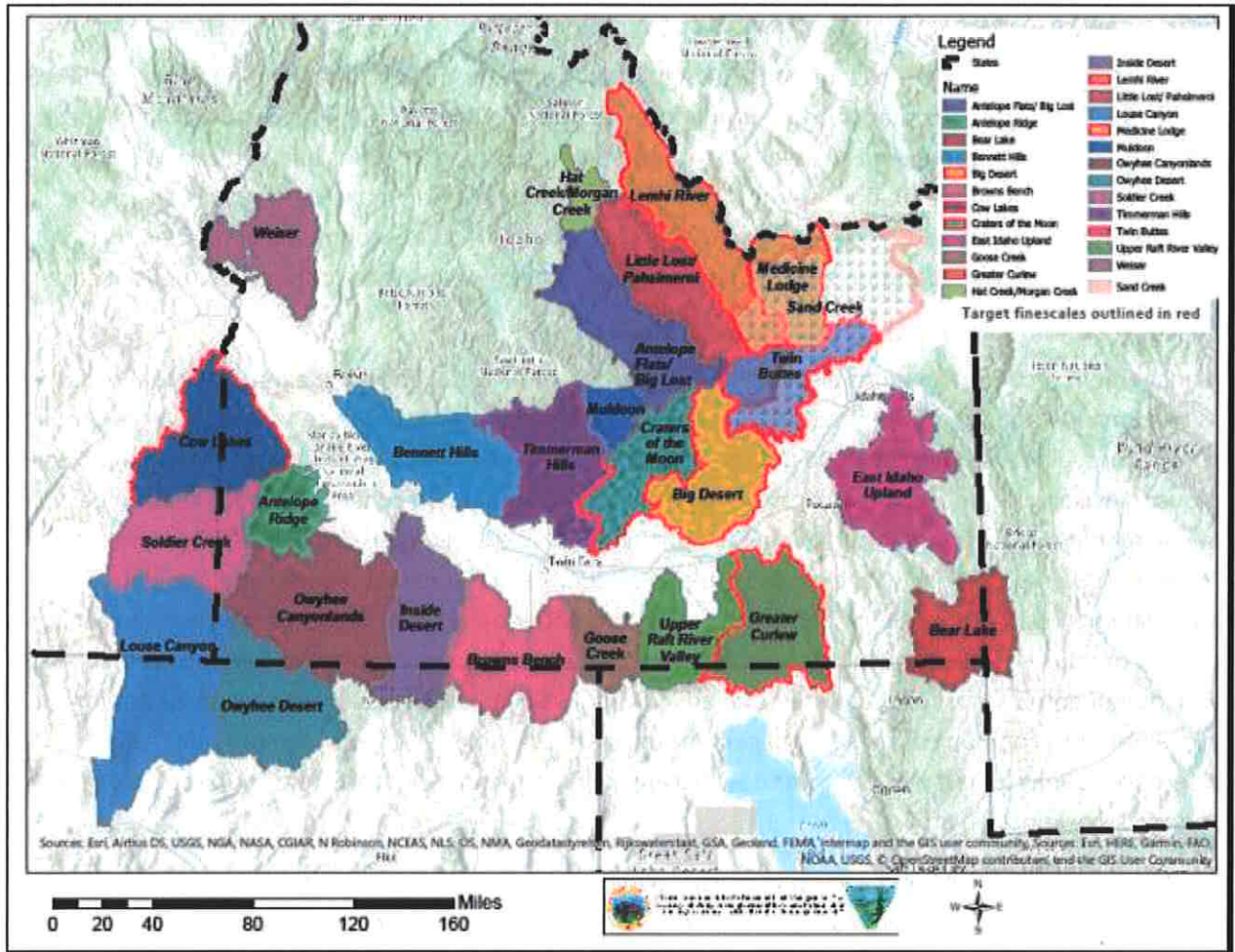


Figure 2. Fine Scale Areas for greater sage-grouse in Idaho and Target Fine Scale Areas for 2019 analysis.

## General Management Actions to Consider

Our focused approach to management follows guidance from the U.S. Fish and Wildlife Service (USFWS 2013) which recommends that conservation efforts focus on key areas on the landscape that will best help maintain viable connected and well-distributed sage-grouse populations and habitat. We are providing these recommendations to the Policy Team so managers can make timely decisions, in the locations necessary, to address the tripped triggers. Furthermore, we recommend continued communication and cooperation across land ownership boundaries, for the long-term benefit of sage-grouse populations.

Management recommendations also build on guidance from federal and state agencies in Idaho, as well as research institutions and partners to collectively improve habitat and reduce threats for sage-grouse populations. For example, the 2006 *Conservation Plan for the Greater Sage-grouse in Idaho* (Idaho Sage-grouse Advisory Committee 2006) provides an array of recommended conservation actions and best management practices, organized by threat. Further guidance is incorporated in the 2012 Idaho Governor's Plan (Governor's Sage-grouse Task Force 2012) and the recent federal land use plan amendments (BLM 2015, 2019; USFS 2015). Over the past two decades, a suite of methods to repair, protect or improve sage-grouse habitat and secure sage-grouse populations have been studied, refined, and implemented. Most of these are outlined in Table 2. Several technical manuals and guides for implementation of many of these management tools are available. The Team can provide these references upon request and can refer users to appropriate technical experts (e.g., habitat biologists, restoration ecologists, etc.).

Furthermore, the USFWS and partners recently updated the Conservation Efforts Database (CED) with sage-grouse conservation and management actions that have been implemented since 2014 (<https://conservationefforts.org/>). By the end of 2020, users will be able to query the CED and export reports by Sagebrush Reporting Units. For Idaho, the Sagebrush Report Units are the same as our fine scale areas. Reports are expected to include summaries of efforts by project type, acres, and land ownership. Finer queries, including geospatial data, will be available for public lands. These data should help the Adaptive Management Team further refine and identify specific needs and locations, as well as to visualize landscape-level efforts and opportunities for cross-boundary partnerships.



Table 2. Suite of management actions to repair, improve, and protect Idaho sage-grouse populations and their habitat.

<p>Repair: Fix what is broken</p> <ul style="list-style-type: none"><li>• Prioritize Post-fire rehabilitation and restoration</li><li>• Expand sagebrush, native grass/forb planting projects<ul style="list-style-type: none"><li>○ Identify suitable recovery areas</li><li>○ Islands of habitat – expand, utilize</li></ul></li><li>• Restore riparian habitat<ul style="list-style-type: none"><li>○ Process-Based Restoration<ul style="list-style-type: none"><li>▪ BDAs, beaver reintroduction</li><li>▪ Repair incised channels, head cuts, reconnect floodplain with small rock structures, Zeedyk</li><li>▪ Other wet meadow improvements</li></ul></li><li>○ Livestock management: enclosure maintenance and installation, provide off-site watering (spring boxes), Grazing rotation (season of use, duration, etc.)</li></ul></li></ul> <p>Improve and Enhance</p> <ul style="list-style-type: none"><li>• Control invasive species</li><li>• Remove Juniper in expansion areas</li><li>• Manage corvid populations, by identifying, limiting or removing anthropogenic features that may be leading to high corvid populations.</li><li>• Augment sage-grouse populations</li></ul> <p>Protect</p> <ul style="list-style-type: none"><li>• Prevent fires<ul style="list-style-type: none"><li>○ Limit size/spread</li><li>○ Fuel breaks/fuel treatments</li><li>○ Herbicide – Invasive annual grass treatments</li></ul></li><li>• Limit human disturbances</li><li>• Minimize brush treatment projects where sagebrush is limiting on the landscape; work locally to plan and manage brush treatment projects where needed.</li><li>• Manage livestock to promote resilience</li><li>• Control or adjust hunt targets</li><li>• Establish conservation easements/land purchases</li><li>• Encourage the initiation of new Rural or Rangeland Fire Protection Associations</li></ul>
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## Management Recommendations for Target Fine Scale Areas

In this section, we make specific management recommendations for Target Fine Scale Areas. Recommendations are primarily based on key issues and concerns that were identified in six of the Target Areas (Medicine Lodge, Lemhi River, Sand Creek, Twin Buttes, Craters of the Moon, Big Desert) in the preliminary causal factor analysis (Ellsworth et al. 2019) and summarized in Table 3 below. Issues and concerns were also compiled from draft BLM Habitat Assessment Framework (HAF) fine-scale reports, when available. HAF reports and expert opinion were used for the Greater Curlew and Cow Lakes Target Areas (contact Idaho BLM State Office for draft reports). These HAF documents examine fine scale seasonal habitat including: a) sagebrush availability, b) connectivity and c) anthropogenic disturbance. Additional recommendations were made by local agency biologists in a draft review of this document in October 2020.

**Table 3. Summary of key issues and concerns within 8 Target Fine Scale Areas in Idaho**

Fine Scale	Conservation Area	Fire	Invasives (High, Med, Low)	Seasonal Habitat Availability Limited?	Habitat Condition Concerns?	Seasonal Habitat Connectivity Concerns?	Anthropogenic Disturbance Level	Other identified issues
Medicine Lodge	Mt Valleys	Y	Med	spring, summer, winter	sagebrush cover	N	High	Ravens, Agriculture
Lemhi River	Mt Valleys	N	Low	summer	forb availability	N	Low	Ravens
Sand Creek	Mt Valleys	Y	Low	winter	winter and mesic habitat	Y	Low	Corridor to winter habitat
Twin Buttes	Desert	Y	Med/High	summer (riparian)	riparian	Y	Medium, recreational use	Agriculture, pesticides, ravens, crested wheatgrass seedings
Craters of the Moon	Desert	Y	Medium	spring, summer (riparian), winter	sagebrush cover	Y	Low	Ravens
Big Desert	Desert	Y	Med/High	summer (riparian)	sagebrush cover	N	Low	Crested wheatgrass seedings
Greater Curlew	Southern	Y	High	spring, summer, winter	sagebrush cover, forb/insect availability	Y	High	Ravens, agriculture, crested/wheatgrass seedings
Cow Lakes	West Owyhee	Y	High	Spring, summer, winter	sagebrush cover	Y	Low	Ravens, Juniper encroachment



Other resources used throughout this analysis and discussion includes:

- Resilience and resistance (e.g., Maestas et al. 2016, Chambers et al. 2017)
- Historic fire perimeters (BLM 2018a)
- Key habitat map (BLM 2018b)
- Sage-grouse seasonal habitat models (State of Idaho 2019)
- Sage-grouse lek locations and telemetry data (IDFG, unpublished data)
- The BLM Idaho State Office Five Year Implementation Monitoring Report (BLM 2020); see summary below.

