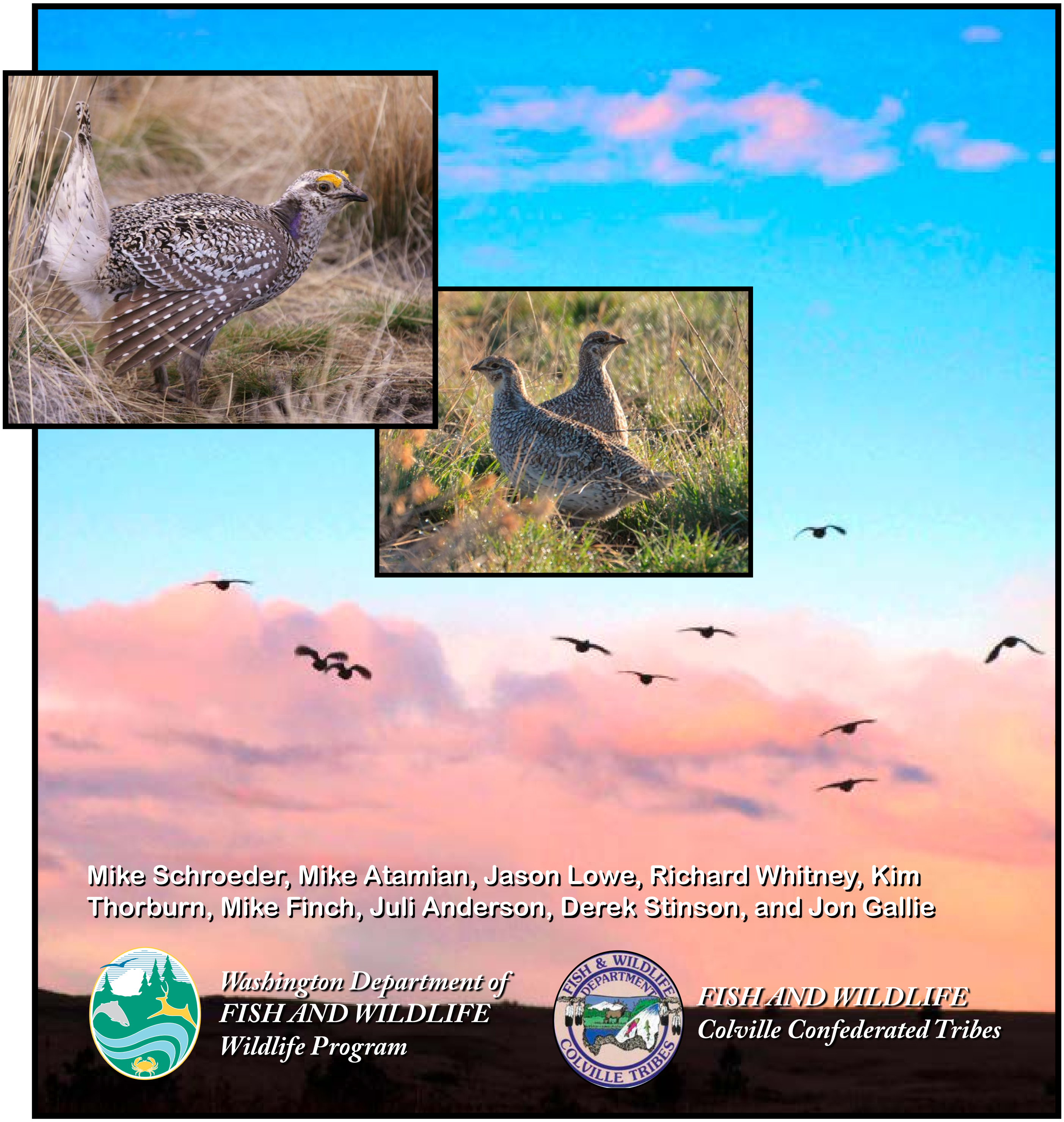
STATE OF WASHINGTON Progress Report December 2016

Recovery of Columbian Sharp-tailed Grouse in Washington: Progress Report



Mike Schroeder, Mike Atamian, Jason Lowe, Richard Whitney, Kim Thorburn, Mike Finch, Juli Anderson, Derek Stinson, and Jon Gallie

Washington Department of
FISH AND WILDLIFE
Wildlife Program

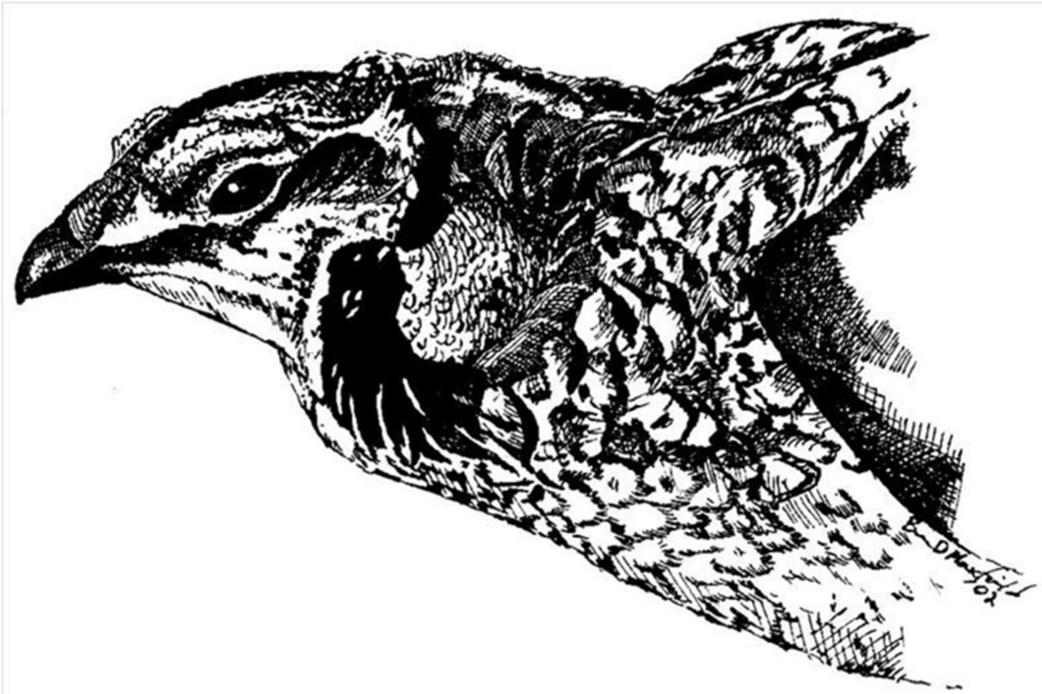
FISH AND WILDLIFE
Colville Confederated Tribes

ABSTRACT

Declining populations and distribution of Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) in Washington have resulted in serious concerns for their long-term conservation status. The overall population was estimated to be 632 on 38 leks in 2016, representing a continuation of long-term declines. Translocations of sharp-tailed grouse from 'healthy' populations outside the state were conducted to improve the genetic and demographic health of populations within Washington. The Washington Department of Fish and Wildlife, in cooperation with the Colville Confederated Tribes, translocated 455 Columbian sharp-tailed grouse from central British Columbia, southeastern Idaho, north-central Utah, and the Nespelem area of Washington to different populations in Washington State in spring 1998–2013. The release sites in Washington included Scotch Creek (NW of Omak in Okanogan County), Dyer Hill (S of Brewster in Douglas County), Swanson Lakes (S of Creston in Lincoln County), Greenaway Springs (SE of Okanogan), and Nespelem (E of Nespelem in Okanogan County). Three of the release sites included state-owned public land and the other sites are Colville Tribal land; all are being managed for the benefit of wildlife, and in particular sharp-tailed grouse. In all release sites, sharp-tailed grouse declined prior to translocation, despite the acquisition and protection of habitat and ongoing habitat restoration efforts. Translocations appeared to reverse the declines, at least in the short term. Analysis of movement, survival, and productivity of the translocated birds is ongoing.

On the front cover: Big Bend area in Douglas County by Eric Braaten; 2 sharp-tailed grouse at Swanson Lakes Wildlife Area, Lincoln County by Kourtney Stonehouse; and single sharp-tailed grouse at Chesaw Wildlife Area, Okanogan County by Michael Schroeder. On page 1: illustration by Brian Maxfield. On the back page: illustration by Darrell Pruett.

