

WASHINGTON GRAY WOLF CONSERVATION AND MANAGEMENT 2015 ANNUAL REPORT

A cooperative effort by the Washington Department of Fish and Wildlife, Confederated Colville Tribes, Spokane Tribe of Indians, USDA-APHIS Wildlife Services, and U.S. Fish and Wildlife Service



Photo: WDFW

This report presents information on the status, distribution, and management of wolves in the State of Washington from January 1, 2015 through December 31, 2015.

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EXECUTIVE SUMMARY

Gray wolves (*Canis lupus*) were classified as an endangered species in Washington under the provisions of the Endangered Species Act (ESA) in 1973. In 2011, wolves in the eastern third of Washington were removed from federal protections under the ESA. Wolves in the western two-thirds of Washington continue to be protected under the ESA and are classified as an endangered species under federal law. In 2015, the U.S. Fish and Wildlife Service (USFWS) began to develop an environmental assessment to guide management of wolves in the federally listed portion of Washington.

In December 2011, the Washington Department of Fish and Wildlife (WDFW) Commission formally adopted the Wolf Conservation and Management Plan to guide recovery and management of gray wolves as they naturally recolonize the State of Washington. At present, wolves are classified as an endangered species under state law (WAC 232-12-014) throughout Washington regardless of federal status. Washington is composed of three recovery areas which include Eastern Washington, the Northern Cascades, and the Southern Cascades and Northwest Coast. The WDFW is the primary agency responsible for managing wolves in the Eastern Washington recovery area while WDFW works under a section 6 agreement with USFWS in the federally listed portion of the state. Wolves that inhabit tribal lands in the Eastern Washington recovery area are managed by those specific tribal entities.

WDFW personnel, partners, and volunteers deployed a minimum of 207 cameras statewide for a total of 14,453 camera nights during 2015. A minimum of 112 cameras were deployed for an estimated 7,585 camera nights in the Eastern Washington recovery area, a minimum of 62 cameras were deployed for an estimated 3,741 camera nights in the North Cascades recovery area, and a minimum of 33 cameras were deployed in the Southern Cascades recovery area for an estimated 3,127 camera nights. Images of wolves were captured in all recovery areas except the Southern Cascades.

The minimum estimated wolf population in Washington increased by approximately 32% over 2014 estimates to at least 90 known wolves in 18 known packs including at least 8 breeding pairs. Pack sizes ranged from 2 to 8 and averaged 4.4 wolves per pack. One pack that existed in 2014 was no longer considered a pack at the end of 2015 while another pack shifted its activity center to Idaho and was considered an Idaho pack at years end. State and tribal biologists captured 14 unique wolves a total of 15 times from 9 different packs (plus 1 lone individual) and monitored a total of 22 unique radio collared wolves from 13 different packs that existed in Washington at some point during 2015. We documented 7 mortalities in Washington during the year and the causes of mortality included human-caused ($n = 3$), unknown ($n = 1$), and legal harvest ($n = 3$).

Wolf populations were managed to ensure progress towards recovery goals while also minimizing chronic loss of livestock caused by wolves. Seven cattle were confirmed wolf-kills while 1 dog was confirmed to be injured by wolves. Three packs (15% of known packs that existed at some point during the year) were involved in at least 1 confirmed livestock mortality. No wolves were removed through agency control actions during 2015. The WDFW processed 3 damage claims and paid a total of \$15,174.60 to compensate livestock producers who experienced livestock losses caused by wolves.

ACKNOWLEDGEMENTS

Wolf management in Washington is a cooperative effort by the Washington Department of Fish and Wildlife (WDFW), Colville Confederated Tribes (CCT), the Spokane Tribe of Indians (STOI), USDA-APHIS Wildlife Services (WS), and the U.S. Fish and Wildlife Service (USFWS). WDFW personnel who played a primary role during 2015 include WDFW Director Jim Unsworth, Wildlife Program Assistant Director Nate Pamplin, Game Division Manager Mick Cope, and Wolf Policy Lead Dave Ware (retired). Other WDFW personnel who assisted with wolf recovery and management efforts included Chris Anderson, Dan Anderson, David Anderson, Mike Atamian, Dana Base, Rich Beausoleil, Candace Bennett, Jeff Bernatowicz, Eric Boyd, Joe Bridges, James Brown, Cole Caldwell, Colleen Chandler, Treg Christopher, John Cotton, Jason Day, Paul DeBruyn, Andrew Duff, Jason Earl, Chris Erhardt, Severin Erickson, Scott Fitkin, John Gallie, Graham Grant, Morgan Grant, Ellen Heilhecker, Jeff Heinlen, Eric Holman, Ryan John, Sandra Jonker, Brian Kertson, Sarah Kindschuh, Keith Kirsch, Danyl Klump, Russell Link, Mike Livingston, Carrie Lowe, Madonna Luers, Ben Maletzke, Richard Mann, Kristin Mansfield, Joey McCanna, Troy McCormick, Scott McCorquodale, Matt Monda, William Moore, Paul Mosman, Brian Murphie, Eric Oswald, Nick Parkert, Matt Peterson, John Pierce, Steve Pozzanghera, Annemarie Prince, Dan Rahn, Scott Rasley, Kevin Robinette, Ella Rowan, Ralf Schreiner, Jay Shepherd, Nicole Stephens, Pam Taylor, Michelle Tirhi, Cal Tresser, Mark Vekasy, Dave Volson, Don Weatherman, Steve Wetzel, Paul Whelan, Paul Wik, and Gary Wiles.