Most of our recommendations center on wildfire prevention and post-fire restoration. Wildfire and subsequent invasion of cheatgrass (and other invasive plants) has clearly had a major impact on sagebrush habitat in Idaho (Figure 3). Moreover, in occupied seasonal habitats, the extent of landscape cover of sagebrush has been substantially reduced in several areas (Table 4, Figure 4). Several studies have documented the importance of maintaining landscape cover of sagebrush across broad scales. Aldridge et al. (2008) documented that areas where sage-grouse had been extirpated had <25% of the land within 30 km classified as sagebrush habitat, while areas with >65% sagebrush habitat had a high probability of persistence. Wisdom et al. (2011) described extirpated range as that with <27% landscape cover of sagebrush and that sage-grouse in landscapes with >50% sagebrush had a high probability of persistence. Knick et al. (2013) found that historic leks that were no longer occupied had 28% landscape cover of sagebrush within 5 km of the lek, but that occupied leks had at least 79% landscape cover of sagebrush. These 3 studies provided consistent evidence that landscape cover of sagebrush at a large scale is critical for persistence of sage-grouse into the future.

Conifer encroachment also has likely reduced habitat availability and contributed to sage-grouse declines in certain parts of Idaho, including Cow Lakes. However, conifer encroachment was not identified as having a major impact on other Target Areas.

In most Target Areas neither recent wildfire nor conifer encroachment has had an obvious impact on sage-grouse populations. Anthropogenic disturbances have been well-documented to impact sage-grouse lek attendance and habitat suitability, but other causal factors of population declines are more speculative and may require focused studies and complex solutions. For example, while common ravens are known to be significant predators at sage-grouse nests (Coates et al. 2008, Bui et al. 2010, Coates and Delehanty 2010, Lockyer et al. 2013), the relative impact on specific populations in Idaho is not known. Other issues, such as the current and long-term impact of pesticides (Blus et al. 1989), are largely unknown but suspected (Table 3).

Mesic resources, such as wet meadows and riparian areas, are considered a limiting factor on the landscape, due to their annual variation and competing uses. However, there is currently not a readily-available tool in Idaho to map and monitor mesic areas. Currently, processes are underway to use site-scale data (HAF, Assessment and Inventory Monitoring (AIM), and Landscape Monitoring Framework (LMF)) to examine the condition of seasonal habitat within these Target Areas. In addition, the BLM National Operations Center (NOC) has a contract in place for mapping of Idaho's wetlands; and data from a pilot lentic AIM monitoring effort in Idaho will be used in the near future to examine habitat

suitability of potential late brood-rearing areas. Finally, the cumulative and long-term impacts of known threats and limiting factors are unknown and difficult to study and quantify.

### Summary of 2020 BLM Monitoring Report

The BLM Idaho State Office Five Year Implementation Monitoring Report (BLM 2020) summarized terrestrial Assessment, Inventory, and Monitoring (AIM) and Landscape Monitoring Framework (LMF) data within Idaho sage-grouse habitat collected between 2013 and 2018. These data provide valuable information on statewide trends in habitat condition on BLM lands. However, there are caveats to these data in relation to our management recommendations, including: 1) the summary of data included in the monitoring report is a plot summary and does not include an estimate of the amount of seasonal habitat that meets the desired conditions for vegetative and habitat characteristics; and 2) it does not summarize AIM and LMF data for the Target Fine Scale Areas. Instead, site-scale vegetation analyses are included in specific completed or pending fine-scale HAF reports (see Idaho BLM State Office contacts for the status of these reports).

With the noted caveats in mind, available plot data from 2013-2018, corroborates concerns of wildfire and the reduction of sagebrush cover. Forb cover also appears deficient area-wide, though this indicator can be highly variable, depending on fluxes in spring/early summer precipitation and associated temperatures. It is unknown whether these conditions have impacted sage-grouse demographics.

Results suggest that on BLM lands within Priority Habitat Management Areas (PHMA), only 28% of monitoring plots (141/510) met the 15-25% sagebrush cover habitat objective for nesting habitat. For this analysis, nesting habitat was separated by arid and mesic sites, as defined locally by annual precipitation, herbaceous understory and soils (Stiver et al. 2015). Only 40% (108/273) of arid site plots and 35% (83/237) of mesic site plots met the nesting habitat objectives ( $\geq 5\%$  cover in arid sites;  $\geq 10\%$  cover in mesic sites) for perennial forb cover. Similarly, for Important Habitat Management Areas (IHMA), only 19% of monitoring plots (50/267) met the 15-25% sagebrush cover habitat objective for nesting habitat; and only 20% (38/190) of arid sites and 38% (29/77) of mesic plots met the objectives for perennial forb cover. Although sagebrush cover and height are not within the desired condition, this does not necessarily mean these locations are unsuitable habitat. These monitoring locations could have either low ecological potential for sagebrush cover and height or the measured values could be slightly above or below the desired conditions. These aspects will be further analyzed within subsequent fine-scale HAF reports at the appropriate time.

Perennial grass cover is meeting habitat objectives ( $\geq 10\%$  cover in arid;  $\geq 15\%$  in mesic sites) at  $\geq 90\%$  of the total locations monitored within PHMA and IHMA. Perennial grass cover in General Habitat Management Areas (GHMA) is meeting desired cover at  $\geq 80\%$  of the total locations. Perennial grass and forb height are also meeting at approximately  $\geq 85\%$  of all locations within PHMA and IHMA and at  $\geq 75\%$  within GHMA.

Additionally, summaries of 11 indicators relevant to sage-grouse habitat were derived from BLM Landscape Monitoring Framework (LMF) data collected between 2013 and 2018 within and outside of sage-grouse habitat. These summaries are weighted estimates representing the area sampled. General





Table 4. Landscape cover of sagebrush (%) within seasonal habitats occupied by sage-grouse in Target Fine Scale Areas and others for comparison.

Landscape cover of sagebrush (%) in occupied sage-grouse habitat and acres of each area burned since 2011				
Target Fine Scale Areas	spring	summer	Winter	Acres burned since 2011
Cow Lakes* (ID and OR)	57	68	49	288,043
Big Desert	47	41	39	128,737
Craters of the Moon	39	33	30	235,977
Twin Buttes	62	69	60	194,666
Sand Creek	70	75	82	175,120
Medicine Lodge	66	57	66	13,604
Lemhi River	78	66	68	504
<b>Other Fine Scale Areas</b>				
Bennett Hills	69	55	60	347,830
Antelope Flats/Big Lost	63	58	66	2,567
Little Lost/Pahsimeroi	79	68	66	2,071

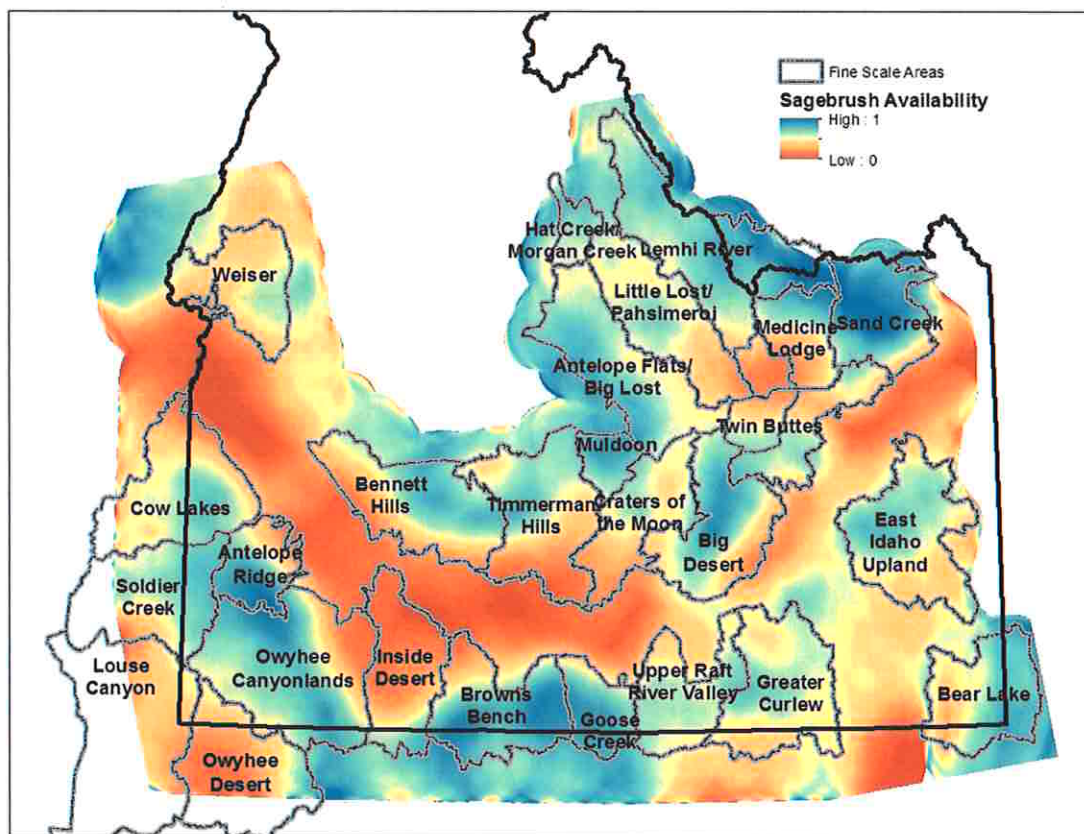


Figure 4. Sagebrush availability, using 18-km moving window analysis and mean sagebrush cover >10% (2014 satellite imagery; USGS 2016, 2017)