RECOVERY OF SHARP-TAILED GROUSE IN WASHINGTON: PROGRESS REPORT



November 2016

Michael A. Schroeder, WDFW, P.O. Box 1077, Bridgeport, WA 98813

Michael Atamian, WDFW, 2315 North Discovery Place, Spokane Valley, WA 99216

Jason Lowe, BLM, 1103 N Fancher Road, Spokane Valley, WA 99212

Richard Whitney, Colville Confederated Tribes, P.O. Box 150, Nespelem, WA 99155

Kim Thorburn, Spokane Audubon Society, P.O. Box 9820, Spokane, WA 99209

Mike Finch & Juli Anderson, WDFW, Swanson Lakes Wildlife Area, Creston, WA 99117

Derek W. Stinson, WDFW, 600 Capitol Way North, Olympia, WA 98501

Jon Gallie, WDFW, 3860 Hwy 97A, Wenatchee WA 98801

ACKNOWLEDGEMENTS

This project would not have been possible without the cooperation of wildlife agencies in Idaho, Utah, and British Columbia; we'd especially like to thank Randy Smith, Ron Greer, and Doug Jury. Some capture efforts in Idaho and Utah were done cooperatively with Oregon Department of Fish and Wildlife who were obtaining birds for release in northeastern Oregon. Funding for this project was provided by numerous sources including the State Wildlife Grants Program and the Recovery Funds through the USFWS, WDFW, YTC, BLM, and WSU. Lisa Shipley, Kourtney Stonehouse, Todd McLaughlin, and Kevin White at Washington State University added a strong research component to this project. Mike Finch and Jim Bauer at Swanson Lakes WLA built the settling boxes for the release of birds. Numerous people assisted in capture, including Bill Burkett, Christian Hagan, Ron Greer, Randy Smith, Megan Schwender, Harriet Allen, Chris Sato, Juli Anderson, Thom Woodruff, Jeff Heinlen, Scott Fitkin, Dave Hays, Dan Peterson, Tiffany Baker, Donovan Antoine, Rick DeSotel, Eric Krausz, Kristin Mansfield, Dave Volson, Leslie Robb, Paul Wik, Luke Mallon, Kurt Merg, Mike Livingston, Ella Rowan, Howard Ferguson, Glenn Paulson, Howard Ferguson, and Rose Gerlinger. The BLM has been a great supporter and sought additional funds to improve this project, particularly with the support of Jason Lowe. Monitoring included efforts by personnel from Colville Confederated Tribes, Bureau of Land Management (BLM), WDFW, Washington State University (WSU), and numerous individuals including Monica McFadden, Nick Hobart, Nancy Williams, Abbey Shuster, Aliina K. Lahti, Dick Rivers, Gary Ostby, Harvey Morrison, Kevin White, Luke Lillquist, Kim Thorburn, Randall McBride, Mike Finch, Sam Rushing, Brian Drake, Nate Lester, Kirby Wallace, Ann Brinley, Katie Wat, Adrian Rus, Dawn McSwain, Gary Wiles, Doug Pineo, Craig Sherwood, Kerrin Doloughan, Rich Parrish, Tyler Kollenbroich, Rose Salonikios, and Craig Cortner. We offer apologies to those that we have forgotten to mention.

INTRODUCTION

Columbian sharp-tailed grouse were historically found in many of the shrub-grass habitats of central and southeastern Washington (Yocom 1952, Aldrich 1963). Surveys have indicated that sharp-tailed grouse are virtually extinct everywhere except Okanogan, Douglas, and Lincoln counties (Fig. 1). The current range is approximately 3% of the historical distribution (Hays et al. 1998, Schroeder et al. 2000, Stinson and Schroeder 2012). Remaining populations are small and localized within isolated areas of relatively intact shrubsteppe as well as Conservation Reserve Program (CRP) fields (Table 1).

The Washington Department of Fish and Wildlife (WDFW) has a goal to recover threatened populations of sharp-tailed grouse in Washington. The state has listed the species as threatened, acquired over 15,000 hectares of sharp-tailed grouse habitat, developed management strategies to improve their habitat (Hallet 2006, Olson 2006, Peterson 2006, Hoffman et al. 2015, WDFW 2015), conducted research on their life history requirements (McDonald 1998), conducted detailed analyses of population genetics throughout the sharp-tailed grouse range (Spaulding et al. 2006), begun translocations to increase and expand populations (Stonehouse et al. 2015), and published a recovery plan (Stinson and Schroeder 2012, Fig. 2). The Colville Confederated Tribes (CCT) has pursued a similar strategy of acquisition and restoration (Berger et al. 2005, Gerlinger 2005, Whitney 2014). The BLM lists the sharp-tailed grouse on their Sensitive list with a goal of minimizing or eliminating threats and improving the condition of habitat. The primary management strategy for the WDFW, BLM, and CCT has been to improve habitat on publicly-owned or leased lands that are currently, or were historically, occupied by sharp-tailed grouse, and help facilitate enrollment of private lands in Farm Bill conservation programs. Habitat improvements include the reduction of grazing pressure, transition of cropland (mostly wheat) to grass-dominated habitats (such as in the federally-funded Conservation Reserve Program [CRP]), restoration of native habitat, and planting of key components such as riparian trees and shrubs.

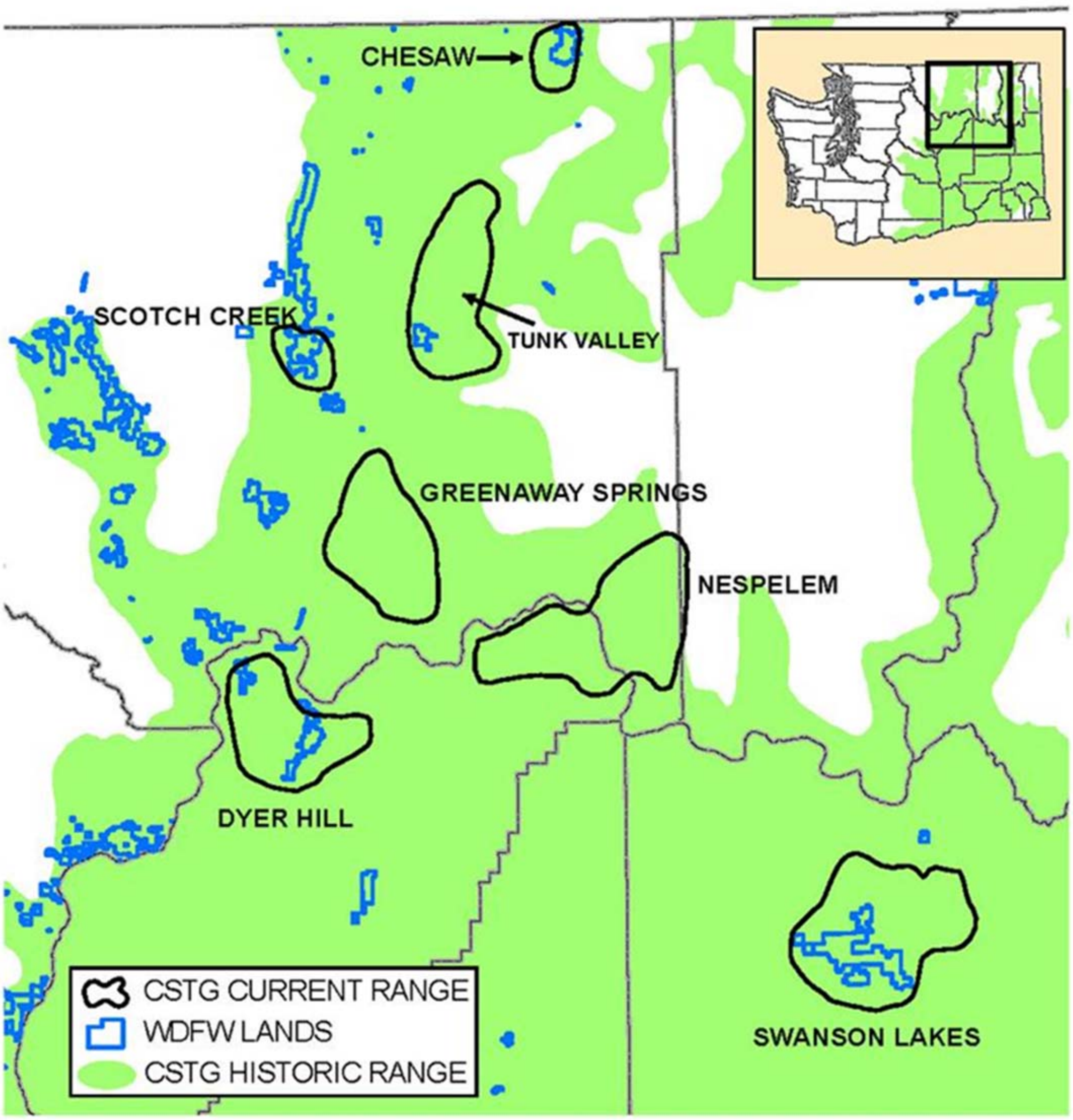


Fig. 1. Estimated historic and current range of sharp-tailed grouse in north-central Washington (modified from Schroeder et al. 2000). The Swanson Lakes area is also known as Crab Creek. The Nespelem area is often divided into the Nespelem area in Okanogan County and the Big Bend area in Douglas County).

Table 1. Distribution of habitats (1993 Thematic Mapper) in Washington in relation to sharp-tailed grouse populations (adapted from Schroeder et al. 2000).

Range or population	Proportion of area (%)					Total area (km^2)
	Shrubsteppe[a]	Cropland	CRP	Forest-shrub	Other	
Total population	67.2	11.6	5.2	14.5	1.5	2,173
Tunk Valley	69.6	1.5	1.2	27.5	0.2	342
Greenaway Springs	78.7	3.6	2.1	14.5	1.2	340
Chesaw	46.0	0.0	3.9	49.9	0.2	70
Scotch Creek	69.3	4.7	0.9	23.7	1.4	79
Dyer Hill	42.0	44.5	12.0	0.7	0.8	308
Nespelem[b]	65.7	5.1	6.9	19.6	2.7	513
Swanson Lakes	77.0	13.0	5.6	2.4	2.0	521
Unoccupied range	36.5	37.9	4.4	17.7	3.4	77,692
Total historical range	37.3	37.3	4.4	17.6	3.4	79,865

[a]Shrubsteppe includes shrubsteppe, meadow-steppe, and steppe habitats described by Daubenmire (1970).

[b]Nespelem includes the area north of the Columbia River on Colville Confederated Tribal (CCT) lands and the Big Bend area south of the Columbia River in Douglas County.