Numerous other agencies and agency personnel also played a key role in wolf management efforts in Washington. In particular, we would like to thank personnel from the USFWS including Eric Rickerson, Jerry Cline, Hilary Cooley, Mike Jimenez, Manisa Kung, Gregg Kurz, Eric Marek, Mike Munts, and Corky Roberts (retired); WS personnel including Roger Woodruff, Terry Smith, and Chad Heuser; CCT personnel including Randy Friedlander; STOI personnel including Billy Joe Kieffer; the U.S. Forest Service including Elizabeth Berkley, Mike Borysewicz, John Chatel, Travis Fletcher, Chris Loggers, Ray Robertson, John Rohrer, Rodney Smoldon, and Aja Woodrow; the Washington Department of Natural Resources including Andrew Hayes, Scott Fisher, and Danielle Munzing; the National Park Service including Roger Christophersen; the U.S. Air Force including Todd Foster and Major J.B. Marshal; and Leo DeGroot of British Columbia Ministry of Forests, Lands, and Natural Resource Operations.

We would also like to thank the many members of the public who provided wolf observation reports and the numerous private landowners in Washington for their cooperation.

Finally, we sincerely appreciate the safe piloting and aerial telemetry skills of Dave Parker of Northern Air (Bonners Ferry, ID), Jim Pope of Leading Edge Aviation (Clarkston, WA), and Jess Hagerman of Northwest Helicopters (Olympia, WA).

Although we could not list every single person that was involved with wolf recovery and management efforts in Washington, for those not listed, we also thank you for your efforts and patience.

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INTRODUCTION

Definitions

Two terms often used when discussing gray wolves (*Canis lupus*) and wolf management are “pack” and “breeding pair”. Although similar, “pack” is primarily used to evaluate the number of wolves on the landscape while “breeding pair” is an estimate of reproductive success and recruitment. A pack is defined as two or more wolves traveling together in winter and a breeding pair is defined as at least one adult male and one adult female wolf that raised at least two pups that survived until December 31. Thus, in any given year, the number of packs will always be greater than or equal to the number of breeding pairs.

Background

Historically, gray wolves were common throughout much of Washington, but numbers began to decline as human populations increased in the latter half of the 1800s. Encouraged by high prices for hides, bounties, and government sponsored predator control programs, wolves were believed to be extirpated from Washington by the 1930s. Sporadic reports of wolves were received over the next several decades, and increased during the 1990s to early 2000s, but no resident packs were documented during this time.

Dispersing wolves from increasing populations in Idaho, Montana, and British Columbia, Canada were likely responsible for the documented reports of wolves in northern Washington during the 1990s to early 2000s. It was not until 2008 that the first resident pack in the state since the 1930s was documented in Okanogan County in north-central Washington. Since that time, wolves have continued to naturally recolonize the state via dispersal from resident Washington packs and neighboring states and provinces.

Federal Status

Gray wolves in Washington acquired federal protections under the Endangered Species Act (ESA) in 1973. When the U.S. Fish and Wildlife Service (USFWS) completed the Northern Rocky Mountain (NRM) Wolf Recovery Plan in 1987, only the states of Idaho, Montana, and Wyoming were included. In 2007, the USFWS published a final rule designating the NRM population of gray wolves as a Distinct Population Segment (DPS). The eastern third of Washington was included in the NRM DPS designation to account for dispersing wolves from populations in Idaho and Montana; however, federal recovery requirements were only applicable to those states in the original NRM Wolf Recovery Plan. To date, no federal wolf recovery requirements have been developed for Washington.