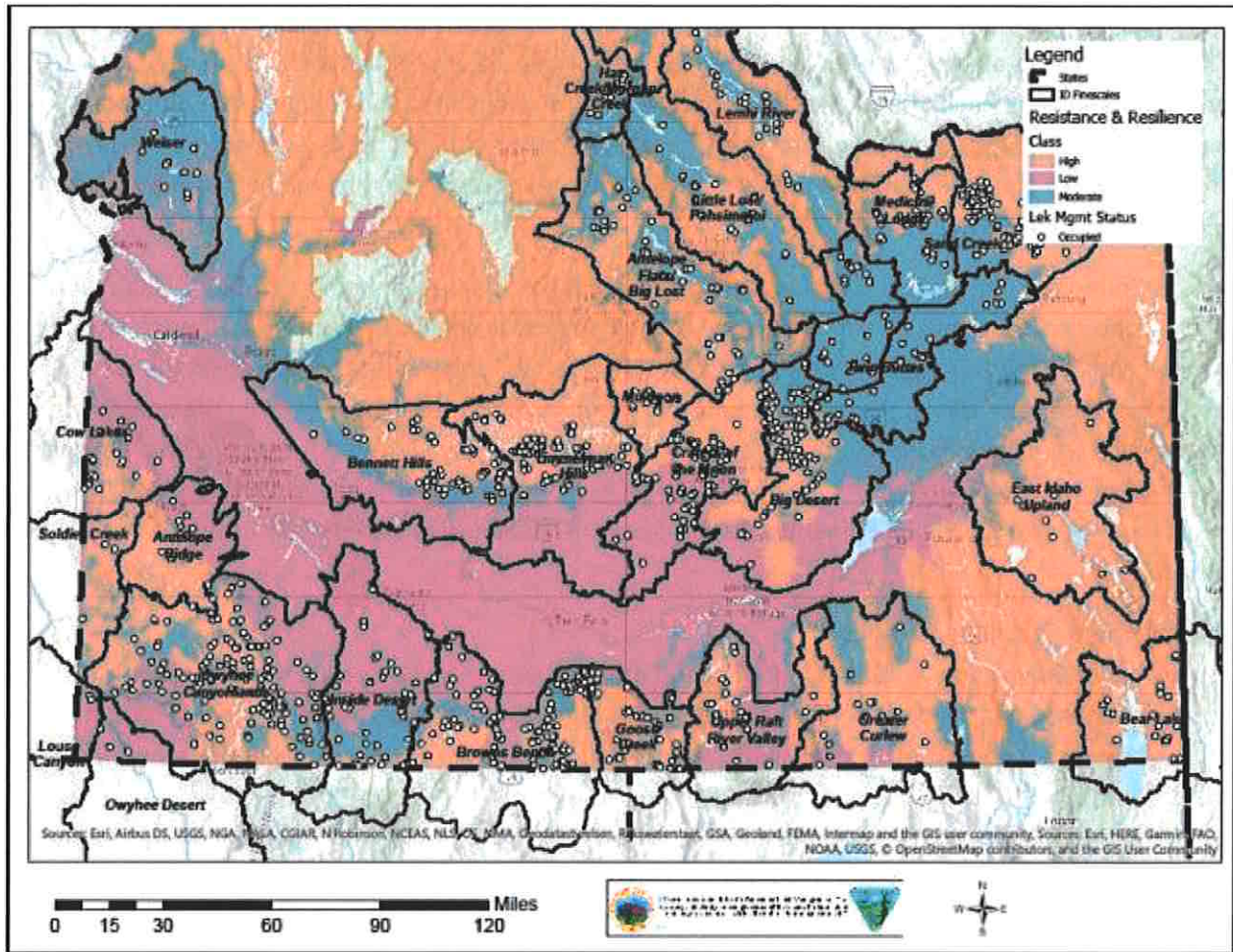


Figure 5. Resistance & Resilience and occupied sage-grouse leks in Idaho Fine Scale Areas.

### Desert CA Target Areas: Big Desert, Craters of The Moon, Twin Buttes

Population declines among Desert CA fine scale areas were most apparent in the Big Desert, Craters of the Moon, and Twin Buttes fine scale areas (Ellsworth et al. 2019). These three Target Areas are generally well connected and share many ecological characteristics and threats. The majority of the area is public land, anthropogenic disturbances and infrastructure are limited, and agricultural issues (e.g., sagebrush conversion, pesticides) are not likely to have a significant impact on nesting and wintering sage-grouse.

The foremost threat in each of these Target Areas is large wildfires, particularly in the Big Desert and Twin Buttes fine scale areas (Figure 3). Wildfire has also recently impacted pockets of habitat within the Craters of the Moon Fine Scale Area, where the amount of occupied sage-grouse habitat with sagebrush is relatively low (Table 4). In more resilient areas (Figure 5), sagebrush communities are recovering, but generally this part of the state appears to be in flux, subject to climate-driven forces that threaten to transform the potential of long-term recovery and ecological conditions. What once was a sea of sagebrush interspersed with volcanic features, has been steadily invaded by pockets of invasive cheatgrass in fire scars. The result is that fire risk in the area has increased, and the suitability of the landscape for sage-grouse has deteriorated.

## Big Desert

The Big Desert has a high concentration of breeding birds, especially to the north. It has few anthropogenic disturbances and has good seasonal habitat availability and connectivity. However, it has a relatively low landscape cover of sagebrush compared to potential (Table 4). Site-scale assessments from many AIM and LMF plots also indicate “unsuitable” sagebrush cover in much of the Big Desert (Ellsworth et al. 2019).

In addition to fire, the availability and condition of riparian resources for late brood-rearing habitat is also a concern. In general, riparian resources are uncommon in the interior of the Big Desert, and late brood-rearing habitat models indicate that most summer habitat is near the periphery in the southern portion of the area. Likely, some hens and broods need to move long distances from breeding areas in the north (Figure 6). This is confirmed from recent studies that have documented some hens moving south to summer near agricultural fields (IDFG and University of Idaho, unpublished data). However, seasonal use patterns and movements by sage-grouse in this landscape are largely unknown outside of this study.

### Management Recommendations:

- Continue planning efforts to identify and prioritize areas with limited sagebrush cover for restoration projects to include collecting local seed and plantings (i.e. drill-seeding, aerial seeding, and plug planting). Expected restoration areas are in the central and southern portions of the Big Desert.
  - Work with partners (e.g., BLM, IDFG, NRCS, RMEF, MDF, and FAA) to identify potential funding sources for seed collection and planting efforts.
- Continue cheatgrass treatment efforts and expand treatments into additional areas.
  - Continue working with partners (BLM, IDFG, and NRCS) to identify priority areas and potential funding sources.
- Identify areas to improve wet meadow and riparian resources for late brood-rearing habitat
  - Identify issues with Webb Spring and develop a plan to restore the spring source and maximize the amount of water available. Webb Spring is the only known natural surface water source on public lands in the Big Desert.
    - Work with partners (BLM, IDFG, and INL) to identify potential funding sources.

### Research Topics:

- Availability and condition of riparian, brood-rearing habitat
- Seasonal habitat use and movements.



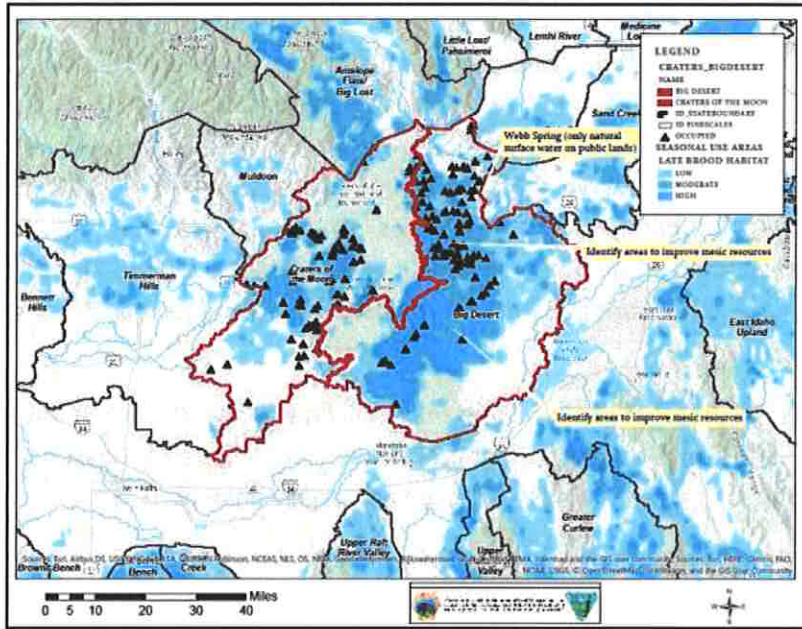


Figure 6. Occupied sage-grouse leks and late brood-rearing habitat suitability in the Big Desert and Craters of the Moon Fine Scale Areas.

## Craters of the Moon

Available habitat in Craters of the Moon is interspersed with lava flows that are not routinely used by sage-grouse. The southern half of this fine scale area has low resilience and resistance (Figure 5), while the northern half, encompassing much of Craters of the Moon National Monument, has high resilience and resistance. Two of the large kipukas (islands of native habitat surrounded by lava) in the Monument, Paddelford Flat and Laidlaw Park, were impacted by wildfires in 2016 (143,867 acres burned), while an additional 10,000 acres burned in this fine scale area in 2018 and 2019 (Figure 7). While BLM has focused restoration in these areas, continued monitoring and re-treatments may be needed.

Riparian resources are rare in this fine scale area, limited mainly to seasonally wet playas (Figure 6), thus the limited availability and condition of late brood-rearing habitat is also a concern (Figure 6). Seasonal use patterns and seasonal movements by sage-grouse in this landscape are largely unknown.

### Management Recommendations:

- Expand sagebrush restoration (seeding, planting), especially in areas with recent fire.
- Expand cheatgrass treatment (herbicide spraying, seeding diverse perennial grass mix with forbs and sagebrush).
- Identify and upgrade key road systems to improve ingress/egress for firefighting response times.
- Identify areas to improve wet meadow and riparian resources for late brood-rearing habitat.