Isolation poses a significant threat to the viability of remaining populations. Westemeier et al. (1998) described the reduction in genetic diversity and in population fitness over a 35-year period in a small, declining greater prairie-chicken (*Tympanuchus cupido*) population in Illinois. They reported that declines in fertility and egg hatchability correlated with a population decline from 2000 individuals in 1962 to less than 50 by 1994. Bouzat et al. (1998) genetically compared the Illinois population with larger populations in Kansas, Nebraska, and Minnesota and found that it had approximately 2/3 the allelic diversity of the other populations. Bellinger et al. (2003) found a similar reduction in genetic variation, though not in reproductive success, in greater prairie-chickens in Wisconsin. Their comparison of greater prairie-chicken samples collected in Wisconsin in 1951 with those collected from 1996 through 1999 revealed a 29% allelic loss.

Population augmentation efforts are one approach to address genetic issues associated with small populations (e.g., lack of genetic heterogeneity and fitness). In addition, by translocating birds from ‘healthy’ populations, a basic hypothesis can be tested. Specifically, is habitat limiting the growth and/or expansion of existing populations or is the problem related to the intrinsic ‘health’ of the birds? An increasing population trend following augmentation would support the hypothesis that a population ‘health’ problem existed. If the population size remains the same or continues to decline, and monitoring indicates that the translocated birds remained in the area and survived to attempt reproduction, data will support the conclusion that habitat quality and/or quantity is limiting population growth.

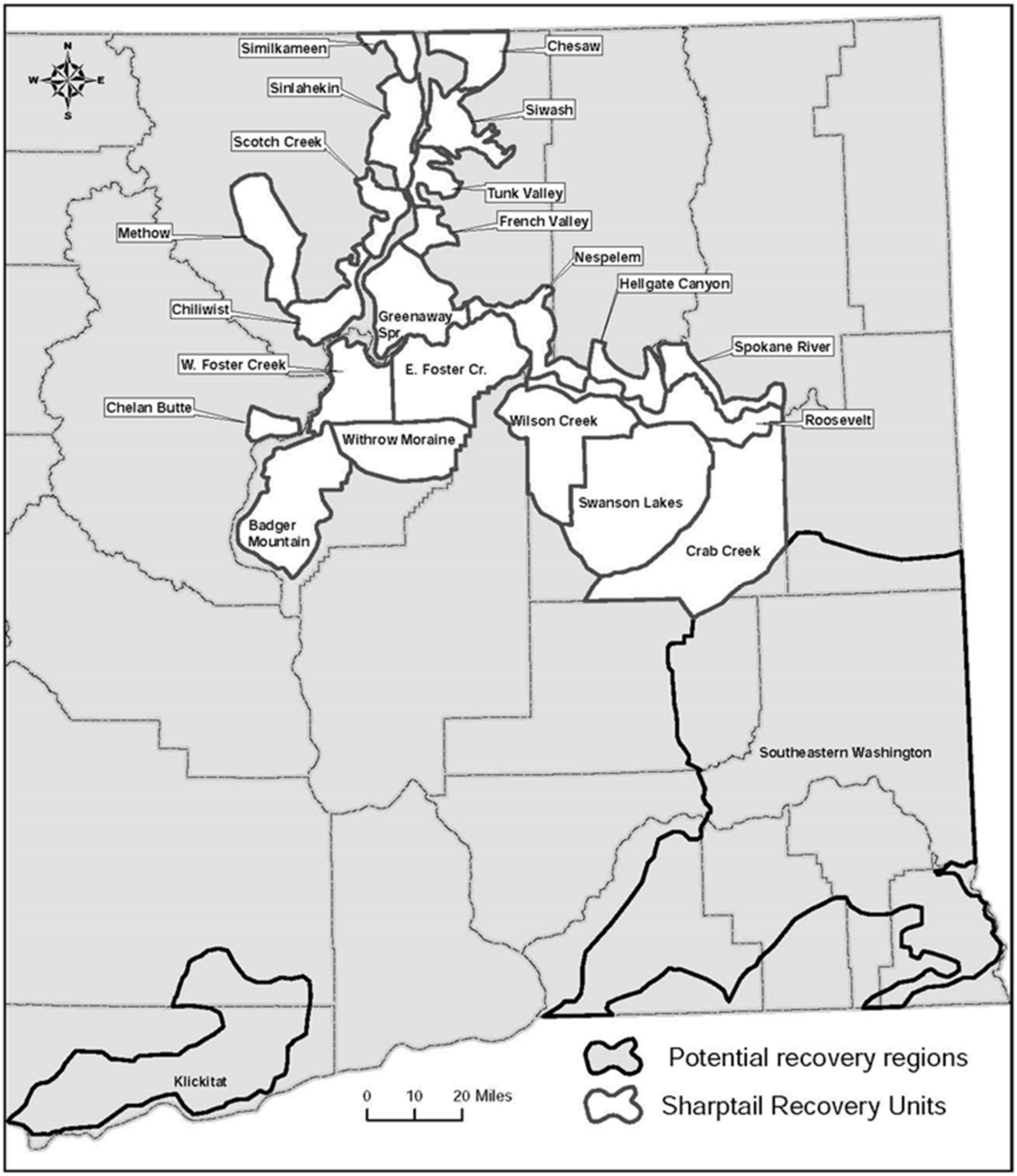


Fig. 2. Twenty-two Columbian sharp-tailed grouse recovery units and two potential recovery regions in Washington (Stinson and Schroeder 2012). The Big Bend population is in the East Foster Creek Unit, the Dyer Hill population is in the West Foster Creek Unit, and the Tunk Valley population is in the Tunk Valley and Siwash units.

METHODS

Inventory and monitoring

Leks can be defined as traditional locations where males perform their breeding displays. Because males will sometimes display at satellite or temporary locations, and because lek locations can be altered slightly from one year to the next, lek locations ≤ 1 km from one another were grouped into lek complexes. In contrast, lek complexes were typically separated from the nearest lek complex by ≥ 2 km. Lek complexes were surveyed annually to obtain information on sage-grouse populations and annual rates of change (Schroeder et al. 2000). The survey protocol included searches for new and/or previously unknown complexes, multiple (≥ 2) visits to all known active complexes, and ocassional visits to complexes believed to be inactive. Some original data from the 1970s were lost so that only single high counts remained, despite some complexes having been observed on more than one occasion.

Numbers of grouse attending lek complexes were analyzed using the greatest number of grouse observed on a single day for each complex for each year. This technique is well established for greater sage-grouse (*Centrocercus urophasianus*), but it may have biases. Despite potential biases, lek counts provide an assessment of a population's long-term trend (Connelly et al. 2004). The population size was estimated by doubling the counts of grouse on lek complexes to account for the females which typically visit leks only once so are rarely counted. We estimated annual rates of population change by comparing total number of grouse counted at lek complexes in consecutive years. Sampling was occasionally affected by effort and/or size and accessibility of leks, and those not counted in consecutive years were excluded from the sample for the applicable intervals. Annual instantaneous rates of change for each population were estimated as the natural logs of the number of grouse counted on leks in one year divided by the number of grouse counted on the same leks the previous year.

Translocations and research

Translocations were addressed with a 4-stage process: 1) consideration of release sites; 2) consideration of source populations; 3) conducting the actual capture and translocation; and 4) monitoring and evaluation of results (Griffith et al. 1989, Reese and Connelly 1997). Release sites (stage 1) were selected based on their historical or current occupancy. The historical presence of sharp-tailed grouse throughout most of eastern Washington has been well established (Yocom 1952, Aldrich 1963). The current distribution of sharp-tailed grouse has also been documented with the aid of extensive state-wide surveys (Hays et al. 1998, Schroeder et al. 2000). The grouse population has declined substantially over the past 40+ years. Genetic diversity and allelic richness are significantly lower in Washington than in populations in Utah, Idaho, and British Columbia (Warheit and Schroeder 2003). Some of this lack of genetic diversity appears to be due to the small size and isolation of populations in Washington relative to other occupied areas.

Because of the declines in sharp-tailed grouse populations throughout Washington and the isolation and small size of the remaining populations, several locations were considered for translocation efforts. Five primary sites were identified based upon assessments of their size, habitat quality, and management potential (Fig. 1): Scotch Creek (northwest of Omak in Okanogan County), Dyer Hill (south of Brewster in Douglas County); Swanson Lakes (southeast of Wilbur in Lincoln County); Nespelem (east of Nespelem in Okanogan County); and Greenaway (southeast of Okanogan in Okanogan County). Three of the release sites include state and federally-owned public land and the other sites are Colville Tribal land; all are being managed for the benefit of wildlife. The Dyer Hill site also was recommended by McDonald and Reese (1998) as the primary target for improvements in the statewide sharp-tailed grouse population. All of the release sites are recommended in the statewide recovery plan for sharp-tailed grouse (Stinson and Schroeder 2012, Fig. 2).

Why have populations of sharp-tailed grouse been reduced or eliminated on the prospective release sites? Has subsequent management on the prospective release sites adequately addressed the explanations for previous declines in numbers of sharp-tailed grouse? There are numerous possible reasons for the sharp-tailed grouse population declines on the potential release sites. These include historical declines in habitat quantity and quality, potential increases in densities of predators such as common ravens (*Corvus corax*), great-horned owls (*Bubo virginianus*), and coyotes (*Canis latrans*) and isolation of remnant populations due to the lack of dispersal corridors between adjacent populations of sharp-tailed grouse. Some of the explanations for the declines have been directly addressed with management activities, in particular, habitat restoration. All the potential release sites have management objectives to conduct habitat restoration activities focused on sharp-tailed grouse habitat needs. These include replacement of poor-quality non-native grass/forb habitats with native shrubsteppe vegetation for spring and summer habitat, and establishment of shrubs and trees necessary for improvement of wintering habitat. CRP also has resulted in the conversion of large areas of cropland to potential sharp-tailed grouse habitat since the mid-1980’s, although early CRP plantings have become monocultures of exotic grasses that need to be reseeded with native seed mix. However, because some of the remaining populations have endured severe ‘bottlenecks’ in abundance, we believe some of these populations have lost some of their intrinsic ability to respond positively to habitat improvements due to their reduced genetic diversity (Westemeier et al. 1998, Bellinger et al. 2003, Johnson et al. 2003). We believe augmentations have potential to address this issue (IUCN/SSC 2013).