In 2008, the USFWS published a final rule to remove wolves in the NRM DPS from ESA protection. This rule was later challenged in federal court and, consequently, wolves were placed back under federal protection. The USFWS again published a final rule to remove the NRM DPS wolf population, excluding Wyoming, from the protections of the ESA in 2009, but the rule was vacated by a federal judge in 2010 which again restored federal protections to wolves in the NRM DPS. In 2011, President Obama signed the Department of Defense and Full-

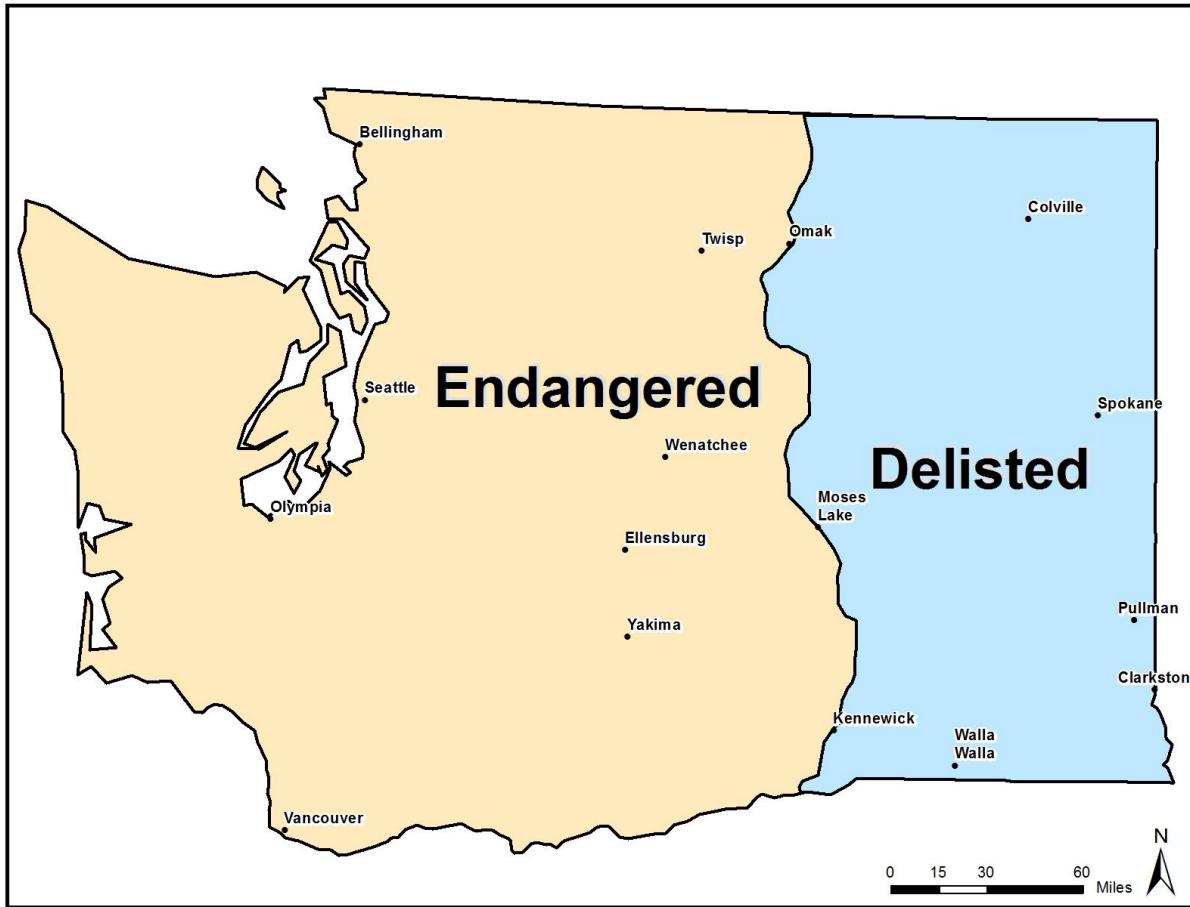


Figure 1. Federal classification of wolves in Washington State, 2015.

Year Appropriations Act, 2011; a section of which directed the Secretary of the Interior to reissue the 2009 delisting rule. As a result, wolves in the NRM DPS, including the eastern third of Washington, were once again removed from ESA protections.