### Research Topics:

- Availability and condition of riparian brood-rearing habitat
- Seasonal habitat use and movements



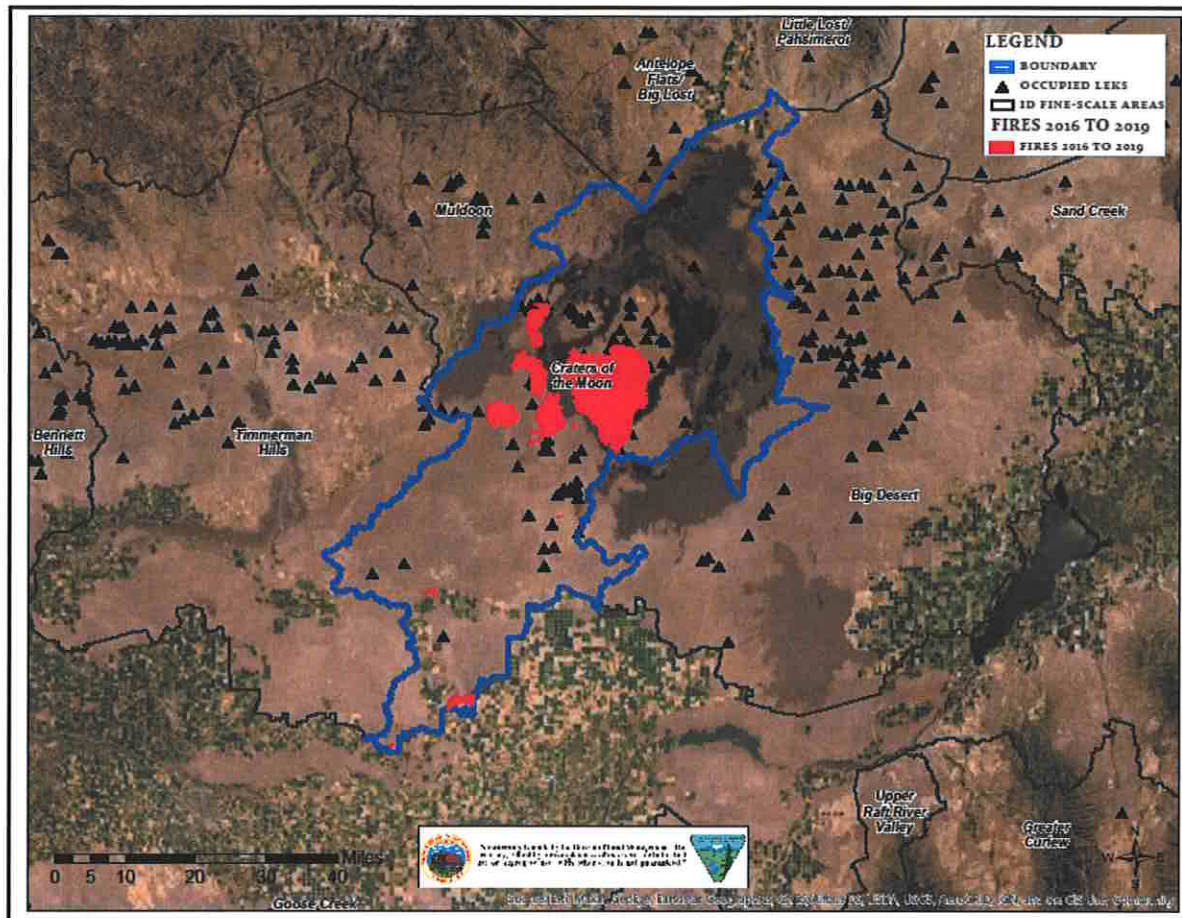


Figure 7. Craters of the Moon Fine Scale Area with 2016–2019 wildfires.

## Twin Buttes

This fine-scale area was targeted for further investigation due to large population declines at individual leks, as well as its proximity and connectivity to the Medicine Lodge, Upper Lemhi, and the Big Desert fine-scale areas. It may be one of the most important areas for connectivity north of the Snake River. Twin Buttes is expansive and most of the area is public land with pockets of private land, agriculture, and infrastructure on the Idaho National Lab (INL).

Wildfires clearly pose the greatest threat to sage-grouse here (Figure 8). Fire over the past thirty or more years have significantly reduced sagebrush cover in this area and restoration efforts have been limited, particularly on the INL (e.g., 2010 Jefferson Fire).

However, the 2019 Sheep Fire on the INL proved to be the exception, with state and federal partners working together to fund fire restoration. The Sheep Fire Ecological Resources Post-Fire Recovery Plan (Forman et al. 2020) resulted in a list of options for future fire rehabilitation on the INL Site, including recommendations for soil stabilization, cheatgrass and noxious weed control, grazing rest following fire, and planting/seeding native grasses, forbs, and sagebrush. The INL Sage-grouse Candidate Conservation Agreement (DOE and USFWS 2014) also resulted in many management recommendations that will protect sage-grouse on the Site, including avoiding building infrastructure in the designated conservation area and mitigating for sagebrush loss by planting seedlings in important areas.

The threat of additional fire is particularly concerning because it contains localized areas of important winter habitat in the Tractor Flats area (Figure 9). Winter habitat here is comprised of relatively extensive intact stands of Wyoming big sagebrush. Recreational uses in this area are increasing as the human population grows in eastern Idaho, resulting in greater risk for human-caused fires. Although a significant portion of this winter habitat is on public land, private tracts of land with intact sagebrush offer opportunities for conservation easements and land exchange or purchase.

Importantly, a recent telemetry study shows that this winter habitat is heavily used by sage-grouse that migrate from nesting and summer habitat in the Sand Creek and Medicine Lodge fine scale areas (IDFG and BLM unpublished data; Figures 9 and 10). In the late fall, sage-grouse vacate the Sand Creek area, perhaps because of deep snow, and access winter habitat in Twin Buttes via a well-traveled yet narrow migration corridor (Figure 8). The corridor is largely comprised of intact sagebrush, but it narrows to 8 km in places where it is bordered by agricultural land. The 2010 Jefferson Fire reduced sagebrush cover in the corridor, highlighting the need for protecting the area from further degradation via fire, sagebrush removal, and anthropogenic disturbance.

Additional identified concerns in the Twin Buttes area include ravens (Howe et al. 2014), availability and condition of brood rearing habitat, and expansive areas of historical crested wheatgrass seedings (Table 3).

### Management Recommendations:

- Expand sagebrush restoration in critical winter and nesting habitat and migration corridors.
- Work with partners to identify priority areas and funding sources for cheatgrass control to improve nesting habitat.



- Protect sagebrush in important winter habitat and migration corridors; recommendations include:
  - Improve fire prevention on public lands
    - Enforce regulations on recreational shooting
    - Encourage the initiation of a Rural or Rangeland Fire Protection Association.
  - Close and reclaim user-created roads/recreation trails.
  - Limit brush control projects on all land ownerships.
  - Use spatial analyses to identify key areas for potential conservation easements, land exchange, or acquisition of private tracts.
  - Explore need to create new or improve existing fuel breaks to help with fire suppression.
  - Work with land management agencies (including the DOE), utility companies, and private landowners to discourage ravens from nesting and perching on artificial structures, including transmission line towers and communication towers.
    - Work with the National Oceanic and Atmospheric Administration to apply nest deterrents to their towers on the INL Site.

#### Research Topics:

- Characterize, monitor, and conserve palatable accessions/patches of sagebrush in and around the Tractor Flats sage-grouse wintering area. Mapping the locations and connectivity of the most palatable morphotypes of sagebrush consumed by sage-grouse and other herbivores will help managers know how broadly sagebrush seed can be sourced for rehabilitation projects following wildfire.
- Capture and collar transient ravens and breeding pairs that nest on INL Site powerlines. The aim of this research would be to learn how far ravens nesting in sagebrush steppe travel to forage. This will allow us to map raven predation risk to nesting sage-grouse.

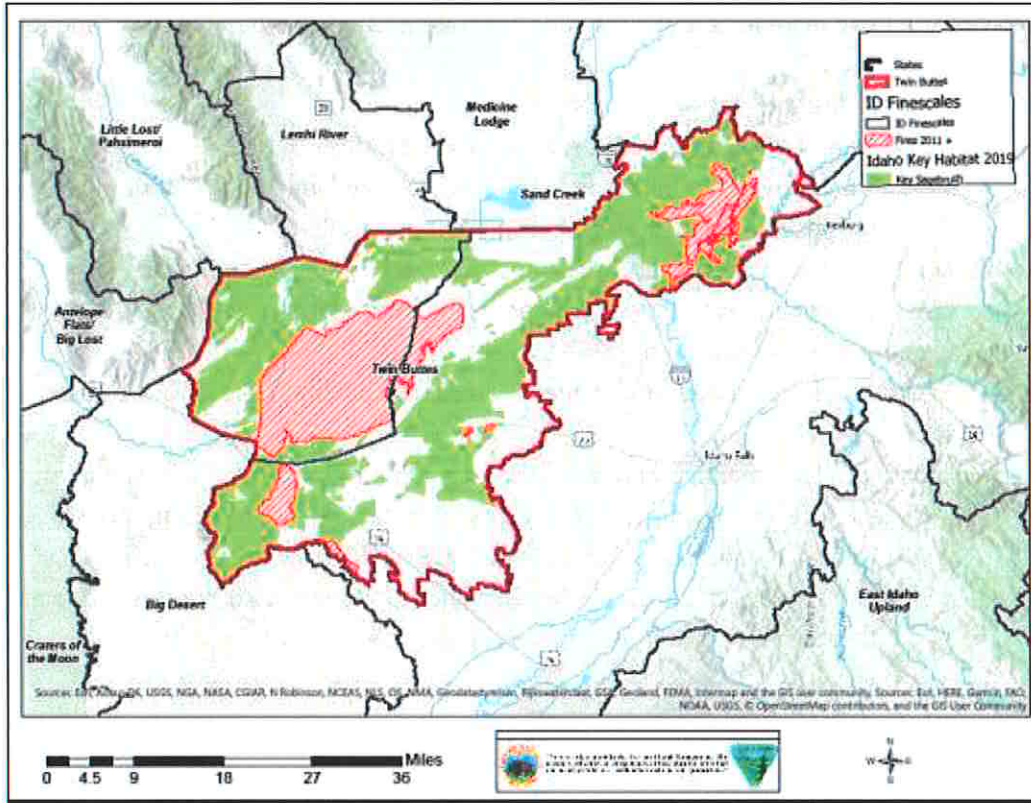


Figure 8. Twin Buttes Fine Scale Area with recent wildfires and existing sagebrush.