Source populations (stage 2) were considered for translocations. The sharp-tailed grouse is currently divided into six extant subspecies (Aldrich 1963, Fig. 3). Sharp-tailed grouse in Washington are within the Columbian subspecies range; this subspecies is distinguishable by its grayer color, smaller size, and shrubsteppe and mountain shrub habitat. Taxonomic differentiation of subspecies has been somewhat arbitrary and ambiguous. Recent genetic analyses indicate that sharp-tailed grouse in Utah, British Columbia, Idaho, and Washington are more similar to each other than to any other region (Warheit and Schroeder 2003, Spaulding et al. 2006). Any population within these areas appears to be a genetically appropriate source population for translocation into Washington. The Columbian sharp-tailed grouse populations in south-central British Columbia, southeastern Idaho and north-central Utah are appropriate source populations for translocations (Fig. 4).

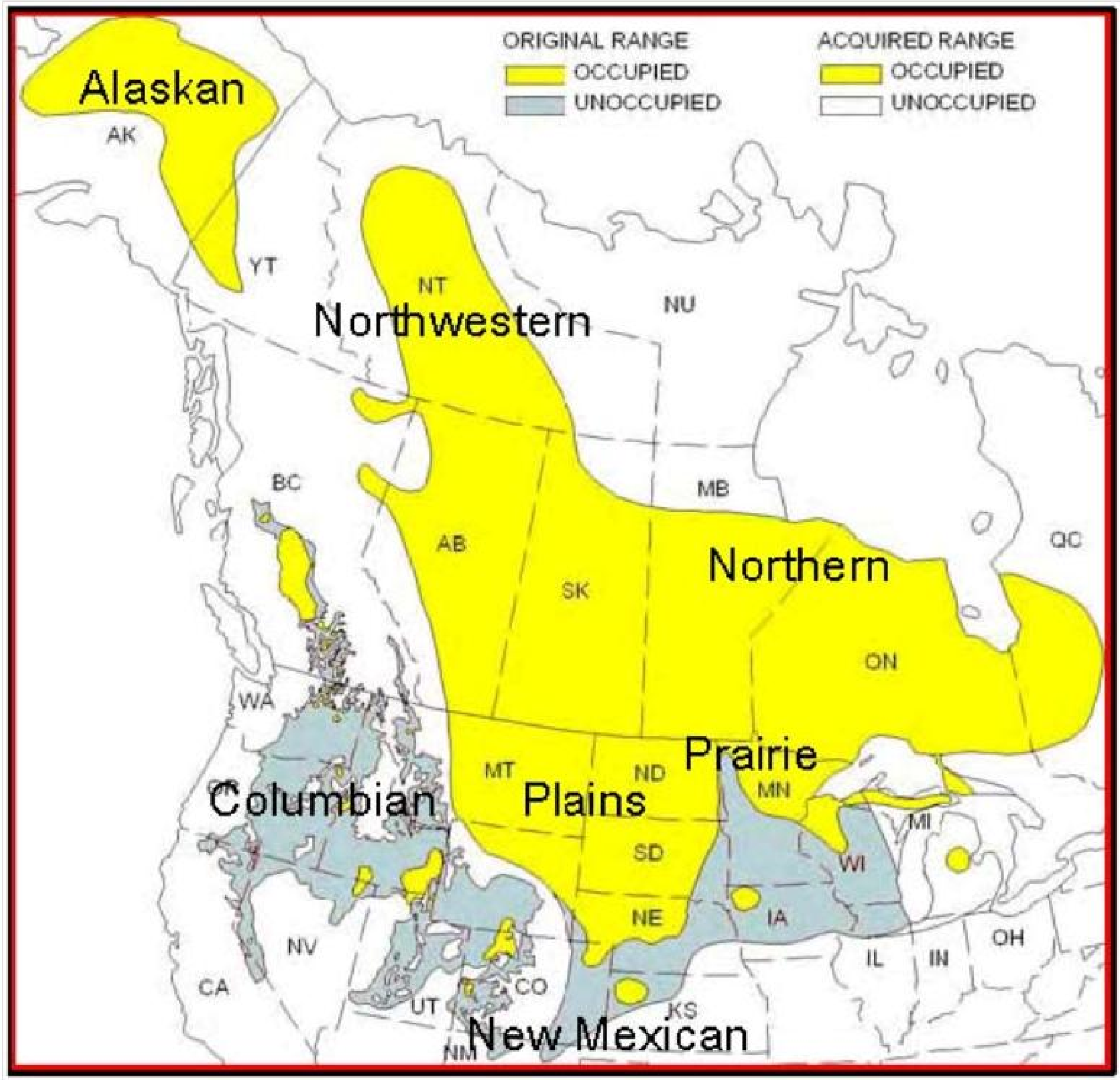


Fig. 3. Distribution of sharp-tailed grouse subspecies in North America (modified from Aldrich 1963).

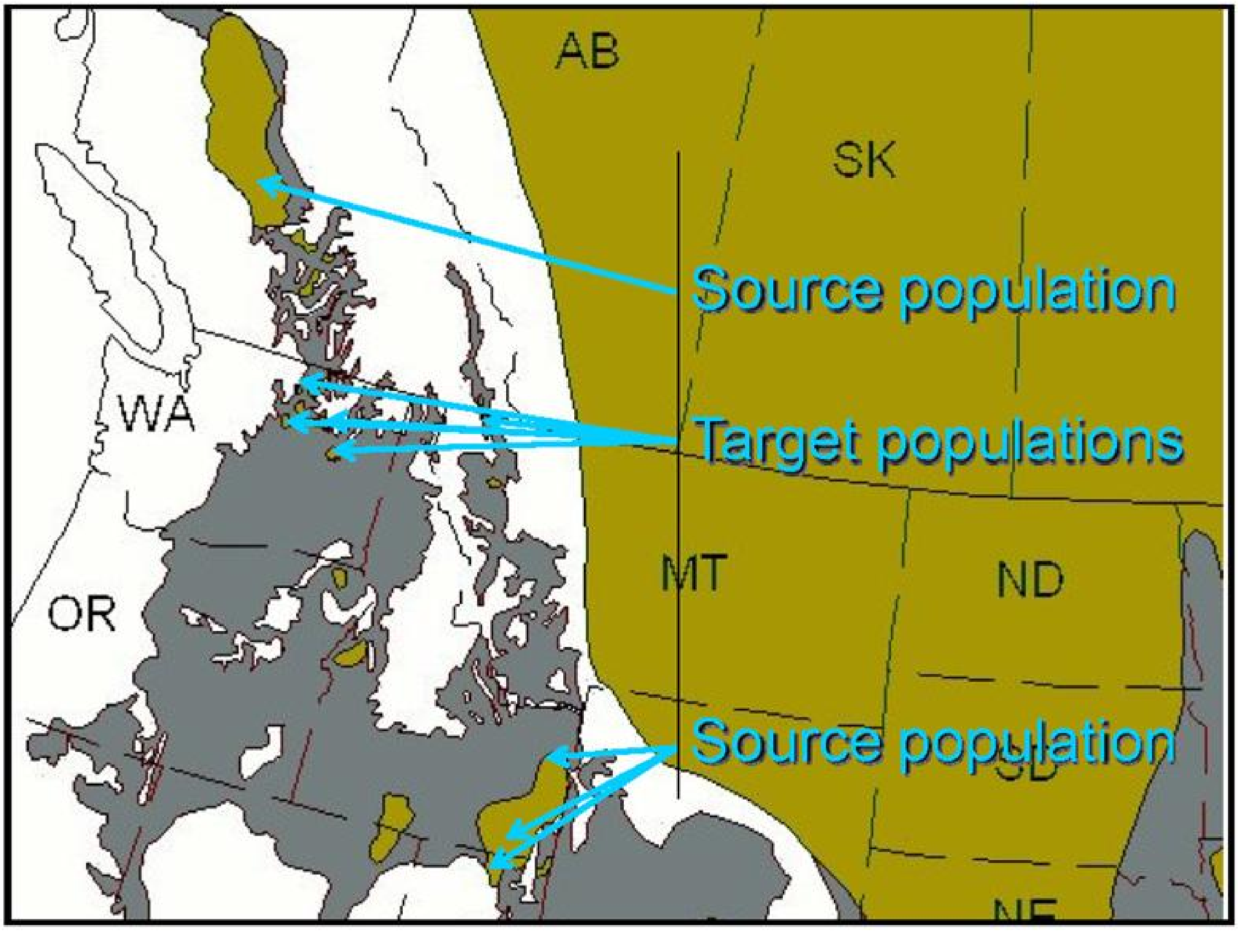


Fig. 4. Location of source populations for translocations within the range of Columbian sharp-tailed grouse in relation to the target populations in Washington.

Sharp-tailed grouse are generally captured for translocation (stage 3) during the spring breeding period (first 3 weeks of April) with the aid of walk-in traps on leks (Schroeder and Braun 1991). All birds are weighed, measured, and banded with unique numbered bands. All females and a subset of males are fitted with necklace-mounted, battery-powered radio transmitters. In addition, sex and age are determined (Henderson et al. 1967, Caldwell 1980) and feather samples are collected for subsequent genetic testing. Birds are transported by plane or car in an individual box or a portion of a box that is small enough to contain the bird's movement. The bottom of each box is lined with absorbant material to reduce contact between feces and the birds' feet.