Although wolves in the eastern third of Washington are no longer federally protected, wolves in the western two-thirds of the state continue to be protected under the provisions of the ESA and are presently classified as an endangered species under federal law (Figure 1). In 2013, the USFWS published a proposed rule to remove gray wolves from the list of endangered and threatened wildlife where they are currently federally protected. This rule also constituted the completion of a status review for gray wolves in the Pacific Northwest, proposed to maintain endangered status for the Mexican wolf (*Canis lupus baileyi*), and proposed to reclassify the Eastern wolf (*Canis lupus lycaon*) from a subspecies of the gray wolf to a species (*Canis lycaon*). The USFWS subjected the proposed rule to an independent expert peer review that was managed by the National Center for Ecological Analysis and Synthesis. The purpose of the peer review was to evaluate the proposed rule and determine if the best available science was used to evaluate the status of gray wolves. Results of the peer review were published in early 2014. As a result, the USFWS reopened the public comment period for the proposed rule so the public may be allowed to provide additional comment based on the results of the peer reviewed

document. To date, USFWS has not released a decision notice on the federal status of gray wolves.

The USFWS began work to develop an environmental assessment in 2015. This document will guide management of wolves in the federally listed portion of Washington and is expected to be completed and implemented in 2016.

Also in 2015, through a cooperative effort among USFWS, WDFW, and USDA/APHIS Wildlife Services (WS), work began on a coordination strategy to more clearly define roles and responsibilities for each agency in regards to wolf recovery and management in the federally listed portion of Washington. This document will also outline an effective communication strategy among the cooperating agencies for responding to wolf-related activities.

State Status

In response to the expected dispersal of wolves into Washington from populations in surrounding states and provinces and the likely formation of resident packs, the Washington Department of Fish and Wildlife (WDFW) initiated the development of the Wolf Conservation and Management Plan for Washington (Plan). In 2007, the Director of WDFW appointed an 18 member working group to advise WDFW during plan development. After nearly five years of work, the WDFW Commission formally adopted the Plan in December 2011 to guide recovery and management of gray wolves as they naturally recolonize the state.

At present, wolves are classified as an endangered species under state law (WAC 232-12-014) throughout Washington regardless of federal classification. The Plan designates three recovery areas in the state which includes Eastern Washington, the Northern Cascades, and the Southern Cascades and Northwest Coast (Figure 2). The WDFW is the primary agency responsible for managing wolves in the Eastern Washington recovery area while WDFW works as the designated agent of the USFWS in the other two recovery areas. Wolves that inhabit tribal lands in the Eastern Washington recovery area are managed by those specific tribal entities.

The Plan allows for downlisting wolves from endangered to threatened status and threatened to sensitive status once specific criteria are met. However, the process of fully delisting wolves under state law will begin only when there are at least 4 successful breeding pairs in each recovery area plus an additional 3 breeding pairs anywhere in the state for three consecutive years; or when there are at least 4 successful breeding pairs in each recovery area plus an additional 6 breeding pairs anywhere in the state for a single year.

Funding

During calendar year 2015, WDFW spent a total of \$1,069,800 on wolf recovery and management activities. Approximately 5% of the total budget was provided through federal grants, some of which required a state match. The remaining 95% of the budget was provided by state funds which came from a combination of additional fees for the registration of personalized and endangered species license plates as well as legislative funding.