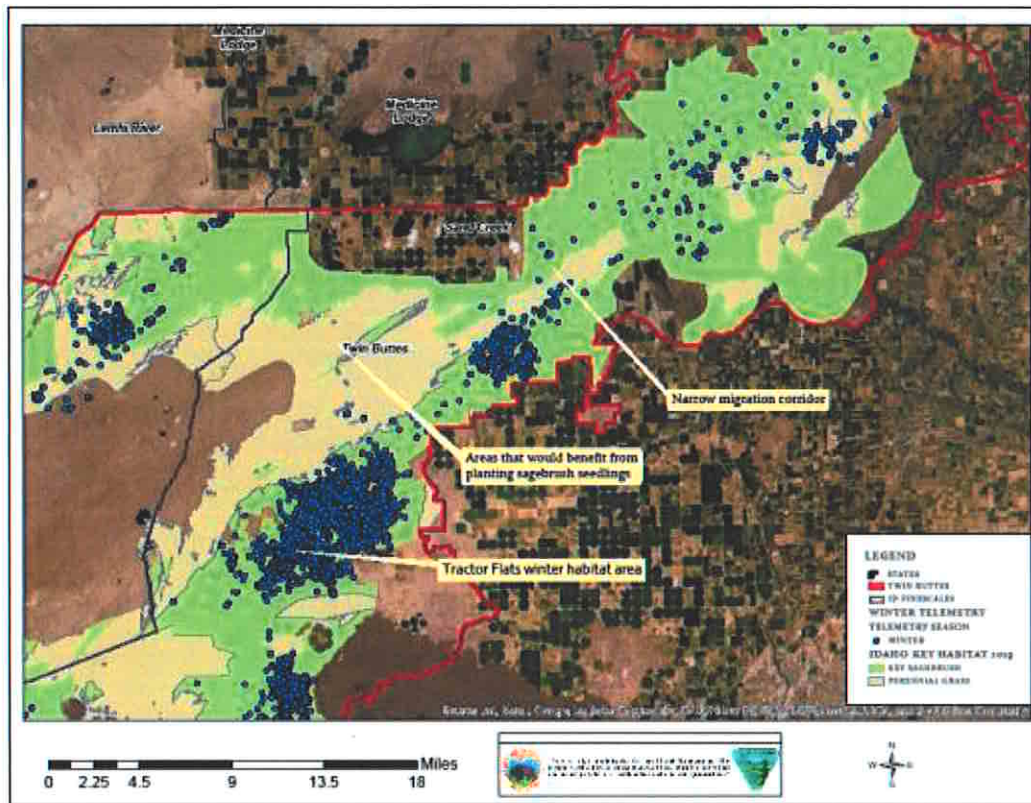


Figure 9. Tractor Flats sage-grouse wintering area and migration corridor in the Twin Buttes Fine Scale Area.



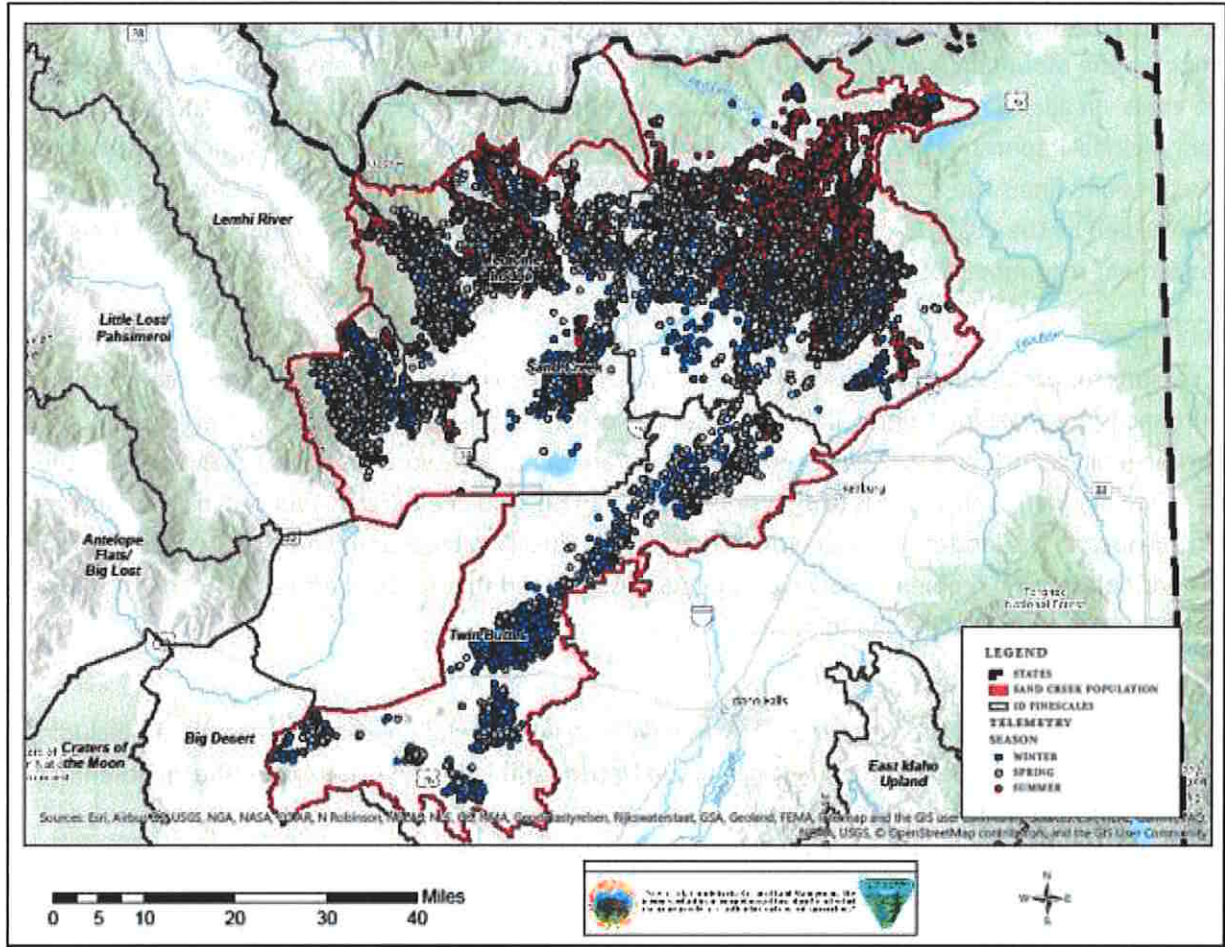


Figure 10. Sage-grouse telemetry locations by season, from birds captured on leks in the Sand Creek and Medicine Lodge fine scale areas and moving southwest to winter in the Twin Buttes Fine Scale Area (2015-2019).

## Mountain Valleys CA Target Areas: Lemhi River, Medicine Lodge, Sand Creek

Declines in the Mountain Valleys CA were most apparent in the Lemhi River and Medicine Lodge fine scale areas. In addition, although Sand Creek has not experienced substantial declines, the area is of broad, regional importance because of high population density and connectivity and overlap with other landscapes and fine scale areas (see Twin Buttes discussion). Furthermore, the Sand Creek population was impacted by the 2018 Grassy Ridge Fire. Each of these Target Areas has a unique set of threats and management recommendations that we discuss below.

### Lemhi River

The reasons for population declines within the Lemhi River are confounding because no recent major disturbances have occurred here. Relative to several other Target Areas, impacts from wildfire, anthropogenic disturbance, or conifer encroachment are minor (Ellsworth et al. 2019). Moreover, the probability of raven occurrence is low (Ellsworth et al. 2019), and cheatgrass cover and distribution is relatively low on the landscape. Indeed, discussions with local partners and biologists in the area have not identified specific problems. However, biologists suggested that focused efforts be made to search for new or undocumented leks in this area.

### Management Recommendations:

- Continue stream and riparian restoration work to improve late brood-rearing habitat, including construction of Beaver Dam Analogs in the Upper Lemhi along Hawley Creek and Eighteenmile Creek (Figure 11).
- We do not have further management recommendations for this area given that no significant potential causal factors of decline have been identified.

### Research Topics:

- We suggest that future analyses focus on 1) seasonal habitat conditions (e.g. a lack of understory forbs and perennial grasses or poor condition of riparian habitat), 2) disease (e.g., West Nile Virus), or 3) poor weather conditions. Indeed, results from the USGS analyses could provide a stronger basis to evaluate these potential factors.
- Search for leks in suitable habitat in spring 2021.



