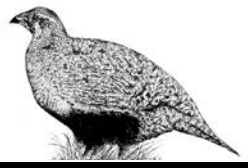
DRAFT

STATE OF WASHINGTON

September 2020

Periodic Status Review for the Greater Sage-grouse



Derek W. Stinson

Washington Department of
FISH AND WILDLIFE
Wildlife Program

The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 220-200-100 and 220-610-010). In 1990, the Washington Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 220-610-110). The procedures include how species listings will be initiated, criteria for listing and delisting, a requirement for public review, the development of recovery or management plans, and the periodic review of listed species.

The Washington Department of Fish and Wildlife is directed to conduct reviews of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing by the Washington Fish and Wildlife Commission. The periodic status reviews are designed to include an update of the species status report to determine whether the status of the species warrants its current listing status or deserves reclassification. The agency notifies the general public and specific parties who have expressed their interest to the Department of the periodic status review so that they may submit new scientific data to be included in the review. The agency notifies the public of its recommendation at least 30 days prior to presenting the findings to the Fish and Wildlife Commission. In addition, if the agency determines that new information suggests that the classification of a species should be changed from its present state, the agency prepares documents to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act.

This Draft Periodic Status Review for the Greater Sage-grouse was reviewed by species experts and contains an update of information pertaining to the status of the Greater Sage-grouse in Washington since the publication of the last periodic status review (Stinson et al. 2016). It will be available for a 90-day public comment period from October 1 to December 30 2020, and comments received will be considered during preparation of the final document. The Department will present the results of this periodic status review to the Fish and Wildlife Commission at an upcoming meeting. Submit written comments on this report by email by December 30 to: TandEpubliccom@dfw.wa.gov

Or by mail to:

Surveys and Forest Wildlife Section Manager, Wildlife Program
Washington Department of Fish and Wildlife
P. O. Box 43141
Olympia, WA 98504-3141

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On the cover: photos of male sage-grouse by Mike Schroeder; background by Mark Teske; black and white illustrations by Darrell Pruett

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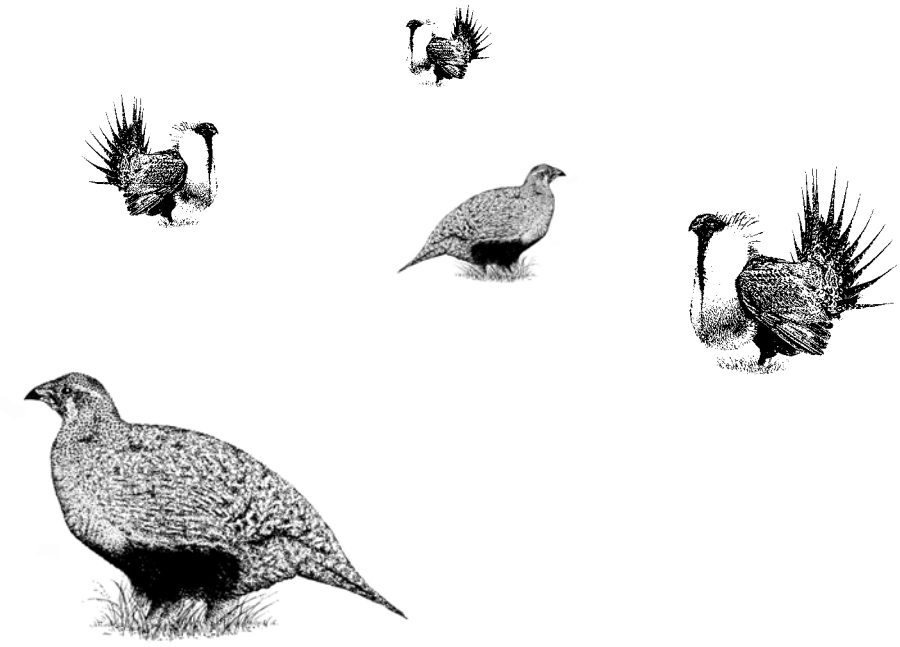

Prepared by
Derek W. Stinson

Washington Department of Fish and Wildlife
Wildlife Management Program
600 Capitol Way North
Olympia, WA 98501-1091

September 2020

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EXECUTIVE SUMMARY

The Greater Sage-grouse (*Centrocercus urophasianus*) historically was found throughout the shrub-steppe areas of eastern Washington. The species is now limited in distribution in the state to Douglas County, the Joint Base Lewis-McChord Yakima Training Center (JBLM - YTC), and Lincoln County where a reintroduction project re-established a small population, though the loss of habitat in the September fire may eliminate it. The state-wide population estimate, based on lek counts, was 676 birds in 2019. Preliminary data for 2020 suggested that the population in Lincoln County declined from 13 to 10, the population on the JBLM -YTC declined from 78 to 65, while the population in Douglas County increased from 585 to 653, for a statewide total of 770. Subsequent to those counts, the habitat of all three populations were affected by wildfires. Preliminary assessments suggest that the Douglas County population will be reduced by ~50% due to loss of sagebrush on half the occupied habitat, and mortalities primarily from high predation due to lack of cover. The struggling Lincoln County population will probably be extirpated.

The sage-grouse was state-listed as threatened in 1998, and a state recovery plan was completed in 2004. From 2001–2015, the Columbia Basin sage-grouse population was a candidate for listing as a threatened Distinct Population Segment (DPS) under the U. S. Endangered Species Act. In September 2015, the U.S. Fish and Wildlife Service issued a decision that the population in Washington did not meet the criteria for a DPS and listing of the Greater Sage-grouse across its entire range was not warranted. However, since that decision, genomic analyses highlighted the unique nature of the Washington population.

The potential for wildfires to eliminate sagebrush (*Artemisia* spp.) on extensive areas has been the greatest ongoing threat to sage-grouse in Washington, as we have seen in 2020. However, with the continued decline, all of Washington's populations are now likely suffering from problems with genetic health and fitness related to small population size. Uncertainty about the long-term maintenance of habitat that depends on Farm Bill programs (CRP/SAFE) is also a major concern. Other major management issues include habitat that is fragmented by roads, agriculture, and development and degraded by past wildfires, historical excessive livestock grazing, fencing, electrical transmission lines, and exotic vegetation. Sage-grouse may suffer mortality rates above historical levels as a result of collisions with fences, powerlines, and vehicles, and higher populations of some generalist predators, especially ravens and coyotes.

The Washington Department of Fish and Wildlife (WDFW) and several partner organizations are working on habitat and other aspects of sage-grouse recovery. Without these efforts, the sage-grouse would likely decline to extinction in Washington. In Spring 2020, sage-grouse had not yet declined to populations levels indicated in the 2004 state recovery plan for up-listing (<650 birds); however, that was before the devastating fires of September, and the threshold assumed that the Douglas County and JBLM-YTC populations were connected, which now appears unjustified. Due in part to their polygynous mating system, the effective size of the three populations are ~107 birds for Douglas County and 10 birds for JBLM-YTC. Extinction of the Lincoln County population is all but certain, and of the JBLM-YTC within a decade or so is likely unless they can be increased substantially. The hope of any reintroductions in the future is tempered by the recent failure of the reintroduction project by the Yakama Nation, and the probable failure of the Lincoln County population, and the continued loss of habitat in suitable condition by wildland fire.

Concurrent with this troubling decline, genomic analysis has indicated that Washington's population is more distinct than the Bi-state population that was proposed for listing as a threatened 'Distinct Population Segment' under the Endangered Species Act (USFWS 2019). For these reasons, it is recommended the sage-grouse be up-listed to endangered in Washington.