Prior to 2008, birds were released directly from boxes. Starting in 2008, birds have been held in settling boxes for a minimum of about 15 minutes prior to release, using a box design modified from those described by Musil (1989). This allows small groups of birds to be held and released together when the box was opened with a cord from a blind to minimize stress during release. All birds are released in the target location prior to darkness the same day they were captured, or the following morning. All birds destined for translocation receive a health certificate from a veterinarian that is accredited within the donor state or province. The US Department of Agriculture maintains a disease list for which all translocated birds are screened.

Monitoring and evaluation (stage 4) was conducted with the aid of lek surveys and radio telemetry (VHF transmitters). Sharp-tailed grouse were located visually or by triangulation with the aid of portable receivers and 3-element Yagi antennas. Fixed-wing aircraft are used to locate lost birds on a regular basis throughout the year. All locations were recorded by Universal Transverse Mercator (UTM) coordinates. Disturbance of birds, particularly at nest sites, was avoided. The specific objectives for telemetry included examinations of movement, habitat and landscape use, productivity, and survival. These evaluations provide essential information to determine whether additional translocations, habitat improvements, release locations, and/or translocation methodologies are necessary (Toepfer et al. 1990, IUCN/SSC 2013).

RESULTS AND DISCUSSION

Inventory and monitoring

The total population estimate for sharp-tailed grouse in Washington was 632 in 2016 (Table 2, Fig. 5). This was the lowest population estimate ever recorded for the state of Washington. Birds were observed on 38 lek complexes with a total of 129 lek complexes documented in the last 50 years (29% of known leks active). The average annual rate of population change (instantaneous) in the last 40 years (1976–2016) was -4.5%. All the subpopulations studied (Table 2) declined between 1976 and 2016. One population (Methow) was extirpated. Among the populations still extant, the average annual rate of decline varied between -2.4% (Nespelem) and Greenaway Spring (-8.3%). The size of the remaining populations varied from 32 at Greenaway Spring to 144 at Crab Creek.

Table 2. Population characteristics for sharp-tailed grouse in Washington State (see Figs. 1 and 2 for locations).

Population	Active leks (%)	Total leks	2016 population estimate	Average annual rate of change (1976–2016)
Tunk Valley	4 (30.8%)	13	44	-4.7%
Greenaway Springs	2 (16.7%)	12	32	-8.3%
Chesaw	2 (33.3%)	6	46	-6.1%
Scotch Creek	2 (14.3%)	14	36	-7.4%
Dyer Hill	3 (25.0%)	12	66	-2.5%
Big Bend	8 (47.1%)	17	126	-3.9%
Nespelem	8 (40.0%)	20	138	-2.4%
Crab Creek[a]	9 (29.0%)	31	144	-3.6%
Methow[b]	0 (0.0%)	4	0	Extirpated
All populations combined	38 (29.5%)	129	632	-4.5%

[a]Crab Creek is also known as the Swanson Lakes Wildlife Area.

[b]The Methow population was last known to be active in 1981.

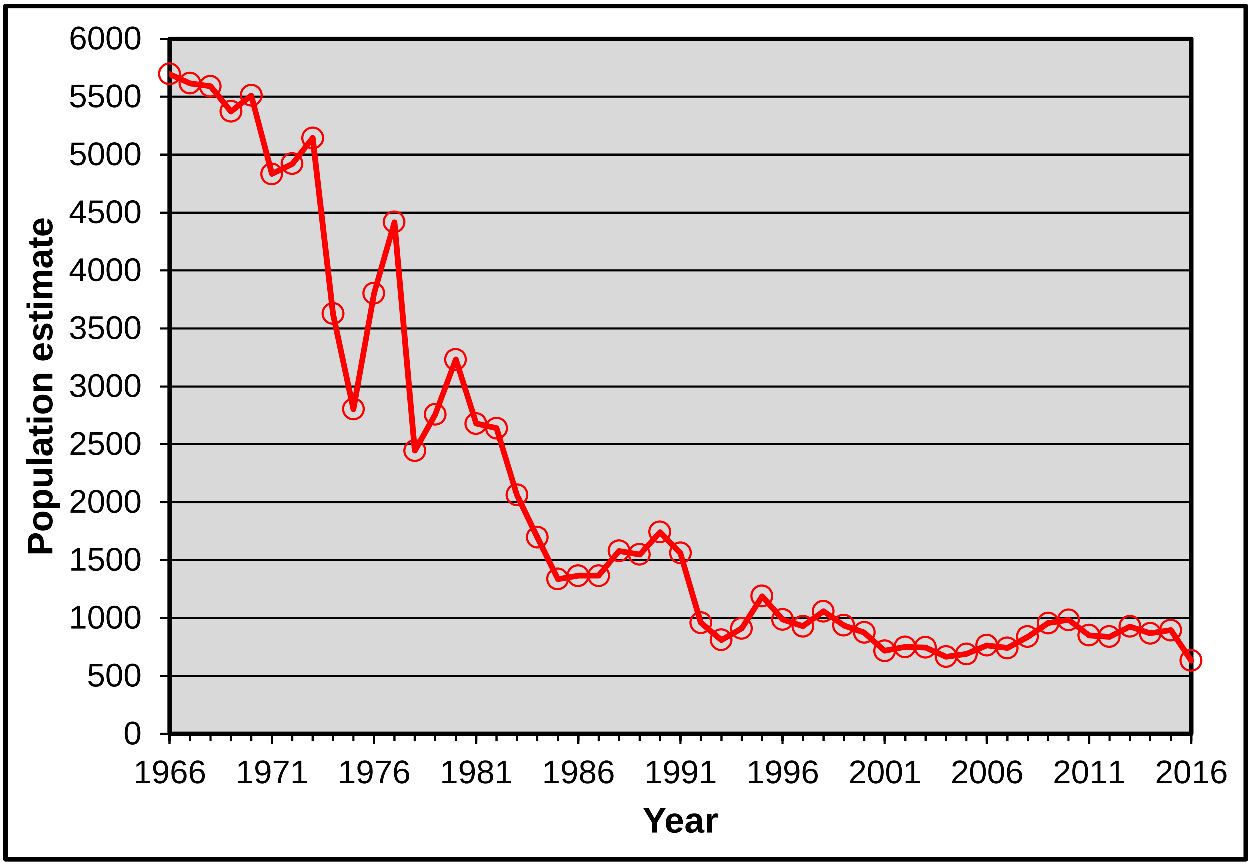


Fig. 5. Population estimate for sharp-tailed grouse in Washington State.

Translocations and research

Overall

A total of 455 sharp-tailed grouse were translocated to key populations in Washington State between 1998 and 2013 (Appendix A). Most of the grouse came from Idaho, but smaller numbers were translocated from Utah, British Columbia, and Washington (Fig. 4). When the results for translocations were combined into a single analysis (Dyer Hill, Crab Creek, and Scotch Creek), they showed that translocations had a positive effect on estimates of population size, even after translocations ended. (Fig. 6). In contrast, wildfires appear to have had a dramatic effect on sharp-tailed grouse in populations affected by wildfires in 2012 (Big Bend population affected by 33,000 ha Barker Canyon Complex wildfire and Crab Creek population affected by the 9000 ha Apache Pass wildfire) and 2015 (Scotch Creek and Tunk Valley populations affected by the 120,000 ha Okanogan Complex wildfire). All the populations with leks within the wildfire perimeters are clearly affected by wildfire, but the effect may disappear after a few years (Fig. 7). The longer-term effect may be positive, particularly in higher precipitation zones where bunchgrasses respond rapidly and unburned habitat can become domonated by woody vegetation. One risk that is difficult to assess is the longterm genetic and demographic impacts of severe population bottlenecks.

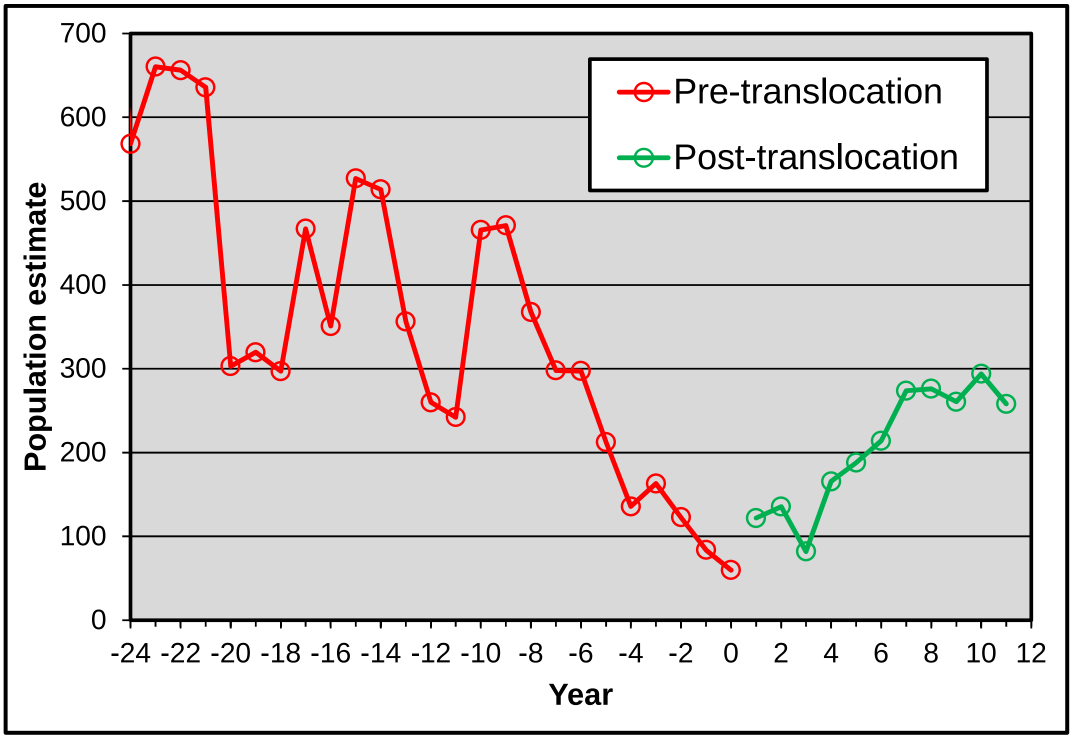


Fig. 6. Population estimate for combined populations (Dyer Hill, Crab Creek, and Scotch Creek) of sharp-tailed grouse prior to, and after initiation of translocations in Washington State.