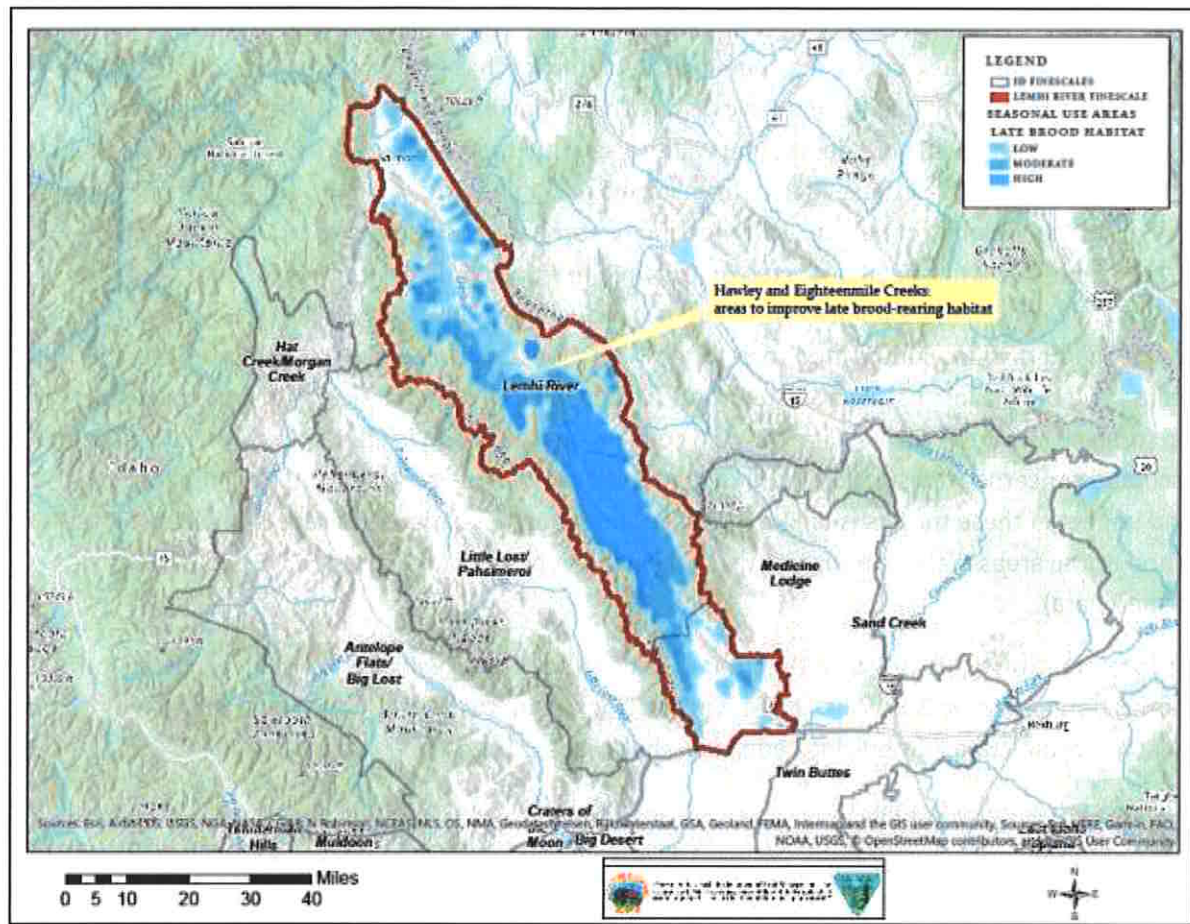


Figure 11: Lemhi River Fine Scale Area with late brood-rearing habitat suitability.

## Medicine Lodge

In the Medicine Lodge fine-scale area, a combination of impacts has likely contributed to sage-grouse declines. The Team identified anthropogenic disturbance, conversion of sagebrush to agriculture, agricultural pesticides, raven abundance, and wildfire as likely causal factors (Table 3; Ellsworth et al. 2019). Most notably, most of these factors have impacted Table Butte, at the southern end of the area, which is an isolated “island” of nesting, summer and winter habitat surrounded by agricultural land (Figure 12). Table Butte has been impacted on multiple fronts and the current 3-year average of lek route counts have declined 89% since 2011. Fire has reduced sagebrush cover (Figure 4) for winter habitat and cheatgrass has contributed to deteriorating understory conditions. Moreover, there appears to have been a loss of historic late brood-rearing habitat due to agricultural crop conversion and reduced foraging opportunities resulting from a conversion from flood irrigation to pivots. The Team also discussed concerns of pesticide use (Blus et al. 1989) and faster swathing equipment, although the scale and impact of these threats is unknown. Recent telemetry locations indicate that birds still use these agricultural areas in the summer, but survival has not been documented (IDFG and BLM, unpublished data).

Impacts from the Grassy Ridge Fire in the Sand Creek fine scale area will also likely have impacts on sage-grouse populations in Medicine Lodge. An ongoing telemetry study is examining fire effects on survival and reproduction in Medicine Lodge and the adjacent Sand Creek area.

### Management Recommendations:

- Expand sagebrush restoration, particularly in known winter areas and including Table Butte (planting, seeding).
- Work with NRCS and local conservation districts to identify potential ways to incentivize producers to swath in a manner to minimize direct mortality to sage-grouse (e.g., swath from inward to outward to push birds out or time of day recommendations).
- Identify areas to improve wet meadow and riparian resources for late brood-rearing habitat in the Medicine Lodge area.
- Work with land management agencies, utility companies and private landowners to discourage ravens from nesting and perching on artificial structures.

### Research Topics:

- Consider investigating the timing of pesticide application and potential changes in types of pesticide being used. Blus et al. 1989 documented pesticide as a threat to grouse in this area, but no new information is available.
- On-going research on sage-grouse demographics, nest-site selection, and seasonal habitat use in the Sand Creek Desert and Medicine Lodge will provide additional insight into potential causal factors and lead to additional targeted management recommendations. Field work on the project will be completed in 2020, with final analyses and reporting by 2021.



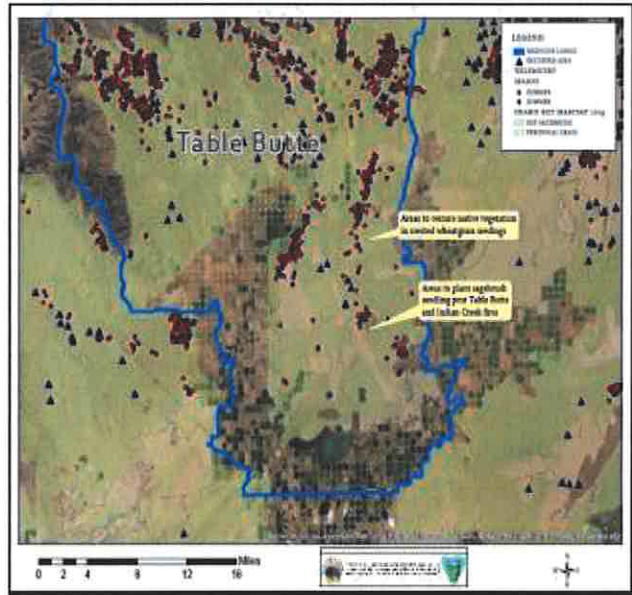
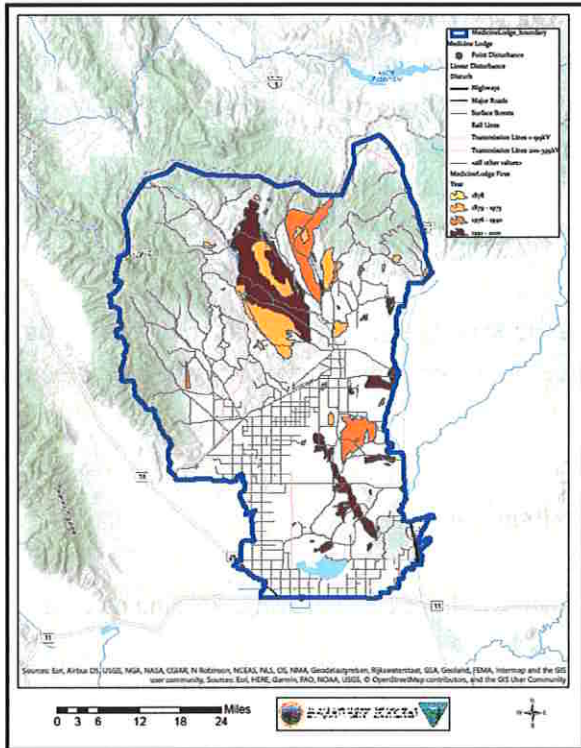


Figure 12. Medicine Lodge Fine Scale Area with disturbance and fire history. Table Butte area within Medicine Lodge showing agriculture influence and restoration needs.

## Sand Creek

The Sand Creek Desert is an area of high resilience and resistance, dominated by mountain big sagebrush and antelope bitterbrush (Figure 5). It is an area that has been traditionally managed by prescribed fire to remove brush cover, although these practices have decreased in recent years. Wildfire is not typically a concern in this landscape, but the 2018 Grassy Ridge Fire has created an avenue for cheatgrass invasion, particularly at the southern end of the fine scale area where resistance and resilience is moderate (Figure 3, Figure 5).

Recent GPS telemetry data indicates that most birds leave the Sand Creek Desert in fall to winter in the Twin Buttes Fine Scale Area (Figure 13). Thus, our management recommendations for Sand Creek focus on nesting and summer habitat.

### Management Recommendations:

- Continue rehabilitation efforts on the 2018 Grassy Ridge Fire.
- Expand sagebrush restoration (seeding, planting).
- Identify and treat areas of expanding cheatgrass invasion (herbicide spraying, seeding diverse perennial grass mix with forbs).
- Continue local efforts to manage and plan brush treatment efforts across land ownership boundaries and time.

### Research Topics:

- On-going research on sage-grouse demographics, nest-site selection, and seasonal habitat use in the Sand Creek Desert and Medicine Lodge will provide additional insight into potential causal factors and lead to additional targeted management recommendations. Field work on the project will be completed in 2020, with final analyses and reporting by 2021.



## Southern CA Target Area: Greater Curlew

Habitat conditions and the factors that influence long-term population viability vary greatly among fine scale areas in the Southern CA. On one hand, Brown's Bench and Shoshone Basin have high population density and connectivity, whereas populations in the southeast corner of the state have scattered leks and poor connectivity. Our primary area of concern in the Southern Conservation Area is the Greater Curlew Fine Scale Area.

### Greater Curlew

The sage-grouse population within the Greater Curlew area has been declining during recent years, prompting IDFG to close sage-grouse hunting seasons in most of Oneida and Power counties from 2014 to current. IDFG, BLM, and U.S. Forest Service (FS) have cooperated on a project to determine what factors are contributing to the decline and investigate why the population seems unable to rebound in years when other populations were increasing. The final report is expected in late 2020.