ACKNOWLEDGMENTS

Copies of reports or survey data were provided by Jason Lowe, Colin Leingang, and Dave Blodgett. Preparation was made easier by recent reports by Colleen Stinson, Jason Lowe, and Kourtney Stonehouse, Kyle Ebenhoch, and Kevin White. The draft was improved by reviews by Kevin White, Ellie Mangelinckx, Lisa Shipley, Grant Casady, Jason Lowe, Mike Atamian, and Mike Schroeder. Many thanks to our partners and cooperators in Sage-grouse conservation, including Bureau of Land Management, Oregon Department of Fish and Wildlife, Washington State University, U.S. Fish and Wildlife Service, Joint Base Lewis-McChord-Yakima Training Center, Spokane Audubon, Yakima Audubon, Yakama Nation, USDA Farm Service Agency, Natural Resource Conservation Service, The Sage-grouse Initiative, Wenatchee Sportsmen, Inland Northwest Wildlife Council, and Lincoln County Conservation District.

INTRODUCTION

The Greater Sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse), the largest grouse species in North America, was once abundant in the shrub-steppe of eastern Washington. Sage-grouse are closely associated with sagebrush (*Artemisia* spp.) and populations require extensive areas of sagebrush habitat to persist. Sage-grouse hunting seasons were closed in Washington in 1987 due to population concerns. The species was state-listed as threatened in 1998, and a recovery plan was completed in 2004 (Stinson et al. 2004). Sage-grouse in Washington are the most genetically unique of any subpopulation in North America and might serve as important genetic reservoirs of adaptive diversity (Oh et al. 2019), if they can be recovered. The Washington birds are more likely to nest, more likely to renest, and they lay more eggs than is typical elsewhere (Schroeder 1997), and they are also 15% larger than sage-grouse to the south (M. Schroeder, pers. comm.). Based on their genomic analyses, Oh et al. (2019) stated that, "highly differentiated populations like the Washington greater sage-grouse may warrant recognition and protection as a genetically distinct conservation unit."

This document is an update of the 2016 periodic status review. It includes the most recent information and estimates for the populations in Washington, as well as a brief synopsis of recent research and management activity. The Population and Habitat Status section have been updated substantially, and there have been changes in distribution, and there is a recommendation for a change in classification, particularly in light of the September 2020 fires.

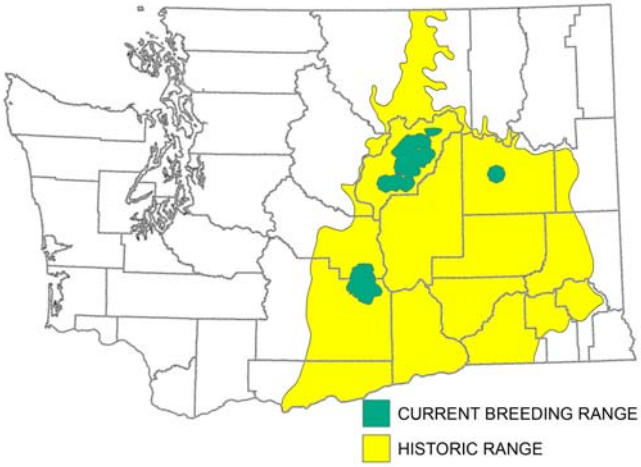

Figure 1. Historical range and breeding range (Habitat Concentration Areas, circa 2012) of sage-grouse in Washington.

Distribution. Sage-grouse persist in two main areas in Washington: one primarily on the U.S. Army's Joint Base Lewis McChord Yakima Training Center (JBLM-YTC) in Kittitas and Yakima counties and the other, often referred to as the Moses Coulee population, in Douglas County and potentially, adjacent parts of Grant County (Fig. 1). Populations were being re-established in Lincoln County (i.e. Crab Creek), and on the Yakama Indian Reservation, but with the 2020 fire, both have now probably failed.

LIFE HISTORY

The spring courtship display of males at specific locations, called 'leks', is the most conspicuous behavior of sage-grouse. Sage-grouse are polygynous, with the dominant males mating with multiple females. In Douglas County, most birds return to breeding areas in late February or March. Females generally return to the same nesting area (Schroeder et al. 1999), and probably visit the same lek or leks each year. Males begin to leave leks in late April and early May and move to summer habitat (Stinson et al. 2004). After mating, females devote most of their time to nesting and brood-rearing; males do not assist in these activities. Sage-grouse females attempt to raise one brood per year (Schroeder et al. 1999). The precocial

chicks feed themselves, but females spend considerable time keeping chicks warm and guarding them for the first four to five weeks.

Habitat requirements. Sage-grouse rely upon shrub-steppe habitat, with sagebrush comprising 60-80% of the yearly diet of adults and up to 95–100% of the winter diet (Schroeder et al. 1999). That is despite sagebrush's high concentrations of monoterpenes, sesquiterpene lactones, and phenolics, substances thought to have evolved as chemical defenses to herbivory (Kelsey et al. 1982). Wyoming Big Sagebrush (*Artemesia tridentata wyomingensis*) and Three-tip Sagebrush (*Artemesia tripartita*) are the most important sagebrush species to sage-grouse in Washington. There is considerable geographic variation in composition and concentration of secondary compounds among and within sagebrush varieties (Welch 2005), suggesting that sage-grouse populations across the species' ranges may be adapted for selecting and digesting the distinct chemistry of local sagebrush varieties (Oh et al. 2019).

Sage-grouse need large areas of shrub-steppe with sagebrush canopy (~15–35%), and a healthy herbaceous understory for nest concealment and brood-rearing cover and food (>10% forb cover, >15% grass cover, >18 cm grass height; Connelly et al. 2000a, Stinson et al. 2004, Hagen et al. 2007). A diverse herbaceous layer supplies food to females during the pre-laying period, and forbs and insects, particularly grasshoppers, beetles, and ants, are important during early chick development and thus are necessary for recruitment (Gregg and Crawford 2009, Connelly et al. 2011b). Later in summer, the diet of juveniles shifts from insects to more forbs, and broods often move to higher elevations or more mesic sites, such as seeps, riparian areas, and alfalfa fields that stay green when the vegetation of surrounding areas has dried (Connelly et al. 2011b). Sage-grouse broods in Washington do not seem to move to higher elevations and riparian habitats in late summer (Sveum et al. 1998, Stonehouse et al. 2015, G. Casady, pers. comm.). In winter, sage-grouse rely on the sagebrush that remains accessible above the snow for food and shelter (Connelly et al. 2011b). Sage-grouse have large home ranges; single 'season' home ranges (i.e. spring-summer) in Douglas County averaged 2–44 km^2 (0.8–12 mi^2; Stinson et al. 2004:14), and in Lincoln County, spring–summer home ranges averaged 33 km^2 (range 4–94 km^2; n=22) for males and 28 km^2 (range 2–174 km^2; n=28) for females (Stonehouse et al. 2015). Annual home ranges averaged 94 km^2 (range 11–292; n=18 m, 48 f) on the JBLM-YTC (K. White, pers. comm.). Sage-grouse also tend to avoid roads, electrical distribution lines, and vertical structures (distribution poles and trees) in their spring–summer home ranges, and when selecting nest sites (Schroeder and Vander Haegen 2014, Shirk et al. 2015, Stonehouse et al. 2015).

Predation and population dynamics. In north-central Washington, the survival rate for chicks to 50 days old was 33.4% (n=515; Stinson et al. 2004). In grouse species (subfamily Tetraoninae), predation typically accounts for about 85% of reported non-hunting mortalities and 79–94% of nest failures (Bergerud 1988: p. 615, 684; Moynahan et al. 2007). Nest success for 2012–2019 on JBLM-YTC was 24.9% calculated using nest survival models in Rmark (E. Mangelinckx, pers. comm.). Moynahan et al. (2007) reported that average seasonal nest success rate was 0.24–0.32 for early nests and 0.32–0.42 for late nests in Montana. Habitat quality, specifically the amount and type of vegetation available to conceal nests from visually hunting predators, like Common Ravens (*Corvus corax*), ultimately affects the number of nests destroyed by predators (Gregg et al. 1994, Ritchie et al. 1994, Rebholz 2007). Recent studies suggest that predation on young sage-grouse chicks can be high, and in fragmented landscapes or in areas with subsidized predators, predation can limit population growth (Hagen 2011). In Washington, ravens, Coyotes (*Canis latrans*), and American Badgers (*Taxidea taxus*), preyed on sage-grouse eggs and were responsible for many nest failures (Stinson et al. 2004, Lannoye and White 2014a, Harris Environmental Group 2015).