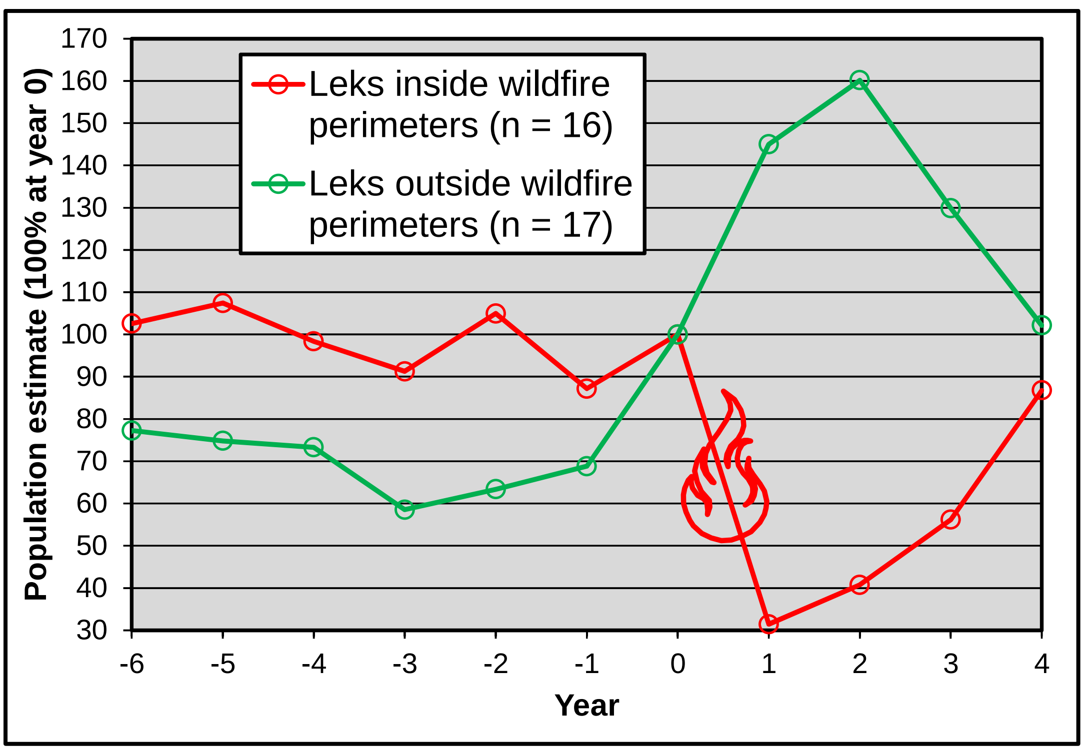


Fig. 7. Combined effects of wildfires on Scotch Creek, Tunk Valley, Big Bend, and Crab Creek populations of sharp-tailed grouse in Washington. The annual rates of population change for burned vs. unburned leks are centered at 100% for the year of the wildfire within each population.

Scotch Creek

Experimental translocations in 1998, 1999, and 2000 were successful in augmenting one population of sharp-tailed grouse in Washington at the 9700 ha Scotch Creek Wildlife Area, northwest of Omak. Birds for this translocation were obtained from the Rockland area in southeastern Idaho (26 males and 25 females) and the Colville Confederated Tribal Reservation in Washington (6 males and 6 females)(Appendix A). Prior to the translocation, surveys indicated that the Scotch Creek population had declined to 1 lek with 2 displaying males. This population increased after the translocation, peaking in 2015 (Fig. 8). The population appeared better in 2015 with an estimate of 100 birds on 4 leks, but the Okanogan complex wildfire in 2016 appears to have set the population back. Hopefully this setback is only temporary.

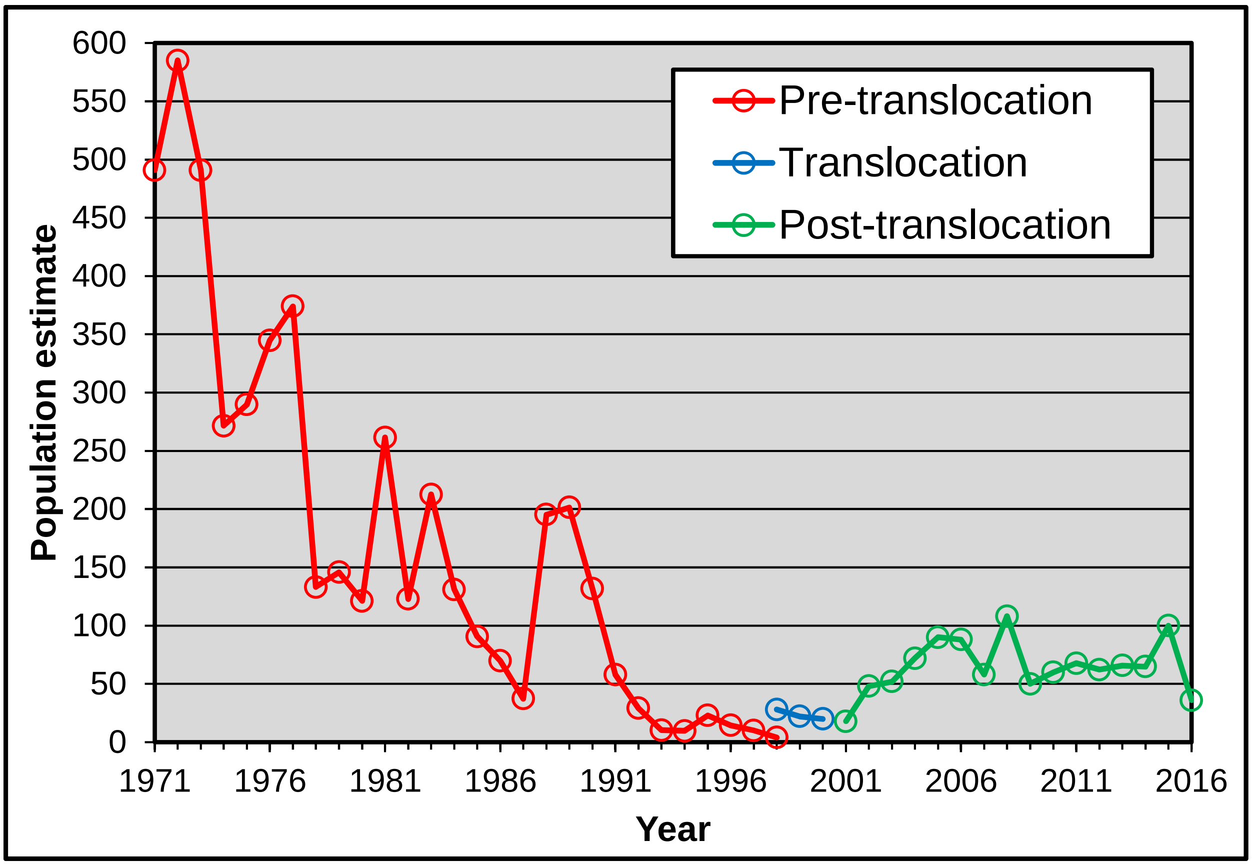


Fig. 8. Population estimate for sharp-tailed grouse at Scotch Creek in relation to the translocation of 63 grouse during spring 1998, 1999, and 2000..

Dyer Hill

The release sites in the Dyer Hill area are clearly within the historical range of sharp-tailed grouse and until relatively recently have had healthy populations of sharp-tailed grouse. Dyer Hill is near the Central Ferry Canyon, West Foster Creek, and Bridgeport wildlife areas in Douglas County. These state-owned areas include approximately 3,800 ha of potential sharp-tailed grouse habitat within a matrix of tens of thousands of additional hectares of private land, also with potential to support sharp-tailed grouse. Work is currently underway in the general area to restore old grain fields to shrubsteppe and to mark or remove fences for the benefit of grouse.

During 1999–2008 64 sharp-tailed grouse (35 males and 39 females) were translocated from Nespelem, Washington, south-central British Columbia, southeastern Idaho, and north-central Utah (Appendix A). The population has fluctuated in the years following translocation, but has generally been higher than it was prior to translocation (Fig. 9).