This area has low landscape cover of sagebrush (Table 4, Figure 4), high habitat fragmentation, a mix of land ownerships, high corridor densities (Coates et al. 2016, Moser and Kemner 2017) and close proximity of detrimental land uses (Coates et al. 2016). In addition, it may be relatively isolated from adjacent sage-grouse populations. The fine scale rating from HAF reports is marginal to unsuitable (contact Idaho BLM State Office for draft copies). A 2005-2006 telemetry study indicated that a 2006 fire impacted approximately 40% of winter habitat for birds in the Greater Curlew Valley (Connelly et al. 2009). Within modelled winter habitat, there appears to be little sagebrush recovery yet from 2006 and 2007 wildfires (Figure 13).

### Management Recommendations:

- Continue rehabilitation efforts on 2006-2007 fire scars by restoring sagebrush overstory.
- Continue cheatgrass and noxious weed treatments and native sagebrush and grass/forb seedings.
- Diversify areas dominated by crested wheatgrass and bulbous bluegrass on publicly managed lands in the Curlew and Arbon valleys.
  - Continue to evaluate new herbicides and treatment approaches to removing these competitive non-native grasses.
- Maintain and expand riparian/wetland exclosures.
- Provide off-site water for livestock to improve lotic/lentic systems for late brood-rearing habitat.
- Encourage additional projects that complement the National Joint Chiefs Restoration Grant (this grant will be completed in 2021).
- Work with land management agencies, utility companies and private landowners to discourage ravens from nesting and perching on artificial structures; continue to remove Russian olives and junipers, where these trees may be used for nesting by ravens in sage-grouse breeding habitat (Moser and Kemner 2017).
- Prioritize acquisition of privately owned lands in known breeding/wintering areas in the Curlew and Arbon, within six miles of Holbrook, ID.
- Continue to adjust livestock seasons of use/stocking rates during grazing permit renewal to ensure adequate forage and cover resources for nesting and brood-rearing grouse.





Research Topics:

- IDFG, BLM, and FS recently completed a 3-year study monitoring nest and brood success, nest site selection, survival, and seasonal movements in the Greater Curlew Valley. These data should provide additional insight into potential causal factors and lead to additional targeted management recommendations. The final report from this study is expected to be available by December 2020.

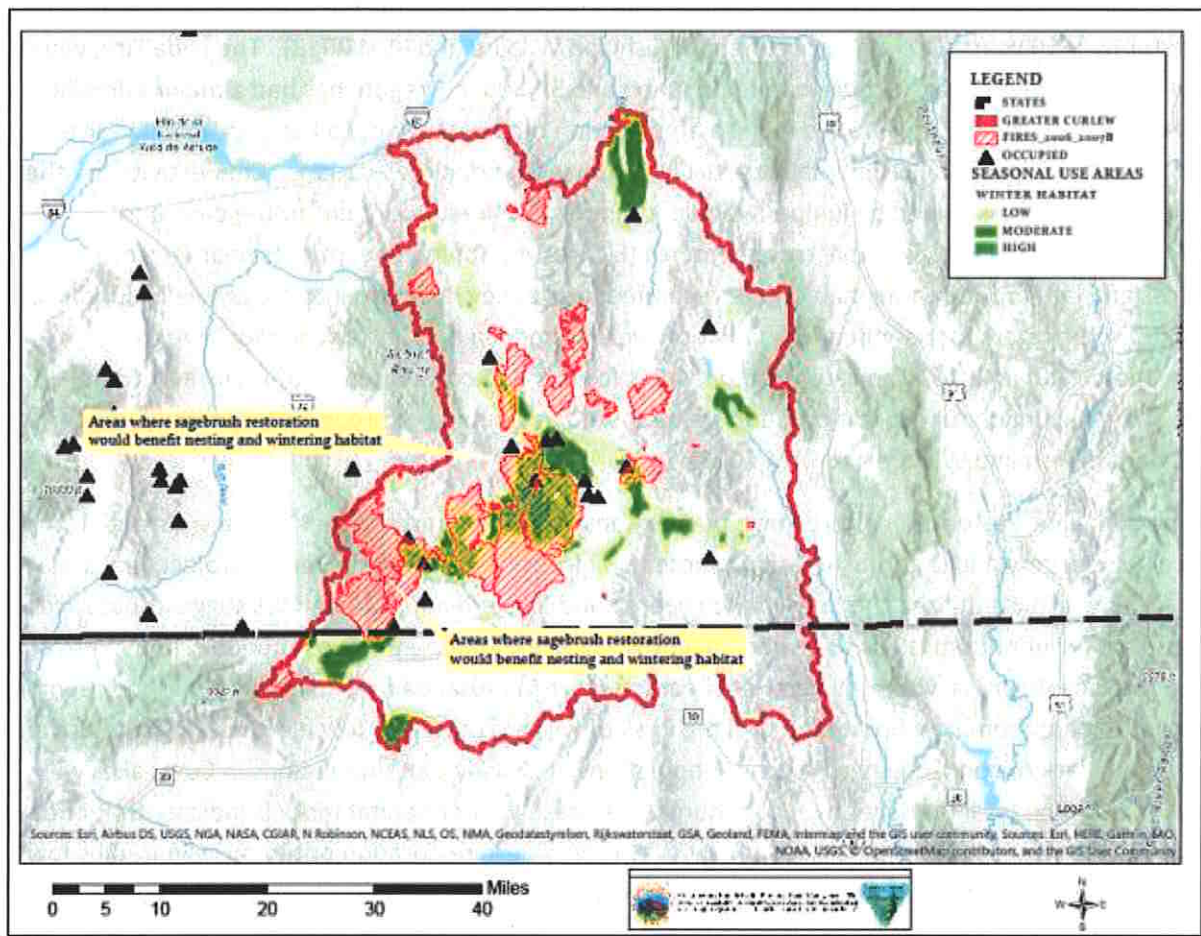


Figure 13. Greater Curlew Fine Scale Area with 2006 and 2007 wildfires, occupied sage-grouse leks, and winter habitat suitability.

## West Owyhee CA Target Area: Cow Lakes

While most populations of sage-grouse in the West Owyhee CA are generally well-connected to populations in Nevada and Oregon, the Cow Lakes population may be somewhat isolated.

### Cow Lakes

The Cow Lakes Fine Scale Area extends into Oregon, and Idaho and Oregon are jointly conducting a Habitat Assessment Framework analysis (contact Idaho BLM State Office for a draft copy). Recent declines have been documented in Idaho (Moser 2019), but population declines have been apparent in Oregon for over 10 years (Oregon Department of Fish and Wildlife and BLM 2018). The Soda Fire, which burned 228,500 acres of sage-grouse habitat in Idaho and 50,500 in Oregon, has had a major additive impact on perhaps the most degraded and isolated portion of the CA. Prior to the Soda Fire invasive annual grasses were already problematic particularly at lower and mid-elevations. Connectivity to other sub-populations is constrained by juniper woodlands in the Owyhee Mountains to the east, and agriculture and anthropogenic impacts to the north (Figure 14). Juniper treatments near mesic resources and late brood-rearing habitat are recommended at key locations in the Owyhee Mountains. In Oregon, soft triggers for habitat and population were tripped in the Cow Lakes Priority Area for Conservation (PAC) in 2016. The causal factor report for this PAC considered wildfire, invasive plants, poor to marginal understory conditions, and fragmentation as the major broad scale factors (Oregon Department of Fish and Wildlife and BLM 2018).

After the Soda Fire, restoration efforts have been extensive, and monitoring has shown substantial herbaceous recovery and sagebrush seeding success in places. A post-fire telemetry project indicates that male sage-grouse utilized the burned area year-round, but preliminary analyses suggest that sage-grouse select for unburned islands of dwarf sagebrush species, areas with more abundant native forbs, and that they avoid areas with high cover of cheatgrass and medusahead rye (BLM, unpublished report). Given that the area remains threatened by a high risk of wildfire potential, low elevation, climate driven factors, and a lack of connectivity with other populations, it is likely that populations in Cow Lakes will continue to decline until the sagebrush community matures. Winter habitat models indicate that birds typically move lower towards the Owyhee front to winter, where restoration potential is limited by low resilience and resistance (Figure 5). However, habitat improvement projects elsewhere in the Cow Lakes Fine Scale Area, including juniper removal projects, are expected to off-set some Soda Fire impacts.

### Management Recommendations:

- Follow up on Soda Fire rehabilitation efforts and determine where additional work is needed including re-treating annual grasses and expanding sagebrush plantings, particularly around occupied leks and in late brood-rearing habitat.
- Continue to maintain new Soda Fire fuel breaks to minimize the potential for future wildfires to impact recovering habitat.
- Encourage utility companies to install perch/nest deterrents on power line poles along Highway 95 and on telephone line poles on the Cow Creek Road.



- Work with partners to identify and prioritize areas for cheatgrass and medusahead control in intact sagebrush habitat; areas of concern are expected to include Whiskey Hill and the Cow Creek and Trout Creek roads.
  - Consider applying for “cheatgrass challenge” grants where appropriate.
- Identify priority areas for riparian restoration to improve summer habitat in close proximity to nesting habitat. Actions could include:
  - Process based riparian restoration
  - Repair and upgrade cattle watering systems such as troughs with float valves and shut-off valves
  - Add off-site watering for cattle, where feasible
  - Maintain or add grazing exclosures, where needed.
- Continue juniper removal projects in the Bruneau-Owyhee Sage-grouse Habitat (i.e., BOSH) landscape.
  - Encourage juniper projects that improve habitat connectivity with the adjacent Antelope Ridge and Soldier Creek fine scale areas.
  - Encourage juniper projects in sagebrush habitat adjacent to the Soda Fire perimeter to improve nesting habitat.

Research Topics:

- The final report of male sage-grouse movements and habitat use in relation to Soda Fire rehabilitation treatments is expected in early 2021. Results may result in additional targeted management recommendations.
- Inventory and assess riparian resources.