The annual survival rate for adult males in Douglas County was 56.9% (n=29) and 72.5% for adult females (n=88; Schroeder 2000). On JBLM-YTC, annual survival for males was 31.7% (n=24) and for

females was 75.2% (n=71) from 2012–2018 (all radio-marked individuals; E. Mangelinckx, pers. comm.). Overwinter survival is generally high, and most mortalities occur in spring, summer and early fall (Connelly et al. 2011a). Sage-grouse are relatively long-lived for gamebirds with individuals up to 9 years old recorded in the wild, and they may be able to live 14 or 15 years.

POPULATION STATUS

The sage-grouse population has continued to decline in Washington (Fig. 2). Based on changes in number of males counted on lek complexes, the sage-grouse population in Washington has declined ~80% since 1970. The state-wide population estimate for spring 2020 was 770 birds associated with 21 known active leks that was before the fires. The birds were distributed between 3 populations including 692 birds with 17 leks in Douglas County, 68 birds with 3 leks on JBLM-YTC, and 10 birds with 1 lek in Crab Creek (Fig. 3). The overall population increased 32% (510 to 710) between 2017 and 2018 but decreased 5% to 676 between 2018 and 2019. The population in Crab Creek (Lincoln County) declined from 13 to 10, and the population on the JBLM -YTC increased by 3; and the population in Douglas County increased ~18% from 585 to 692. A fourth population resulting from a reintroduction project of the Yakama Nation, was lost between 2018 and 2019.

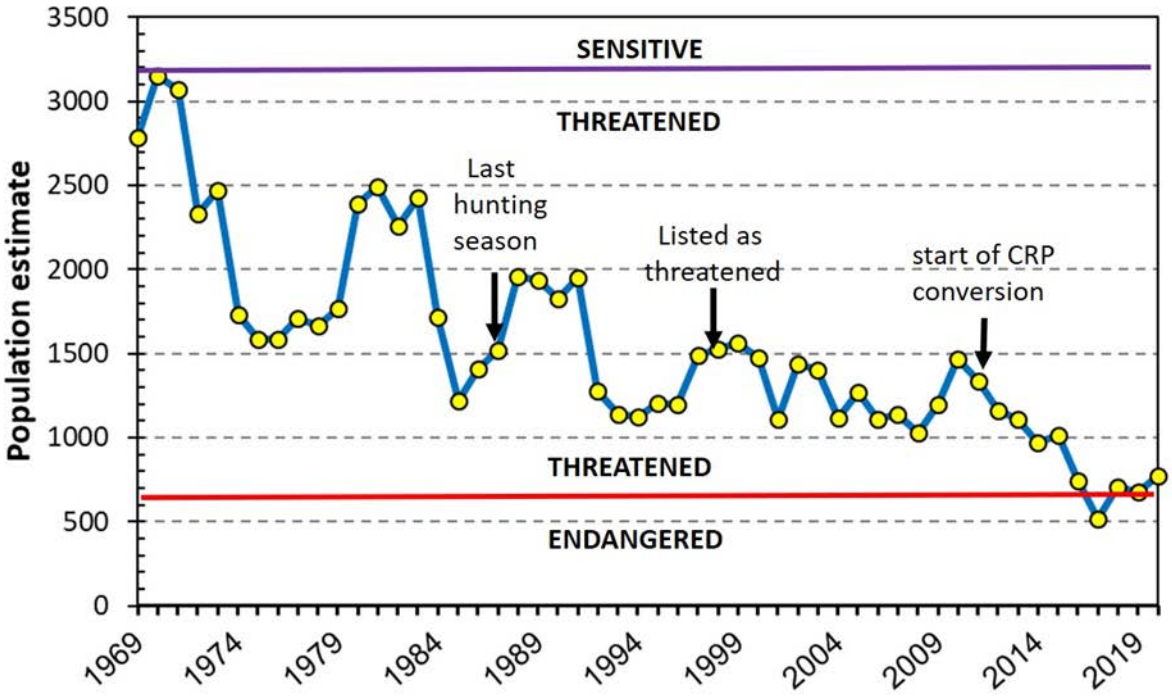

Figure 2. State-wide population estimate and significant events for sage-grouse in Washington,1969-2020 (spring, before the fires).

The relative stability of the population from ~1997 to 2011 has been attributed to the maturation of Conservation Reserve Program (CRP) fields in Douglas County (Schroeder and Vander Haegen 2011). CRP enrolled lands allowed the Douglas County population to remain relatively stable, whereas the JBLM-YTC population has continued a long decline since 1983, despite inhabiting one of the largest areas (1,300 km^2, 502 mi^2) of shrub-steppe remaining in the state (Fig. 3). The number of active leks declined to 3 in 2019 and 2020 on the JBLM-YTC, down from 6 in most recent years. Also, sage-grouse

numbers in Douglas County were affected by the wildfires of 2012, and cropland coming out of CRP, or tilling of older CRP that did not comply with stricter planting requirements of the Sage-grouse and Sharp-tailed Grouse State Acres for Wildlife (SAFE) program. An anticipated increase with habitat improvements may have been just starting to be evident in 2020, but SAFE and CRP acreage is expected to decline in the next few years.

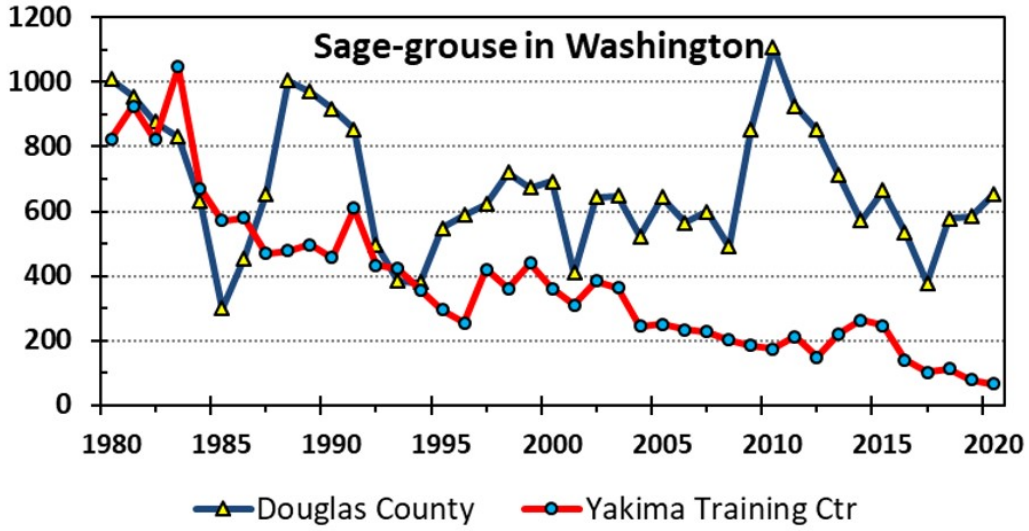

Figure 3. Estimates for the Douglas County and JBLM-YTC populations of sage-grouse in Washington, 1980-2020.