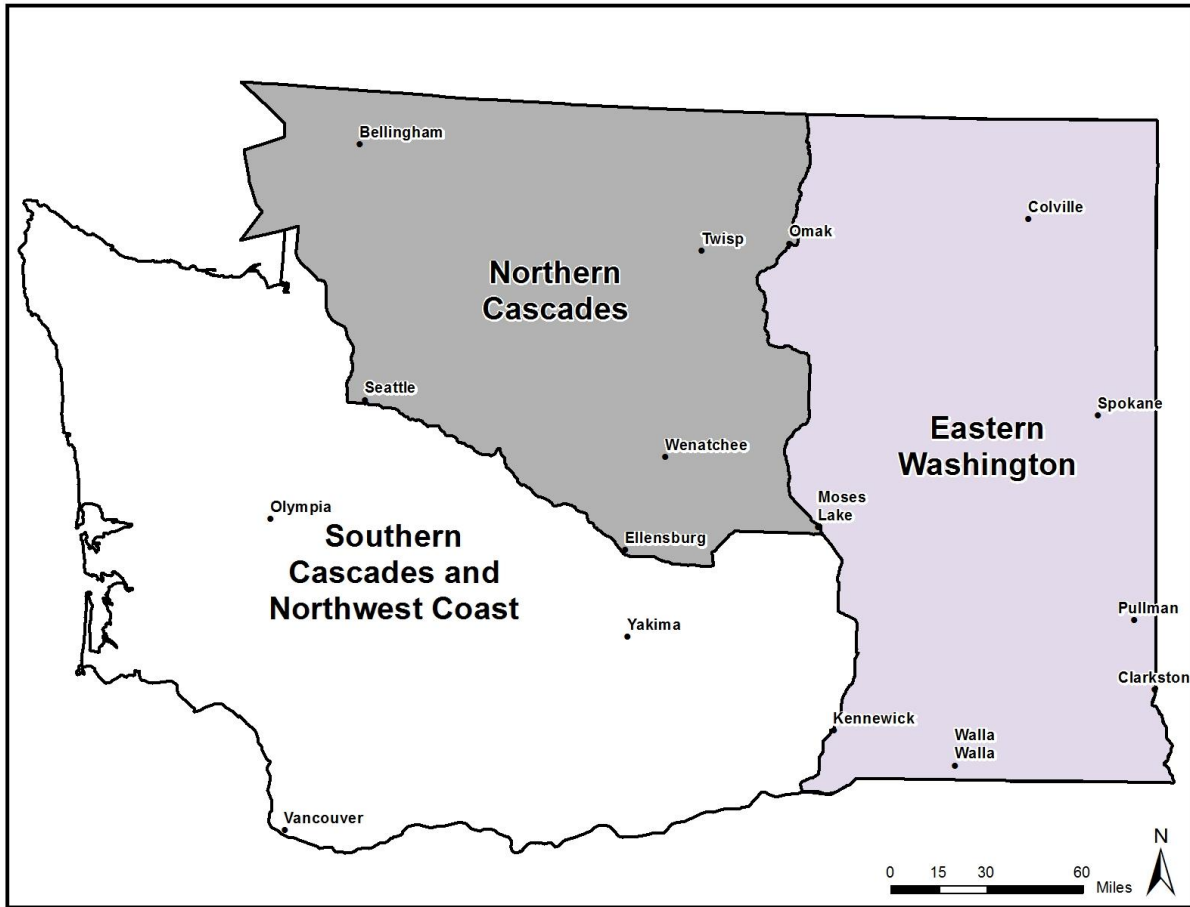


Figure 2. Washington wolf recovery areas as defined in the Wolf Conservation and Management Plan.

POPULATION MONITORING

Monitoring Techniques

Wolf monitoring activities occur year-round. The most common monitoring techniques include direct observational counts either from the ground or the air, track surveys, and remote camera surveys. These techniques were used by biologists to evaluate pack size and reproductive success, identify pack territories, monitor movements and dispersal events, identify new areas of possible wolf activity, and mitigate conflicts with livestock.

As with all wildlife, counting the total number of wolves on the landscape can be challenging, if not impossible, so biologists use a combination of the above techniques to derive a minimum number that is known to exist at the end of each calendar year. Thus, our estimates of total wolf numbers and reproductive success (e.g., breeding pair status) were likely conservative and the actual number of wolves in Washington may be slightly higher. Lone wolves were accounted for when reliable information was available. Because lone wolves are difficult to document and they account for between 10-15% of the known winter population (Mech and Boitani 2003¹, page 170), our minimum known estimate was multiplied by 0.125 to account for unknown wolves on the landscape. Suspected wolf packs were those that could not be verified with confidence and they were not included in the reported minimum known estimates. If evidence collected during the most recent calendar year suggested that packs and/or breeding pairs were present on the landscape the previous year, our estimates (e.g., total number, packs, breeding pairs) will be updated to reflect this new information. This means that numbers from past reports are subject to change and may differ from numbers included in the most recent annual report.

Remote Camera Surveys

The popularity of remote cameras to monitor wildlife for work and/or recreation has increased in recent years. Remote cameras can be used to collect data on elusive or seldom seen species with little effort and, due to its relatively low capture bias, can assist managers in determining the presence (or possible absence) of wildlife in an area. By using multiple cameras over an extended period of time, managers may be able to document range extent of some species by conducting camera based surveys over a large area. Because managers seldom obtain an entire herd or pack of animals in a single image they rarely have the ability to identify individuals (due to a lack of individual identifying marks), thus camera surveys alone are not an effective method for estimating abundance or density without also incorporating other survey methods and/or population estimation techniques.

WDFW personnel, partners, and those working under the direction of WDFW (e.g., range riders, volunteers, etc.), routinely deploy remote cameras to follow-up on wolf sighting reports provided by the public or to monitor known packs in the state, however, no formal protocols for documenting camera monitoring efforts existed. In 2014, remote camera survey protocols were developed and distributed to WDFW personnel statewide to formalize data collection procedures and to ensure that basic information was collected about each camera deployed. Over time, this

¹ Mech, L.D. and L. Boitani. 2003. *Wolves: Behavior, Ecology, and Conservation*. The University of Chicago Press. Chicago, Illinois, USA.

Table 1. Remote camera information by WDFW recovery area, 2015.