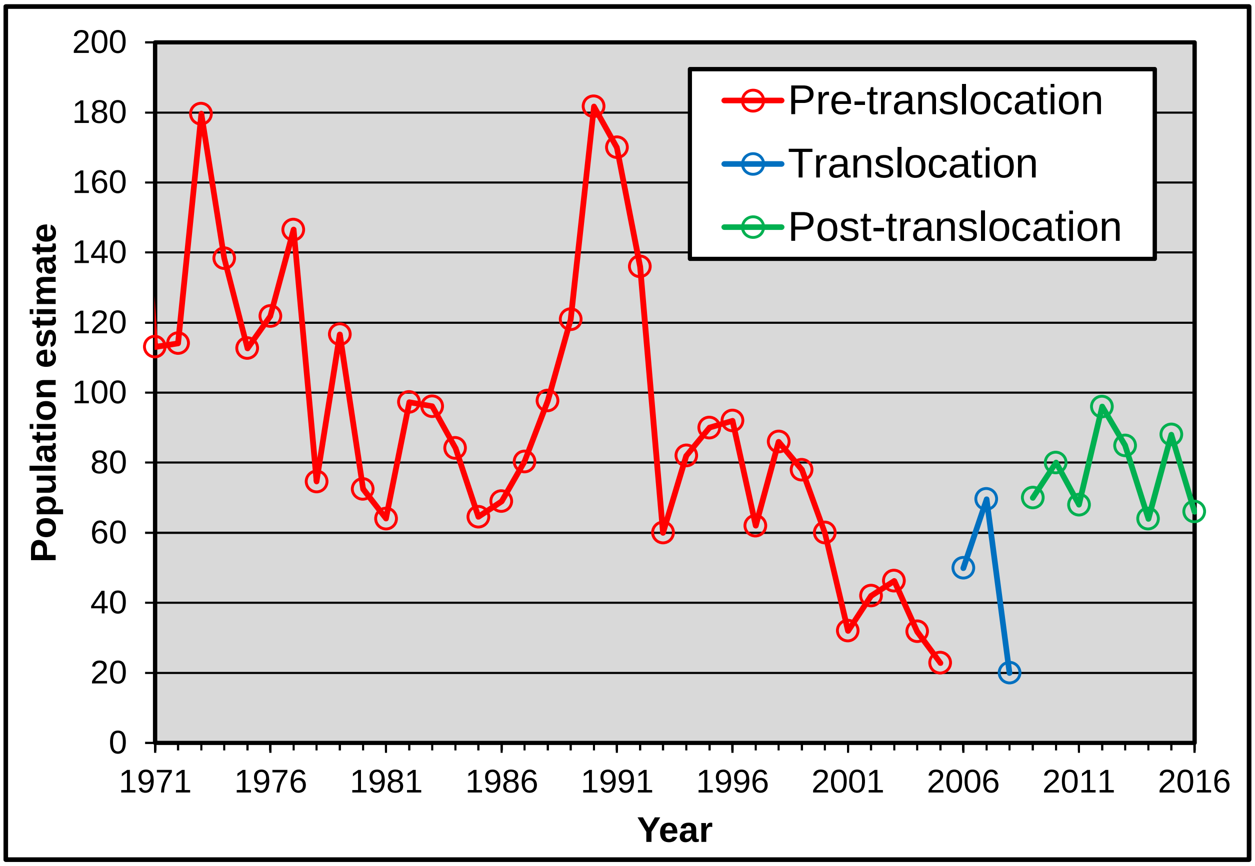


Fig. 9. Estimated population of sharp-tailed grouse in the Dyer Hill population in Washington before, during, and after translocation of 64 sharp-tailed grouse during 1999–2008.

Crab Creek

The Swanson Lakes Wildlife Area includes about 8100 ha, with an additional 500 ha lease of Washington Department of Natural Resources land (Fig. 10). In addition, the BLM has purchased several properties adjacent to the wildlife area, providing an opportunity to secure connectivity of habitats among various agencies. The Lakeview Ranch is a 5100 ha parcel located approximately 9 km north of the town of Odessa in southwest Lincoln County. Management of the area has focused on supporting wildlife habitat, seasonal livestock grazing, and wildlife-based recreational opportunities. Twin Lakes is a 6,200 ha parcel located approximately 26 km southwest of Davenport in central Lincoln County. Coffeepot Lake is a 400 ha parcel located 19 km west of Harrington in Lincoln County.

Fig. 10. Major public lands and landcover of the sharp-tailed grouse reintroduction area in the Swanson Lakes Management Unit, Washington (Crab Creek population). BLM lands are outlined with yellow, WDFW lands with green, and WDNR lands with brown.

Since 1996, WDFW has restored almost 1000 ha of former cropland in Lincoln County, and is currently working on restoration projects on BLM and WDFW lands totaling 200 ha. Fence collisions can be a source of mortality for grouse, and making them more visible can reduce collisions. In 2011–2012, a BLM project marked 200 km of fences, and removed 7 km of powerline on BLM and WDFW lands in Lincoln County. WDFW also assisted the Lincoln County Conservation District with an ALEA grant to remove 24 km of unneeded fencing in 2010–2011.

During 2005–2013, 203 sharp-tailed grouse (113 males and 90 females) were translocated from south-central British Columbia, southeastern Idaho, and north-central Utah (Appendix A). The population has fluctuated in the years following translocation, but has generally been higher than it was prior to translocation (Fig. 11). The translocated birds in the Crab Creek area have been the focus of sharp-tailed grouse research in Washington State (Stonehouse 2013, Stonehouse et al. 2015). This research includes examinations of movement, habitat use, productivity, and survival. The basis for this research was approximately 5000 telemetry locations for 184 individual grouse.

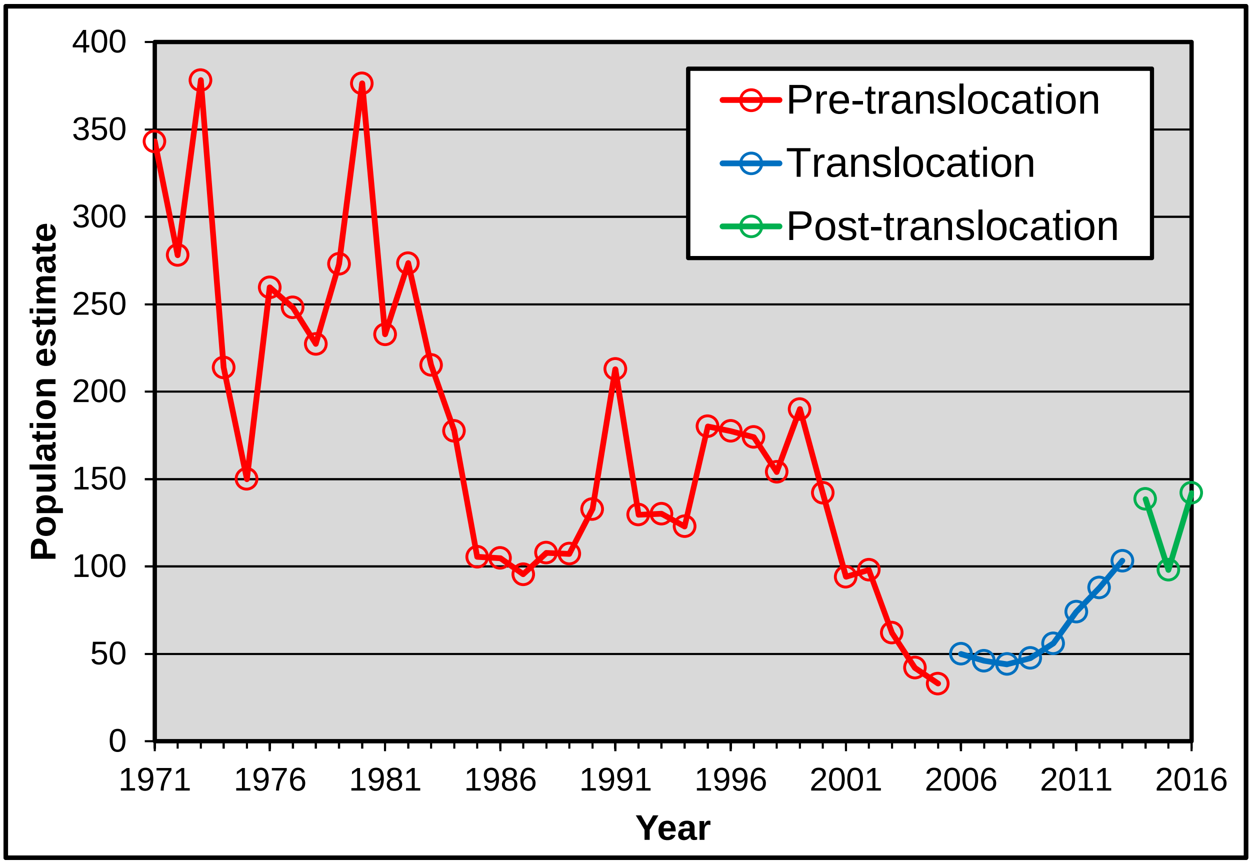


Fig. 11. Estimated population of sharp-tailed grouse in the Crab Creek population in Washington before, during, and after translocation of 203 sharp-tailed grouse during 2005–2013.

Other populations

Translocations have been conducted in other populations including Nespelem (63 males and 30 females during 2005–2012) and Greenaway Spring (25 males and 7 females in 2005 and 2011)(Appendix A). Both of these were on land managed by the Colville Confederated Tribes. We did not have detailed data to examine the success of these translocation, but the preliminary results were similar to the other translocations described earlier. In addition the Greenaway Spring is particularly important for connectivity amoung sharp-tailed grouse leks throughout the state of Washington due to its centrality (Robb and Schroeder 2012).

PLANS FOR 2017

Work will continue in all populations in 2017. In addition to the research projects specified below, conservation activities will include habitat conservation planning, working with landowners on federal conservation program lands, and habitat management on state-owned wildlife areas.

- Translocate 20 male and 20 female sharp-tailed grouse from British Columbia pending approval to the Tunk Valley and CCT in Washington.