With the 2020 fires, sage-grouse will almost certainly have declined to populations levels below that indicated in the 2004 state recovery plan for up-listing by 2021 (<650 birds); that threshold also assumed that the Douglas County and JBLM-YTC populations were connected. In the ~15 years since that the uplist objective was developed, we have seen very little movement between populations, and the populations appear to be functionally isolated. All the populations were affected by fires; Douglas County may decline >50% from predation due to loss of cover, loss of sage-brush nesting habitat around half the active leks and reduced reproductive success due to conditions. If a hard winter follows, lack of sage-brush food and cover may result in additional mortalities. The JBLM-YTC population will also likely be down further as a result of the Taylor Ponds Fire, and the struggling Lincoln County population will likely be extirpated by the Whitney Fire. The full impact will not be known until surveys are done in 2021 and 2022, but Foster et al. (2019) reported reduced adult female survival and low nest survival after a large fire in Oregon in 2012. Connelly et al. (2000b) also reported an accelerated population decline and loss of active leks after a prescribed burn in southeastern Idaho.

Perhaps a more important metric than census population estimates for predicting population persistence is the 'effective population' size. The effective population [N_e] is the proportion of a population that can be expected to pass on their genetic information from one generation to the next (Frankham 1995). Schroeder (2000) estimated the ratio of census and effective populations sizes (N_c/N_e) for Washington's sage-grouse was 0.156. Therefore, the Douglas County population (~692 individuals in spring 2020), which was just above the up-list threshold of 650 birds, had an estimated effective population size of 107 birds. The JBLM-YTC (68 birds) had an estimated N_e of 10 birds. The 'extinction vortex' scenario described in the literature that results from inbreeding and reduced fitness in small populations (Gilpin and Soule 1986), and is aggravated by habitat and demographic stressors, may describe these populations. Extinction of the JBLM-YTC population within a decade or so is very likely unless they can be increased

very soon, but habitat condition may no longer be adequate to long sustain a population. Population modeling based on trends of lek counts indicated that "extinction is probable for both the Moses Coulee [Douglas County] and Yakima [JBLM-YTC] population" (Garton et al. 2015). The hope of reintroductions in the future is tempered by the recent failure of the sage-grouse reintroduction project by the Yakama Nation, and the probable extirpation of the Lincoln County population.

HABITAT STATUS

Sage-grouse in Washington inhabit large remnants of shrub-steppe on public land, areas where a matrix of private land contains a high percentage of shrub-steppe fragments, and lands enrolled in Farm Bill conservation programs (Conservation Reserve Program [CRP] and Sage and Sharp-tailed Grouse State Acres For Wildlife [SAFE]). Within this matrix, sage-grouse make use of some cropland for leks and foraging. Larger areas not converted to cropland were typically grazed by livestock, and some of these remaining shrub-steppe areas provide winter habitat, but little perennial grass or forb cover needed for nesting and brood-rearing, a legacy of historical heavy grazing. The largest areas of shrub-steppe vegetation on public lands are affected by multiple factors that have degraded their habitat value for sage-grouse as well. The current condition and situation of the Sage-grouse Management Units (SMU) with, and adjacent to extant populations (Fig. 4), are briefly described below.

Moses Coulee & Mansfield Plateau SMUs/Moses Coulee PAC. The Moses Coulee population centered in Douglas County occupies a 461,583 ac Habitat Concentration Area (HCA) that is a mosaic of cropland, CRP, and patches of high-quality shrub-steppe. Washington Department of Natural Resources (DNR) owns significant portions of the Mansfield Plateau (12%) and Moses Coulee (8%) sage-grouse units, with much of that leased for grazing, crops, or in CRP; Bureau of Land Management (BLM) and WDFW also own small portions. The CRP program has been essential for providing habitat for sage-grouse (Schroeder and Vander Haegen 2006, 2011). The Sage-grouse and Sharp-tailed Grouse SAFE program has specific planting requirements and is expected to boost grouse populations, but the tilling of older CRP starting in 2010 precipitated a decline in grouse numbers from which the populations had not yet recovered. In 2020, the Pearl Hill Fire burned ~223,000 ac including much of the Mansfied Plateau unit likely indicating a loss of nesting, brood–rearing, and wintering habitat in the area surrounding ~50% of the leks in Douglas County. Other recent fires include the 2012 Barker Canyon (>17,000 ac) and Leahy fires (73,000 ac) that also impacted portions of the Mansfield Plateau. The Barker Canyon Fire affected sagebrush cover, but the native grasses and forbs have recovered well. The Foster Creek Fire in 2012 totaled about 1,350 ac including private lands, BLM and WDFW; most of the ~725 ac of WDFW land had suitable sage-grouse habitat.

Joint Base Lewis-McChord Yakima Training Center SMU/ PAC. JBLM-YTC is an active U.S. Army training facility, and ongoing programs are required to maintain vegetation and restore impacts from military land-use and fires. Habitat modeling in 2014 identified ~92,117 ac (~30% of the installation) that likely had 15–40% sagebrush canopy cover (Lannoye and White 2014b). However, much of that habitat is located in the northern portion of the installation that receives little to no sage-grouse use, likely because this area is naturally separated from the southern portion of JBLM-YTC by several tall east-west ridges. Additionally, noise from Interstate 90 (I-90) and large power transmission lines, including the 230 kilovolt Vantage-Pomona Heights transmission line that is being constructed (BLM 2017, PacifiCorp n.d.), reduce the quality of JBLM-YTC's northern areas for sage-grouse.

Several large fires have occurred since the 2014 analysis, that contributed to further habitat loss and degradation. Fire is a constant threat on JBLM-YTC, particularly when live-fire training occurs during