Recovery Area	Min # cameras deployed	Min # camera nights	Mean nights/camera	# cameras capturing wolf images	% cameras capturing wolf images
E Wash	112	7,585	68	26	23.2%
N Cascades	62	3,741	60	15	24.2%
S Cascades	33	3,127	95	0	0.00%
TOTAL	207	14,453	70	41	19.8%

information will allow for improved documentation of statewide wolf monitoring efforts and it will be used to better direct where WDFW efforts may be needed in the future as well as the intensity of those efforts.

The WDFW personnel, partners, and volunteers deployed a minimum of 207 cameras statewide for a total of 14,453 camera nights during 2015 (Table 1, Figure 3). Of these 207 known cameras that were deployed, approximately 20% obtained images of wolves (Table 1). Of the 41 cameras that obtained images of wolves, 27 were deployed to monitor known packs, 10 were deployed primarily to document the presence of other species, 3 were deployed over ungulate carcasses or in response to a reported conflict, and 1 was deployed in response to a public sighting report. In combination with surveying countless miles of roads and trails for wolf sign, camera surveys assisted WDFW, federal, and tribal biologists in documenting the presence of 4 previously unknown packs in Washington (Beaver Creek, Loup Loup, Skookum, and Stranger). Although 4 new packs were identified in 2015, it is possible that some wolves may have been present in other areas that were surveyed, but simply avoided detection.

Population Status and Distribution

As of 31 December 2015, the minimum known number of wolves in Washington increased by approximately 32% over the 2014 minimum estimate and was composed of at least 90 wolves (Figure 4) in 18 known packs (Table 2, Figure 5). Pack sizes ranged from 2 to 8 and averaged 4.4 wolves per pack. One pack that existed in 2014 was no longer considered a pack at the end of 2015 while another pack shifted its activity center to Idaho and was considered an Idaho pack at years end (Table 2).

Reproduction was documented in 11 packs during 2015 and, as of 31 December 2015, 8 of those packs were considered successful breeding pairs (Table 2; Figure 6). A minimum estimate of 29 pups survived to the end of the calendar year.

During 2015, wolves continued to inhabit a mix of both public and private lands from eastern Washington to the east slopes of the Cascade Mountains (Figure 7). The estimated mean home range size of 10 packs with known territories was approximately 349 mi² (905 km²) and ranged from an estimated 229 mi² (592 km²) to 669 mi² (1,734 km²).