- Monitor VHF-marked sharp-tailed grouse associated with the Tunk Valley translocation.
- Analyze VHF data for sharp-tailed grouse in the Crab Creek population.
- Initiate the evaluation of the Methow Wildlife Area for possible reintroduction.

LITERATURE CITED

Aldrich, J. W. 1963. Geographic orientation of North American tetraonidae. Journal of Wildlife Management 27:529–545.

WDFW. 2015. Swanson Lakes and Revere wildlife areas management plan with Reardan Audubon Lake Wildlife Area Unit. Washington Department of Fish and Wildlife, Olympia, Washington.

Bellinger, M. R., J. A. Johnson, J. Toepfer, and P. Dunn. 2003. Loss of genetic variation in greater prairie chickens following a population bottleneck in Wisconsin, U.S.A. Conservation Biology 17:717–724.

Berger, M.T., R.P. Whitney, R.A. Gerlinger, and D.J. Antoine. 2005. Colville Confederated tribes Columbian Sharp-tailed Grouse Management Plan. Colville Confederated Tribes, Fish and Wildlife Department, Colville Agency, Washington.

Bouzat, J. L., H. H. Cheng, H. A. Lewin, R. L. Westemeier, J. D. Brawn, and K. N. Paige. 1998. Genetic evaluation of a demographic bottleneck in the greater prairie chicken. Conservation Biology 12:836–843.

Caldwell, P. J. 1980. Primary shaft measurements in relation to age of sharp-tailed grouse. Journal of Wildlife Management 44:202–204.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies Report. Cheyenne, Wyoming.

Daubenmire, R. F 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station, Technical Bulletin 62, Washington State University, Pullman, Washington.

Gerlinger, R. 2005. Sharp-tailed Grouse Restoration; Colville Tribes Restore Habitat for Sharp-tailed Grouse, 2003–2004 Annual report, project No. 200103000, (BPA Report DOE/BP-00006927-2). Bonneville Power Administration, Portland, Oregon.

Griffith, B., J. M. Scott, J. W. Carpenter, and C. Reed. 1989. Translocation as a species conservation tool: status and strategy. Science 245:477–480.

Hallet, M. 2006. Wells Wildlife Area Management Plan. Washington Department of Fish and Wildlife, Olympia, Washington.

Hays, D.W., Tirhi, M.J. and D.W. Stinson. 1998. Washington state status report for the sharp-tailed grouse. Washington Department of Fish and Wildlife, Olympia, Washington.

Henderson, F. R., F. W. Brooks, R. E. Wood, and R. B. Dahlgren. 1967. Sexing of prairie grouse by crown feather patterns. Journal of Wildlife Management 31:764–769.

Hoffman, R. W., K. A. Griffin, J. M. Knetter, M. A. Schroeder, A. D. Apa, J. D. Robinson, S. P. Espinosa, T. J. Christiansen, R. D. Northrup, D. A. Budeau, and M. J. Chutter. 2015. Guidelines for the management of Columbian sharp-tailed grouse populations and their habitats. Sage and Columbian Sharp-tailed Grouse Technical Committee, Western Association of Fish and Wildlife Agencies, Cheyenne, Wyoming, USA.

IUCN/SSC. 2013. Guidelines for reintroductions and other conservation translocations. Version 1.0. IUCN Species Survival Commission, Gland, Switzerland.

Johnson, J. A., J. E. Toepfer, and P. O. Dunn. 2003. Contrasting patterns of mitochondrial and microsatellite population structure in fragmented populations of greater prairie-chickens. Molecular Ecology 12:3335–3347.

McDonald, M. W. 1998. Ecology of Columbian sharp-tailed grouse in eastern Washington. M. S. Thesis. University of Idaho, Moscow, Idaho.

McDonald, M.W, and K.P. Reese. 1998. Landscape changes within the historical distribution of Columbian sharp-tailed grouse in eastern Washington: Is there hope? Northwest Science 72:34–41.

Musil, D. D. 1989. Movements, survival, and habitat use of Sage grouse translocated into the Sawtooth Valley, Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho.

Olson, J. 2006. Scotch Creek Wildlife Area Management Plan. Washington Department of Fish and Wildlife, Olympia, Washington.

Peterson, D. 2006. Sagebrush Flats Wildlife Area Management Plan. Washington Department of Fish and Wildlife, Olympia, Washington.

Reese, K.P. and J.W. Connelly. 1997. Translocations of sage grouse *Centrocercus urophasianus* in North America. Wildlife Biology 3:235–241.

Robb, L. A., and M. A. Schroeder. 2012. Habitat connectivity for sharp-tailed grouse (*Tympanuchus phasianellus*) in the Columbia Plateau Ecoregion. Appendix A.1 in Washington Wildlife Habitat Connectivity Working Group. Washington connected landscapes project: analysis of the Columbia Plateau Ecoregion. Washington Department of Fish and Wildlife, and Washington Department of Transportation, Olympia, Washington.

Schroeder, M.A. 2008. Job Progress Report Federal Aid in Wildlife Restoration: Upland bird population dynamics and management. Project #3. Progress Report. Washington Department of Fish and Wildlife, Olympia, Washington.

Schroeder, M. A., and C. E. Braun. 1991. Walk-in traps for capturing greater prairie-chickens on leks. Journal of Field Ornithology 62:378-385.

Schroeder, M. A., D. W. Hays, M. A. Murphy, and D. J. Pierce. 2000. Changes in the distribution and abundance of Columbian sharp-tailed grouse in Washington. Northwestern Naturalist 81:95–103.

Spaulding, A. W., K. E. Mock, M. A. Schroeder, and K. I. Warheit. 2006. Recency, range expansion, and unsorted lineages: implications for interpreting neutral genetic variation in the sharp-tailed grouse (*Tympanuchus phasianellus*). Molecular Ecology 15:2317–2332.

Stinson, D. W., and M. A. Schroeder. 2012. Washington State recovery plan for the Columbian Sharp-tailed grouse. Washington Department of Fish and Wildlife, Olympia, Washington.

Stonehouse, K. F. 2013. Habitat selection by sympatric, translocated greater sage-grouse and Columbian sharp-tailed grouse in eastern Washington. M.S. Thesis. Washington State University, Pullman, Washington.

Stonehouse, K. F., L. A. Shipley, J. Lowe, M. T. Atamian, M. E. Swanson, and M. A. Schroeder. 2015. Habitat selection and use by sympatric, translocated greater sage-grouse and Columbian sharp-tailed grouse. Journal of Wildlife Management. 79:1308–1326.

Toepfer, J. E., R. L. Eng, and R. K. Anderson. 1990. Translocating prairie grouse: what have we learned? Transactions of the North American Wildlife and Natural Resources Conference 55:569–579.

Warheit, K. I. And M. A. Schroeder 2003. Genetic survey of Columbian sharp-tailed grouse populations in western North America. Unpublished Report, Washington Department of Fish and Wildlife, Olympia, Washington.

Westemeier, R. L., J. D. Brawn, S. A. Simpson, T. L. Esker, R. W. Jansen, J. W. Walk, E. L. Kershner, J. L. Bouzat, and K. N. Paige. 1998. Tracking the long-term decline and recovery of an isolated population. Science 282:1695–1698.

Whitney, R. P. 2014. Modeling survival of Columbian sharp-tailed grouse on tribal landscapes in north central Washington. M.S. Thesis. Washington State University, Pullman, Washington.

Yocom, C. F. 1952. Columbian sharp-tailed grouse (*Pedioecetes phasianellus columbianus*) in the state of Washington. American Midland Naturalist 48:185–192.

Appendix A. Number of sharp tailed-grouse translocated to Washington, 1998–2014.

Target populations	Translocation year (always in April)	Source populations										
		SE Idaho		Nespelem, WA		South-central British Columbia		North-central Utah		Total		
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Scotch Creek	1998	13	12	0	0	0	0	0	0	13	12	25
	1999	3	3	6	6	0	0	0	0	9	9	18
	2000	10	10	0	0	0	0	0	0	10	10	20
Dyer Hill	1999	3	2	0	0	0	0	0	0	3	2	5
	2005	5	3	0	0	7	5	0	0	12	8	20
	2006	0	0	0	0	0	0	5	5	5	5	10
	2007	1	0	0	0	0	0	7	7	8	7	15
	2008	6	5	0	0	0	0	1	2	7	7	14
Greenaway Spring	2005	0	0	0	0	5	1	0	0	5	1	6
	2011	20	6	0	0	0	0	0	0	20	6	26
Nespelem	2005	0	0	0	0	9	4	0	0	9	4	13
	2006	0	0	0	0	0	0	5	4	5	4	9
	2007	6	1	0	0	0	0	2	3	8	4	12
	2008	0	0	0	0	0	0	7	7	7	7	14
	2009	5	5	0	0	0	0	0	0	5	5	10
	2011	9	0	0	0	0	0	0	0	9	0	9
	2012	20	6	0	0	0	0	0	0	20	6	26
Crab Creek	2005	7	5	0	0	5	3	0	0	12	8	20
	2006	0	0	0	0	0	0	5	5	5	5	10
	2007	0	2	0	0	0	0	8	4	8	6	14
	2008	4	5	0	0	0	0	3	2	7	7	14
	2009	15	13	0	0	0	0	0	0	15	13	28
	2010	31	20	0	0	0	0	0	0	31	20	51
	2011	10	10	0	0	0	0	0	0	10	10	20
	2012	5	2	0	0	0	0	0	0	5	2	7
	2013	20	19	0	0	0	0	0	0	20	19	39
Total		193	129	6	6	26	13	43	39	268	187	455