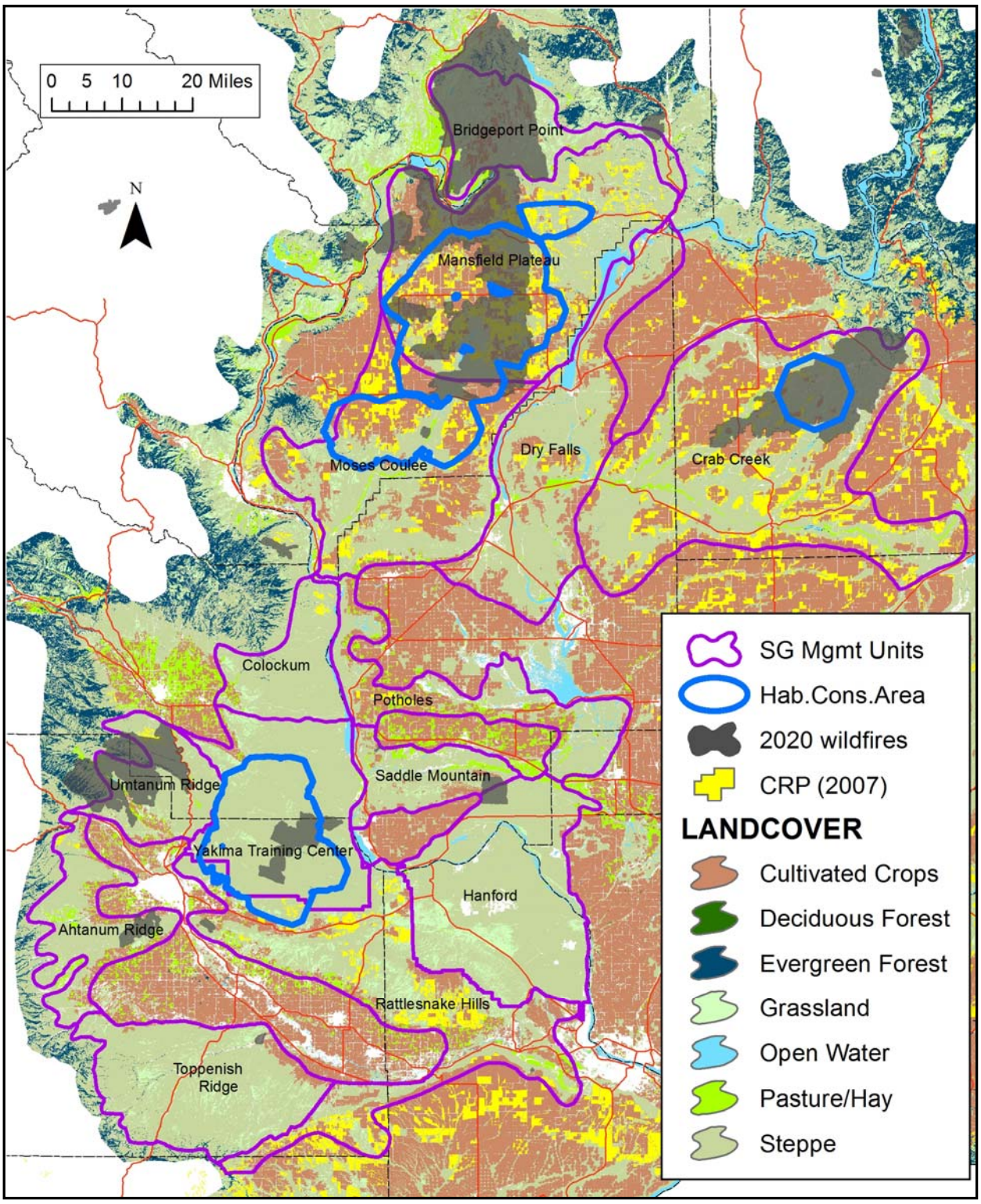

Figure 4. Land cover and Sage-grouse Management Units, Habitat Concentration Areas (Robb and Schroeder 2012), and the 2020 fires.

the driest months (June–October). In 2016, the Range 12 fire burned the southern part of JBLM-YTC and much of the shrub-steppe between the installation and the Hanford unit, totaling ~173,000 ac. Additional fires have originated from adjacent interstates (I-90, I-82), including the Boylston Fire that originated from I-90 and burned >44,000 ac in the northern portion of JBLM-YTC in 2018. As of 2018, 55% of YTC had burned at least once in the past 30 years. As of February 2020, JBLM-YTC had an estimated 58,090 ac (18% of the installation) of high-quality sage-grouse habitat with 15–40% sagebrush canopy cover and an additional 158,841 ac of habitat that may achieve sagebrush canopy cover of 15–40% through restoration and/or natural succession. In 2020, the Taylor Pond Fire burned ~25,000 ac on the YTC, and the impact to sage-grouse is being assessed as of writing. Sage-grouse on JBLM-YTC often use areas with < 15% sagebrush cover because these areas often have healthy bunchgrass communities and other non-sagebrush shrubs (e.g., yellow rabbitbrush [*Chrysothamnus viscidiflorus*]) that provide cover. These areas provide seasonal habitat for the species, but lack sagebrush for winter forage. A telemetry study during 2012-2018 identified ~ 117,128 ac of occupied area on YTC (34% of total area) and 4,400 ac on adjacent private lands; the population core area was 23,722 ac (96 km^2). The Sage-grouse Protection Area on YTC, which encompasses 78,600 ac, has temporal and spatial protections, but 53% of the total population-level home range and 34% of the population core area were outside the Sage-grouse Protection Area.

Crab Creek SMU/PAC. Substantial shrub-steppe habitat has remained in the Lincoln County portion of the Crab Creek SMU where 'channeled scablands' formed by the ice age floods contain thin or rocky soil that is poorly suited to cropland. Many of the areas with deeper soils were converted to wheat, and many were later enrolled in CRP contracts. The combined WDFW (Swanson Lakes Wildlife Area) and BLM (Twin Lakes and Telford management areas) ownership totals 53,000 ac. The relatively large blocks of suitable shrub-steppe vegetation and >3,000 ac of restored habitat, along with management changes, had improved the potential for sage-grouse since the birds were extirpated in the 1980s. Many miles of fences had been removed or marked to reduce collision mortalities of birds, and several miles of power distribution lines were removed or buried.

In 2020, the Whitney Fire burned >130,000 ac, including almost the entire Swanson Lake Wildlife Area and almost all the sage-grouse habitat that had been occupied since the reintroduction (Fig. 4). During the 10-year period from 2003–2012, approximately 29,000 ac (28%) of the Crab Creek Habitat Concentration Area in Lincoln County had burned in 6 major wildfires, including the Apache Pass Fire much of which included occupied sage-grouse habitat.

Dry Falls SMU. This unit is very important for any future connectivity between Crab Creek and Moses Coulee units, particularly the area from Banks Lake, south to Ephrata (Robb and Schroeder 2012); a few sage-grouse are known to have moved through this area. Connectivity value is compromised by Banks Lake and two 500 kilovolt transmission lines radiating from Grand Coulee Dam, and the 2017 Spartan Fire (8,700 ac).

Colockum SMU. This unit is very important for potential connectivity between Moses Coulee and the JBLM -YTC populations (Robb and Schroeder 2012). The Colockum, Quilomene, and Whiskey Dick Wildlife Areas comprise 2/3 of this unit, but topography is rather rugged and connectivity value is compromised by multiple power transmission lines south of the unit on JBLM-YTC, I-90, the Wild Horse wind turbines, and the effects of Milepost 22 Fire (7,600 ac) in 2018.

Toppenish Ridge SMU/Yakama PAC. The Toppenish Ridge SMU, on the Yakama Indian Reservation, contains substantial areas of shrub-steppe (Jamison and Livingston 2004). The major management issues are feral horses and wildfires. The Yakama Nation has been engaged in efforts to reduce the potential for large wildfires, and to reduce feral horse numbers. Fences exclude horses from 19,500 ac and an

additional 18,000 ac are being fenced. Additional funding is being pursued to enlarge the original exclosure to protect an additional 30,000 ac (D. Blodgett III, pers. comm.).

Umtanum Ridge, Ahtanum Ridge, Hanford and Rattlesnake Hills SMUs. These units are important for potential population expansion and connectivity between the JBLM-YTC unit and the Toppenish Ridge unit, if the decline in the JBLM-YTC population can be reversed. The Ahtanum Ridge unit was impacted by the Ahtanum Ridge Fire (~6,000 ac) in 2020. The Umtanum Ridge was affected by the Pipeline Fire (6,500 ac) in 2019, and the Evans Canyon Fire in 2020 (76,000 ac). The Rattlesnake Hills would connect the JBLM-YTC with the Hanford SMU, but it was impacted by the Range 12 fire (176,000 ac), and the Hanford SMU has had fires repeatedly dating back to the 1980s. The low precipitation on the Hanford makes restoration difficult and vegetation recovery slower.

Bridgeport Point SMU. The Bridgeport Point unit was affected by the Cold Springs Fire (190,000 ac) in 2020.

FACTORS AFFECTING GREATER SAGE-GROUSE IN WASHINGTON

Adequacy of Regulatory Mechanisms

Federal regulation. Sage-grouse are not directly protected by federal regulations at this time, but as a state-listed species, it is considered when federal actions would negatively affect them. From 2001-2015, the sage-grouse population in Washington was considered the Columbia Basin Distinct Population Segment (DPS) and was a candidate for listing under the Endangered Species Act. This raised the priority of sage-grouse conservation in the state and there was a consistent focus on habitat protection on federal lands, including JBLM-YTC and BLM, and for funding of conservation actions by USFWS. BLM has been, and continues to be, an important partner in sage-grouse recovery, by funding research, restoring habitat, and other conservation work. JBLM-YTC has been proactive in efforts to accommodate the needs of sage-grouse with their Army training mission. The recent decision that the population did not qualify as a DPS (USFWS 2015), however, has affected funding priority for sage-grouse work, and a first draft of the update to their Integrated Natural Resource Plan (INRMP) included reduced sage-grouse protections. Sage-grouse in Washington are the most genetically unique of any subpopulation in North America (Oh et al. 2019). The next most unique subpopulation is the Bi-state population on the border of California and Nevada, which is considered a DPS by the U.S. Fish and Wildlife Service (USFWS 2010, 2019).