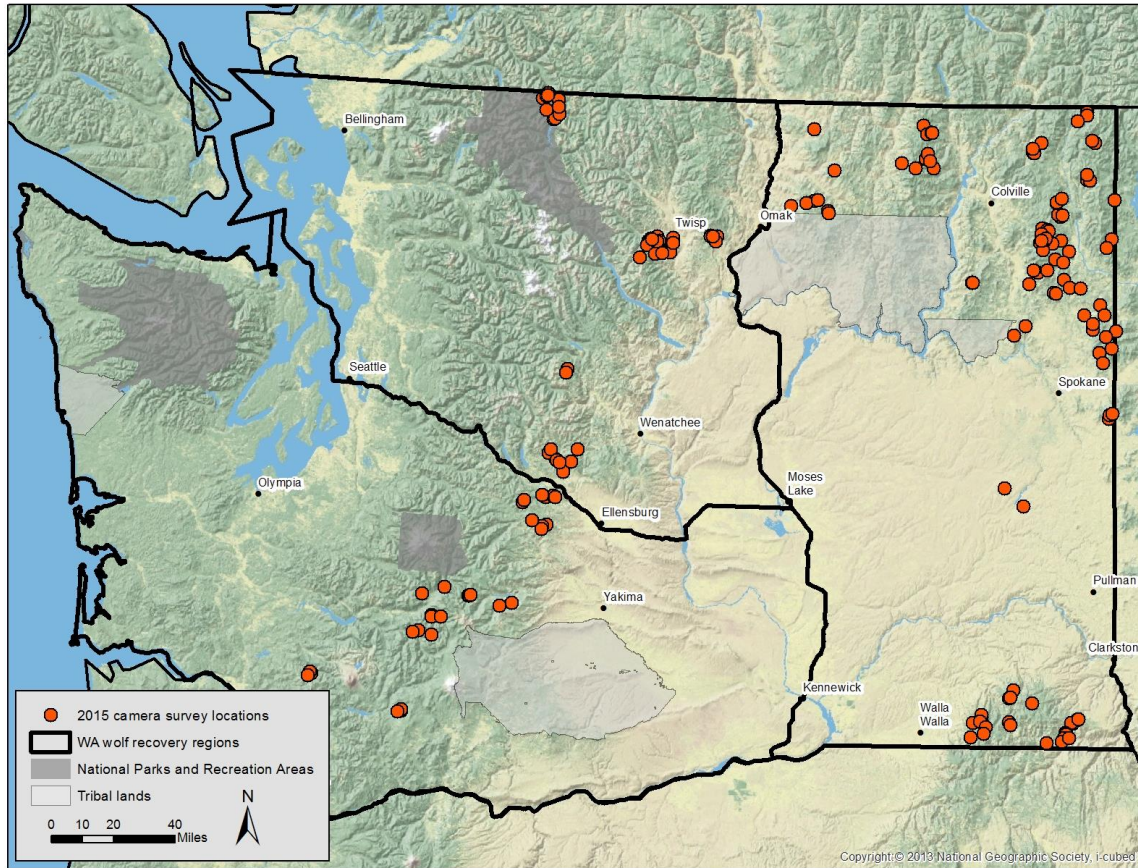


Figure 3. Locations of WDFW and collaborator remote cameras deployed in Washington, 2015.

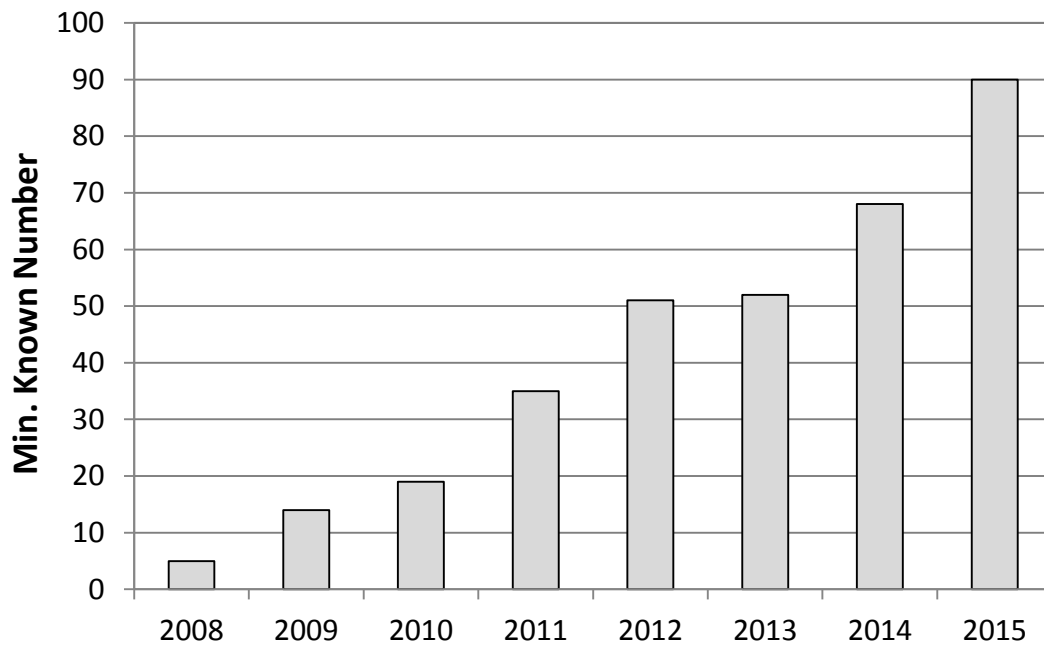


Figure 4. Minimum known number of wolves in Washington, 2008 – 2015.