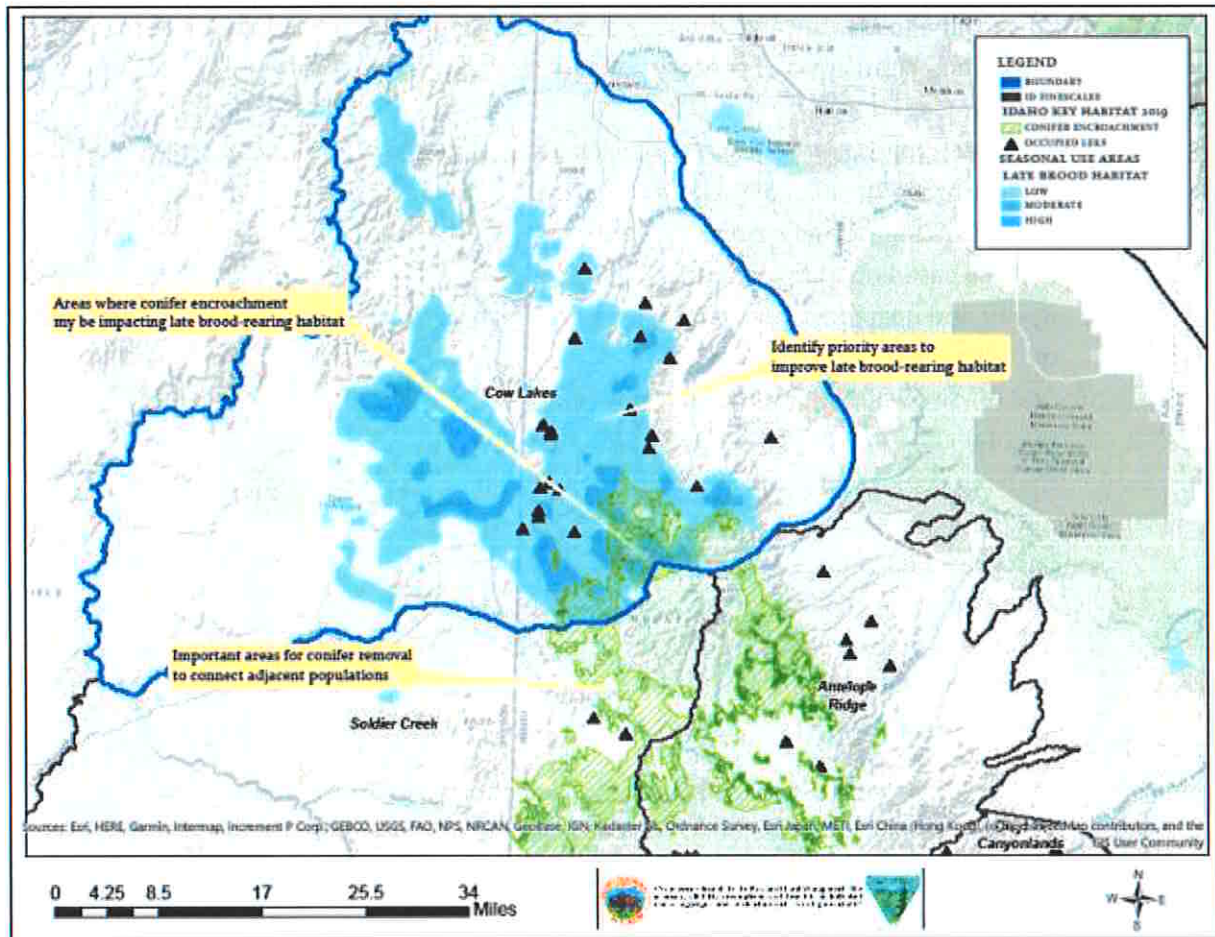


Figure 14. Conifer encroachment areas and sage-grouse summer use areas in the Cow Lake Fine Scale Area.

## ArcGIS Online Interactive Maps/ StoryMap

Go here to interact with maps of the target fine-scale areas and the impacts identified in this report:

<https://storymaps.arcgis.com/stories/eb8c478e75324ce794c359804bc6d845>

Share this story map to help communicate the adaptive management recommendations from this report.



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## Appendix A: Coordination on Project Planning and Prioritization

Greater sage-grouse utilize habitats at a landscape scale, that transcends land ownership and jurisdictional boundaries. As such, it is important for agency conservation partners and willing landowners, to coordinate to the extent possible on project planning and implementation efforts to achieve the greatest benefit to the species. This is especially relevant with respect to treatments intended to improve habitat suitability and/or connectivity on larger scales (e.g., thousands of acres). Funding capacities, policies, and timelines vary for each federal and state agency involved with sage-grouse population conservation in Idaho, so being aware of this information and coordinating with the appropriate local and/or state office personnel as early as possible can help with strategizing future project types and locations (Table 1).

**Table 1. Idaho sage-grouse conservation partners project planning information.**



PARTNER S	TASK	TIMELINE	COMMENTS
FEDERAL			
BLM	Offices develop their Sagebrush Integrated Program of Work (IPOW) projects and input outyear funding (Current FY+1,2,3) requests into BPSS (non-vegetation projects) and NFPORS (vegetation/fuels projects) databases.	Mid-February to Mid-March	Partners should coordinate with BLM SO and/or District/Field Offices in fall or early winter, to discuss partnering or to make recommendations for outyear projects.
	National and State Office program leads for BPSS and NFPORS work with field (Districts) to finalize and QA/QC BPSS and NFPORS data prior to data export to the IPOW Project Exploration Tool (PET) by the NOC	Mid-March to Early-April	
	NOC exports FY21 data from BPSS and NFPORS to populate the PET	Early- to Mid-April	
	Districts and State Offices prioritize Project Priorities in the PET (i.e., BPSS and NFPORS combined, priorities 1-n)	Mid-April to Early-May	
	FY21 State Office funding distribution determined by national Program Leads & approved by SGIG Core Team, DSDs, and Division Chiefs	Early June	
	SOs ensure PET (for BPSS projects) and NFPORS (regional approvals) reflect approved FY21 Planning Target Allocation funding allocations for Oct 1 <sup>st</sup> start	Late June	
	PTA allocations available in the PET	Late September	
	States/Districts begin to implement new FY work	October 1	
NRCS	FY 2020 Cheatgrass Challenge Proposals Due to State Office	May 15, 2020	2020 reference is for example only. Dates may vary by year.
	FY 2020 Sage Grouse Initiative EQIP Application Deadline (Accept Applications Year-Round)	May 29, 2020	
	Application Cutoff for Cheatgrass Challenge	June 12, 2020	
	Ranking & Cost Estimate Deadline for Sage Grouse Initiative & Cheatgrass Challenge Applications	July 17, 2020	

PARTNER S	TASK	TIMELINE	COMMENTS
	Contract Obligation Deadline for Cheatgrass Challenge & Sage Grouse Initiative EQIP	August 21, 2020	
USFS	Timelines/processes for National Forest vary.	Varies	Partners seeking to collaborate on projects or to make recommendations should work closely with the relevant National Forest at least 18 months in advance.
USFWS	Annual GRSF funding is placed on an agreement with OSC that is partnered/distributed through the Sage-Grouse Actions Team		See OSC Sage-Grouse Actions Team description
	FWS Partners for Fish and Wildlife Program has funds available year-round with no application deadline, for use on private lands	Anytime	Funding restricted to private lands, but recommend federal and state land managers look for opportunities to incorporated neighboring private lands.



PARTNER S	TASK	TIMELINE	COMMENTS
<b>STATE</b>			
IDFG	Opportunistic with OSC or IDL projects	Varies	No specific sage-grouse habitat funds
IDL	Sage Grouse Fund available annually for use on endowment lands only	Varies	Projects proposed on endowment land are typically run through OSC's Sage Grouse Action Team. IDL also is willing to contribute to valuable projects that include endowment lands and frequently provide funds to BLM and other agencies to participate in landscape level restoration and rehab.
OSC	Sage-grouse Actions Team meets to go over current funding priorities, ranking criteria, request for proposals etc.	January/ Feb 2020	2020 reference is for example only. Specific dates may vary by year. Potential applicants for SGAT project funding should be thinking about project ideas in fall or early winter to be prepared for the RFP.
	Send out Request for Proposals to Potential Applicants through Agency Networks, newsletters, press releases, etc.	February 14, 2020	
	Legislature in session discussing agency budgets and General Fund allocations. (OSC funds are from the State General Fund)	February – March 2020	
	Application Deadline for potential projects to Actions Team	May 1, 2020	
	Actions Team ranks projects proposals and gives recommendations	May 26, 2020	
	Work with other funding sources (BLM, IDL, USFWS) to identify which projects should be funded out of what pot of money	May 26 – June 1, 2020	
	Contracts put together, signed by OSC Administrator and sent to successful applicants for signature	June 9, 2020	
	Receive completed signed agreements back from applicants	June 9 – June 30, 2020	
	Project implementation	July 1, 2020 – June 1, 2021	

PARTNER S	TASK	TIMELINE	COMMENTS
	As project are completed applicants provide completion reports with photo points	July 1, 2020 – June 1, 2021	
	A certain amount of funding is set aside for the current year’s potential wildfire rehabilitation. If all funds are not allocated through the RFP process or used for wildfire rehabilitation, additional projects can be submitted throughout the fiscal year.	September 2020- April 2021	

**Acronyms:**

- BLM: United States Bureau of Land Management
- BPSS: Budget Proposal Submission SharePoint
- EQIP: Environmental Quality Incentives Program
- GRSG: Greater Sage-Grouse
- HQ: BLM Headquarters
- IDL: Idaho Department of Lands
- IPOW: Integrated Program of Work
- NFPORS: National Fire Plan Operations and Reporting System
- NOC: BLM National Operations Center, Denver
- OSC: Idaho Governor’s Office of Species Conservation
- PET: Project Exploration Tool
- PTA: BLM Planning Target Allocation (e.g., preliminary budget)
- RFP: Request for Proposals
- SB: Sagebrush
- SG: Sage-Grouse
- SGIG: Sage-Grouse Implementation Group
- SO: BLM State Office
- USFS: United States Forest Service
- USFWS: United States Fish and Wildlife Service