State and local regulations. Loss of sage-grouse habitat is often caused by conversion to cropland or development. On non-federal lands, the Growth Management Act (GMA) is Washington's primary regulatory tool to protect rare and threatened species from development impacts. Local governments are required to: 1) create and implement development regulations that protect state-listed species and their habitat; 2) adopt zoning ordinances that ensure areas outside of urban growth areas remain rural in character, and: 3) ensure that development does not occur on natural resource lands designated for long-term agricultural use. However, rural densities allowed (e.g. ~1 dwelling/20 ac) by zoning meet the needs of most species, but likely exceed the tolerance of sage-grouse. The state rule implementing GMA (WAC 365-190-130) requires that wildlife habitat conservation areas (FWHCA - a type of critical area) must be designated and counties and cities should consult current information on priority habitats and species (PHS) identified by WDFW.

PHS management recommendations are not regulatory, but they are often adopted through county regulations. Known or discovered locations of sage-grouse and habitat trigger the process of avoiding, minimizing, and mitigating impacts. Though the specific nature of these protections varies across the counties, the inclusion of sage-grouse and shrub-steppe habitat provides a mechanism for minimizing disturbance from construction and development activities. Although land use regulations generally provide some protection for wildlife and occupied habitat, they typically do not adequately protect habitat that is not occupied, thus they are poorly suited for the recovery of species that require large landscapes.

Continued Habitat Loss, Fragmentation or Degradation

Sage-grouse are generally a species of undeveloped shrub-steppe landscapes, therefore conserving large contiguous patches of intact habitat is important (Connelly et al. 2011b). Moreover, Connelly et al. (2011b:83) cautioned that "failure to protect what is left and fix what is broken will likely result in extirpation of many, if not most, populations of Greater Sage-Grouse."

A range-wide analysis of sage-grouse data found a strong negative effect of development (urban, suburban areas, and interstate and state highways) within 18 km (11.2 mi) of leks; most active leks had no developed lands within 5 km (3.1 mi; Johnson et al. 2011). Compared to where they remain, the portion of sage-grouse range where they were extirpated contained almost 27 times the human density, almost 3 times more area in agriculture, was 60% closer to highways, and had 25% higher density of roads than occupied range (Wisdom et al. 2011). The Moses Coulee and Mansfield Plateau SMUs have potential to be influenced by development because of the amount of private land and its location near significant population centers and Banks Lake, which is attractive for recreation. Development on the JBLM -YTC, including development of training ranges and other facilities, has undoubtedly had some cumulative effects, and Army training affects habitat quality through sagebrush mortality and disturbance to understory vegetation, which requires ongoing rehabilitation and restoration.

Another long-term concern with the potential for major impact on sage-grouse in Washington is that Farm Bill programs (e.g. CRP/SAFE) are vulnerable to changes by Congress. Federal Farm Bill Programs such as CRP and SAFE have been essential in providing additional habitat and in buffering patches of remnant natural habitat. The Sage & Sharp-tailed grouse SAFE program has 72,941 ac enrolled, and Shrub-steppe SAFE has 19,530 ac enrolled in Washington. The Douglas County population in particular largely depends on these programs and has benefitted from a waiver of the 25% cap of cropland acres in a county; the potential for a waiver in the 2018 Farm Bill is unclear. It is also uncertain if the SAFE program will continue after the current contracts, and during 2025–2027, 61,449 ac under contracts in Douglas County will expire.

Wildfire. Wildfires are the most immediate threat to sage-grouse in Washington (Stinson et al. 2004). Wildfires impact significant amounts of shrub-steppe annually (Coates et al. 2015). High severity fires eliminate sagebrush, and it can take > 10 years to recover sufficient sagebrush cover to be suitable for sage-grouse, assuming enough residual sagebrush survived to provide a seed source. Drought can greatly influence the risk of catastrophic fire, and some of the ignitions are due to human activities that are not closely regulated such as target shooting and burning of weeds. Gaps in fire district coverage can also lead to time delays in suppressing fires when they are small and more easily controlled. The emphasis on protecting infrastructure and directing fire resources to developed areas allows fires to expand. Efforts within Washington and rangewide to reduce the size of wildfires include establishing fuel breaks; their effectiveness may depend on sustained funding to maintain them over the long-term so that they remain effective.

Electrical transmission lines and renewable energy projects. Transmission lines have been negatively correlated with sage-grouse persistence and movements (Connelly et al. 2004, Beck et al. 2006, Wisdom et al. 2011, Schroeder and Vander Haegen 2014, Shirk et al. 2015, Gibson et al. 2018). Major transmission lines have a substantial footprint on the JBLM-YTC and in Douglas County; two radio-collared sage-grouse that moved from Lincoln County to Douglas County were found dead near transmission lines and were probably collision casualties. The impact of wind turbines is not clear; sage-grouse generally avoid tall structures, but in 2006, a female from the JBLM-YTC nested (unsuccessfully) near a turbine of the Wild Horse project in the Colockum management unit. Recent proposals for large solar energy projects in eastern Washington have the potential to further reduce and fragment shrub-steppe habitat, depending on location, and would likely need additional powerlines; WDFW has not yet received formal proposals.

Livestock grazing and management. Livestock grazing is the most widespread land use occurring in sage-grouse range. Livestock grazing is compatible with sage-grouse where the habitat characteristics needed for breeding and wintering can be consistently maintained (Connelly et al. 2000a, 2011b; Wambolt et al. 2002, Crawford et al. 2004). The effects of livestock on sage-grouse habitat depend on stocking level, season of use, utilization levels, history of the site, and drought. The most immediate impact of grazing can be reduction of grass cover at sage-grouse nest sites, which can result in high rates of nest predation (Gregg et al. 1994, Hockett 2002, Rebolz 2007), although rotational grazing in Montana, and late season grazing in Wyoming did not have this effect (Monroe et al. 2017, Smith et al. 2017). Collisions with fencing constructed to manage livestock can cause direct mortality to sage-grouse (Stevens et al. 2012). Water developments can result in the degradation of important brood-rearing habitat by concentrating livestock and they may facilitate the spread of West Nile Virus by providing mosquito breeding sites (Walker and Naugle 2011). Raven occurrence is also associated with cattle (Coates et al. 2016). Sage-grouse population declines may be correlated with drought (Johnson et al. 2011), which can increase the negative effects of a grazing regime that might otherwise be sustainable. Though the range of sage-grouse still shows some effects of excessive historical grazing, in general, livestock management has improved, and ranching on private lands is less detrimental for sage-grouse than alternative land uses such as development of ranchettes or conversion to cropland. The Douglas County General Conservation Plan and the Sage-grouse Initiative (below in *Management Activities*) provide incentives for landowners to incur fewer impacts to sage-grouse on working ranch and farm lands.

Livestock grazing is currently not permitted on most of WDFW-managed lands within the Sage-grouse Management Units; there are seven grazing leases representing a small percentage of the acres in the Units, and only one of these leases is in occupied habitat. Grazing permits on WDFW managed land for periods of more than two weeks require livestock grazing management plans that include monitoring and schedules for evaluation. DNR owns more than 150,000 ac of land in sage-grouse PACs in Douglas, Lincoln, and Grant Counties. 80,000 ac are leased for grazing. On public lands, grazing is monitored to ensure that the appropriate standards are met. On state lands, this is required by Ecosystem Standards for State-Owned Agricultural and Grazing Land (RCW 79.13.600, 79.13.610, and 77.12.204). BLM primarily implements deferred rotation grazing systems with conservative stocking rates (J. Lowe, pers. comm.). The rotations are set up to seasonally avoid grazing in areas that are most likely to support nesting birds during the breeding season. An assessment of sage-grouse habitat on the Twin Lakes allotment showed BLM land under grazing management is meeting breeding habitat requirements for nesting habitat indicators and is not significantly different than un-grazed control transects (BLM 2014a).

Other Factors Affecting Sage-grouse

Predation. Predation is the most important proximate cause of mortality for sage-grouse, and the rate of predation is affected by the quality of habitat (Connelly et al. 2011a,b). Losses to predation are sustainable in large populations but have a more significant impact on small populations in fragmented habitat. Hagen (2011) suggested that areas with higher predator populations in human altered landscapes may be population sinks. He noted that short-term reduction of predators may be warranted during translocation projects, because translocated birds often suffer higher than normal rates of mortality (Hagen 2011). Habitat changes and human-associated food sources (e.g. roadkill, agriculture, landfills) and nesting and perching structures have generally increased the abundance of some important predators of sage-grouse eggs, chicks, and adults, particularly Common Ravens, Coyotes, and Great Horned Owls (*Bubo virginianus*; Schroeder and Baydack 2001, Stinson and Schroeder 2012, Schroeder et al. 2019). The population of ravens has increased ~400% in western North America in the past 40 years (Howe et al. 2014, Sauer et al. 2017, O'Neil et al. 2018). Coates and Delehanty (2010) reported that daily survival rate of sage-grouse nests in Nevada was directly related to local abundance of ravens.

West Nile Virus. West Nile Virus (WNV), a disease new to North America, has caused high mortality in sage-grouse populations in some locations (Naugle et al. 2005, Walker and Naugle 2011). It is transmitted between mosquitoes and birds; many infected birds die within 4–8 days, but if they survive, the antibodies may confer long-lasting protection from reinfection (Kilpatrick et al. 2007). In 2009, 4 mosquito samples from the JBLM -YTC tested positive for WNV, but effects of the disease on Washington populations are unknown.

MANAGEMENT ACTIVITIES

Stinson and Schroeder (2014) previously described conservation actions to address tasks in the state recovery plan for sage-grouse; updates of several activities are briefly described in annual reports (Schroeder et al. 2019) and mentioned below.

Lincoln County reintroduction. During 2008–2015, 277 sage-grouse from Oregon were released in Lincoln County (Schroeder et al. 2019). The movements, productivity, habitat use, and survival of these birds were monitored closely as part of a graduate research project (Stonehouse 2013, Stonehouse et al. 2015). Sage-grouse numbers were down after extreme conditions in winter 2016–2017 and the population has struggled since then. Additional releases to reinforce numbers were planned, but the Whitney Fire has likely eliminated that from consideration.

JBLM-YTC augmentations, demographic, habitat, and predator studies. A population augmentation effort was conducted to address genetic concerns associated with small population size of the JBLM-YTC population. During 2004–2006, 61 birds from Nevada or Oregon were released. Genetic analysis to determine if the augmentation was successful was inconclusive, and the augmentation effort resumed in 2014–16, with 36 females from Idaho (n=18) and Nevada (n=18). Ebenhoch et al. (2019) evaluated vital rates of resident vs. translocated birds and White et al. (unpublished data) assessed the spatial distribution and demographics of resident sage-grouse from 2012–2018. Sage-grouse habitat models, and predator assessments and management plans were also completed (Vernadero Group 2012, White and Lannoye 2014, Lannoye and White 2014a,b, Harris Environmental 2015).

Yakama Nation reintroduction. The Yakama Nation attempted to re-establish a population on the Yakama Reservation in the Toppenish Ridge SMU. A total of 155 sage-grouse from Oregon, Nevada, and Wyoming were released from 2005–2006, and 2013–2014. However, this incipient population struggled; a single male was present on the lek in 2018, and none were present in 2019.

Wildfire suppression and prevention. The threat of wildfires is being addressed in several ways. The JBLM-YTC has done substantial planning and established the capacity for aggressive fire suppression. Although initially effective upon implementation from 2010-2013, lack of consistent application of wildland fire management actions starting in 2014 has resulted in significant impacts to habitat both on and off the installation. The Lincoln County Conservation District initiated a fuel breaks project in 2015, and BLM began a project in 2019, mowing 9 miles; to date ~15-20 miles have been established. Swanson Lakes WLA staff are working with the District and BLM to develop a maintenance plan so that the firebreaks will remain effective. There is also proposed legislation that would remedy the gaps on the landscape where primary responsibility for fire suppression is not clear.

Habitat restoration. Restoration projects have had varied success at reestablishing sage-grouse habitat due to differences in precipitation levels, soil quality, invasion by non-native species, and the length of time required (Arkle et al. 2014). JBLM-YTC has ongoing sagebrush restoration to address areas affected by past wildfires and chronic training impacts; however, given the time required for sage-brush regrowth, the efforts are not meeting the need given the rate and scale that wildland fire impacts are occurring. Many other habitat restoration projects in sage-grouse management units have been completed or are in various stages of completion on WDFW and BLM lands (Stinson and Schroeder 2014, Schroeder et al. 2019). Since 1995, >3,000 ac of former cropland had been restored in Lincoln County, though it isn't clear how much will recover from the recent fire. The funding required to restore suitable habitat conditions at the needed scale limits the amount and pace of restoration work that can occur.

Fence marking and fence and perch structure removal. Fence collisions can be a major source of mortality for sage-grouse, although making them more visible can dramatically reduce collision risk (Stevens et al. 2012, Van Lanen et al. 2017). Many miles of fencing in SMUs have been marked by BLM, WDFW, JBLM -YTC, conservation districts, partner organizations and volunteers, and many miles of unneeded fences have been removed. In Lincoln County, 7.7 miles of power distribution line and telephone lines were removed eliminating 126 poles, 2 miles were installed below-ground, perch deterrents have been installed on 68 powerpoles on the central distribution line in the reintroduction area, and other structures used as predator perches (e.g. a wind mill) have also been taken down.

Sage-grouse Initiative (SGI). The Natural Resource Conservation Service (NRCS), in partnership with Pheasants Forever, initiated the Sage-grouse Initiative (SGI) in 2010. Ranchers in sage-grouse habitat areas of central and eastern Washington may be eligible to receive financial assistance to help protect habitat and improve range conditions for their livestock for existing grazed ranch lands and expired CRP lands as well as restore marginal crop land back to native habitat. SGI uses farm bill dollars to implement conservation practices that benefit both their daily operations as well as sage-grouse and other wildlife species. SGI typically funds infrastructure such as pipelines, troughs, wells and fencing to develop rest/deferred-rotational grazing systems on private lands, and requires marking of fences in sage-grouse areas. Other common practices include; escape ramps, native seedings, obstruction removal, pollinator plots, cover crops, shrub plantings, and riparian restoration. Since 2010, 120,547 ac of private/public land have been enrolled in 135 SGI contracts in Washington with an overall investment over 6 million dollars, primarily in Douglas County. In 2020, the Chelan-Douglas Land Trust submitted application to NRCS for protecting approximately 6,724 acres of rangeland and dry cropland from development in southern Douglas County that was eligible for special funding through SGI. The easement represents the first SGI-funded Agricultural Land Easement (ALE) that NRCS completed in Washington, and the single largest ALE in the state. Over the next several years, NRCS hopes to work more closely with WDFW to help with connectivity between sage-grouse populations within the state.

Douglas County General Conservation Plan. The Foster Creek Conservation District developed a Multiple Species General Conservation Plan (GCP) for Douglas County that includes sage-grouse as a covered species. A GCP is a programmatic Habitat Conservation Plan under which multiple Section 10 permits can be granted for "incidental take" for otherwise lawful activities. The GCP describes a process for applicants (private agriculture landowners) to develop voluntary site-specific farm plans that will result in improved habitat for covered species while gaining long-term assurances for their agriculture operations. The GCP has grazing guidelines for developing grazing management plans that would promote better habitat and improve plant productivity and vigor, seed production, photosynthesis, recovery, and re-growth.

Coordination and cooperation. Sage-grouse in Washington are the focus of an interagency 'tech team', and a larger working group, that help coordinate conservation actions and identify priorities for conservation actions. The tech team recently assisted with the development of a guidance document for grouse translocations (Stinson 2019), that is being used as the foundation for a Western Association of Fish and Wildlife Agencies (WAFWA) whitepaper.

Research

Landscape connectivity. Re-establishing connections between populations that are now isolated is vital for the long-term viability of sage-grouse populations in Washington. Robb and Schroeder (2012) modeled habitat concentration areas and movement corridors for sage-grouse to help prioritize protection and restoration of key linkage habitat. Shirk et al. (2015) used data from telemetry, genetics, and leks to evaluate the expert opinion models used in the analysis to predict rates of movement, gene flow, and lek persistence.

Sage-grouse male movements and post-fire habitat use. Movements of sage-grouse were analyzed before and after the Apache Pass Fire in Lincoln County (Wells et al. 2016). Thornton and Olsoy (2018) analyzed the movements and resource use by translocated and resident male sage-grouse in Lincoln County.

Survival and habitat use by translocated sage-grouse. Ebenhoch (2017) and Ebenhoch et al. (2019) compared movements, survival and reproduction of translocated and resident sage-grouse on JBLM-YTC. Stonehouse et al. (2015) analyzed habitat use by the sage-grouse translocated to Lincoln County.

CONCLUSION AND RECOMMENDATION

Greater Sage-grouse are now limited in distribution to two main areas centered in Douglas County and on JBLM-YTC; the small number of birds in Lincoln County will likely be extirpated by 2021. Due to the sage-grouse polygynous mating system, the effective sizes of Washington's populations were not sustainable. The spring 2020 total estimate was 770 birds, up slightly from 676 in 2019, but the devastating fires in September 2020 may result in a ~50% population decline. The full impact may not be known for 1-2 years. Efforts are underway by various partner agencies to reduce the size of wildfires, but they still pose the greatest threat to habitat and may not be able to remedy fires during extreme conditions as existed in September 2020.

The Douglas County sage-grouse population is unique in that Farm Bill conservation programs have been essential for maintaining it, but recent changes to Farm Bill programs create great uncertainty going

forward. Without the Farm Bill programs and other conservation efforts, sage-grouse will likely decline to extinction in Washington.

Sage-grouse will likely decline well below the level indicated (<650 birds) in the state recovery plan for up-listing (Stinson et al. 2004). That objective, which was roughly derived from the 50/500 effective population 'rule' and the estimate of an N/N_e ratio of 0.156, assumed the populations were connected, but they appear to be functionally isolated. Conservation science has increasingly emphasized the negative effects of fragmentation and small population size for genetic health and fitness, particularly given the effect of the polygynous mating system on effective population size. The N_e of the Douglas County, JBLM-YTC, and Lincoln County populations were 107, 10, and 2 birds, respectively, before the September fires. The Lincoln County population may now be effectively extinct, and the JBLM-YTC population has continued a steady decline.

Concurrent with the troubling decline, genomic analysis has indicated that Washington's population is more distinct than the Bi-state population in California and Nevada which has been proposed for listing as a threatened DPS under the Endangered Species Act (USFWS 2019). Oh et al. (2019) suggested that Washington's highly differentiated population may possess important adaptions and "may warrant recognition and protection as a genetically distinct conservation unit." Macdonald et al. (2017) suggested that peripheral populations of species may be a valuable resource for translocation to augment vulnerable populations facing rapid ecological and climatic changes elsewhere. Washington's sage-grouse populations would first need to recover from the current population bottleneck before any such translocation would be considered, and they continue to lose genetic diversity as long as populations remain small.

For these reasons, we recommend that the Greater Sage-grouse be up-listed to endangered in Washington.

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The references cited in the Periodic *Status Review for the Greater Sage-grouse* are categorized for their level of peer review pursuant to section 34.05.271 RCW, which is the codification of Substitute House Bill 2661 that passed the Washington Legislature in 2014. A key to the review categories under section 34.05.271 RCW is provided in Table A.

Individual papers cited cover a number of topics discussed in the report, including information on: 1) the species' description, taxonomy, distribution, and biology; 2) habitat requirements; 3) population status and trends; 4) conservation status and protections; 5) research, monitoring, and restoration activities; and 6) factors affecting the continued existence of the species.

Table A. Key to 34.05.271 RCW Categories:

Category Code	34.05.271(1)(c) RCW
i	(i) Independent peer review: review is overseen by an independent third party.
ii	(ii) Internal peer review: review by staff internal to the department of fish and wildlife.
iii	(iii) External peer review: review by persons that are external to and selected by the Department of Fish and Wildlife.
iv	(iv) Open review: documented open public review process that is not limited to invited organizations or individuals.
v	(v) Legal and policy document: documents related to the legal framework for the significant agency action including but not limited to: (A) federal and state statutes; (B) court and hearings board decisions; (C) federal and state administrative rules and regulations; and (D) policy and regulatory documents adopted by local governments.
vi	(vi) Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under the processes described in (c)(i), (ii), (iii), and (iv) of this subsection.
vii	(vii) Records of the best professional judgment of Department of Fish and Wildlife employees or other individuals.
viii	(viii) Other: Sources of information that do not fit into one of the categories identified in this subsection (1)(c).

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PERSONAL COMMUNICATIONS

David Blodgett III, Wildlife Biologist
Wildlife Resource Management
Yakama Nation,
Toppenish, Washington

Grant Casady, Associate Professor
Director of Environmental Studies
Whitworth University

Jason Lowe, Biologist
USDI Bureau of Land Management
Spokane District Office,
Spokane, Washington

Ellie Mangelinckx
Whitetail Environmental, LLC
U.S. Army -Yakima Training Center,
Environmental Division
970 Firing Center Rd, Bldg. 810
Yakima, Washington

Kevin White
Whitetail Environmental, LLC
U.S. Army -Yakima Training Center,
Environmental Division
970 Firing Center Rd, Bldg. 810
Yakima, Washington

Washington State Status Reports, Periodic Status Reviews, Recovery Plans, and Conservation Plans

Periodic Status Reviews

2020 Mazama Pocket Gopher
2019 Tufted Puffin
2019 Oregon Silverspot
2018 Grizzly Bear
2018 Sea Otter
2018 Pygmy Rabbit
2017 Fisher
2017 Blue, Fin, Sei, North Pacific Right, and Sperm Whales
2017 Woodland Caribou
2017 Sandhill Crane
2017 Western Pond Turtle
2017 Green and Loggerhead Sea Turtles
2017 Leatherback Sea Turtle
2016 American White Pelican
2016 Canada Lynx
2016 Marbled Murrelet
2016 Peregrine Falcon
2016 Bald Eagle
2016 Taylor's Checkerspot
2016 Columbian White-tailed Deer
2016 Streaked Horned Lark
2016 Killer Whale
2016 Western Gray Squirrel
2016 Northern Spotted Owl
2016 Greater Sage-grouse
2016 Snowy Plover
2015 Steller Sea Lion

Conservation Plans

2013 Bats

Recent Status Reports

2019 Pinto Abalone
2017 Yellow-billed Cuckoo
2015 Tufted Puffin
2007 Bald Eagle
2005 Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot
2005 Aleutian Canada Goose
1999 Northern Leopard Frog
1999 Mardon Skipper
1999 Olympic Mudminnow
1998 Margined Sculpin
1998 Pygmy Whitefish
1997 Gray Whale
1997 Olive Ridley Sea Turtle
1997 Oregon Spotted Frog

Recovery Plans

2020 Mazama Pocket Gopher
2019 Tufted Puffin
2012 Columbian Sharp-tailed Grouse
2011 Gray Wolf
2011 Pygmy Rabbit: Addendum
2007 Western Gray Squirrel
2006 Fisher
2004 Sea Otter
2004 Greater Sage-Grouse
2003 Pygmy Rabbit: Addendum
2002 Sandhill Crane
2001 Lynx
1999 Western Pond Turtle
1996 Ferruginous Hawk
1995 Pygmy Rabbit
1995 Snowy Plover

Status reports and plans are available on the WDFW website at:
http://wdfw.wa.gov/publications/search.php