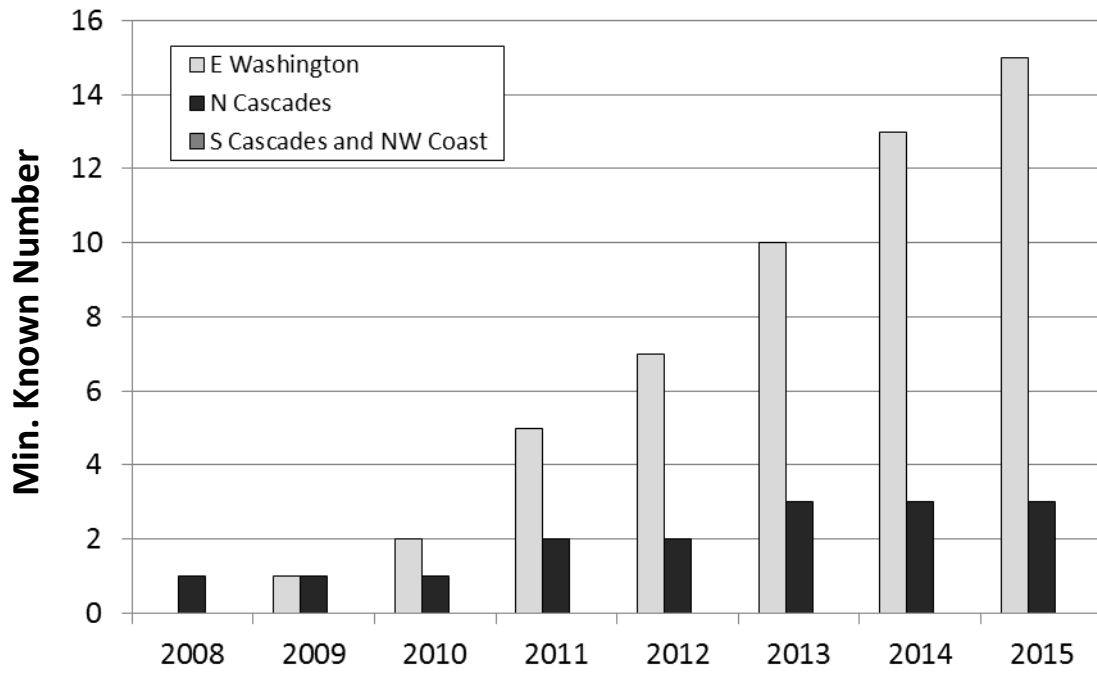


Figure 5. Minimum known number of packs by recovery area in Washington, 2008 – 2015.

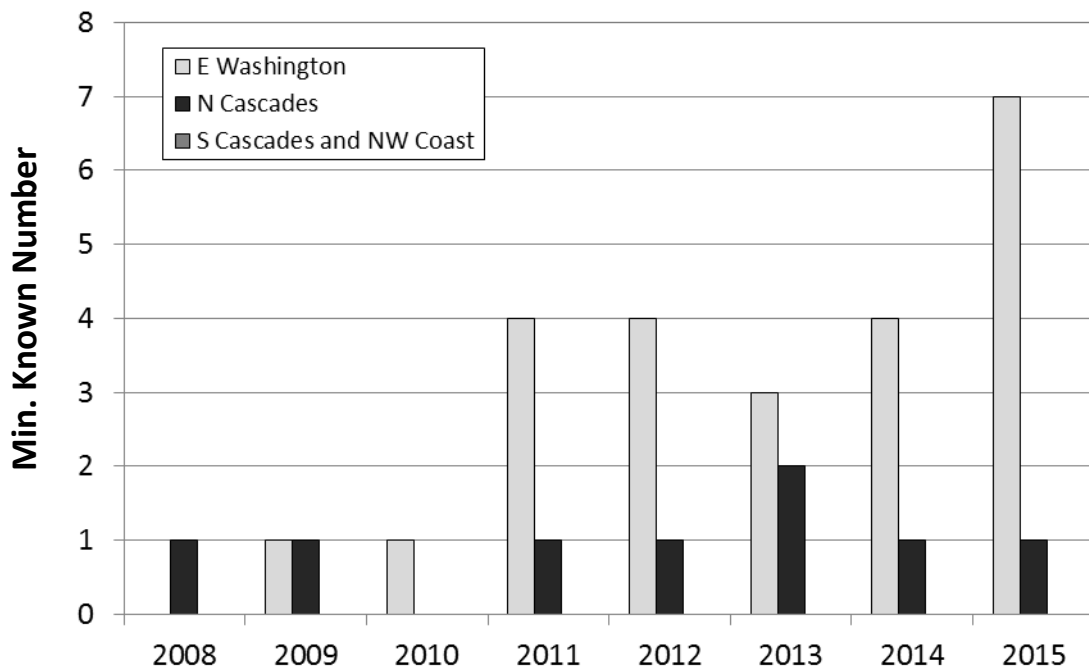


Figure 6. Minimum known number of breeding pairs by recovery area in Washington, 2008 – 2015.

Table 2. Known wolf packs in Washington by WDFW recovery area, minimum estimated size of known packs, documented mortalities, number of known wolves that dispersed, and number that went missing in 2015. Underlined packs were counted as breeding pairs. Strikethrough packs did not exist in Washington at the end of the calendar year. CCT = Colville Confederated Tribes.

Wolf Pack	Recovery Area	Minimum Known Pack Size Dec 2015	Documented Mortalities					Known	
			Natural	Human	Unkn	Harvest	Control	Dispersed	Missing
Beaver Creek	E. Wash	2							
Carpenter Ridge	E. Wash	2							
Diamond	E. Wash	0							
<u>Dirty Shirt</u>	E. Wash	8							
<u>Goodman Meadows</u>	E. Wash	7							
<u>Huckleberry</u>	E. Wash	5				3			
Lookout	N Cascades	3							1
<u>Loup Loup</u>	N Cascades	6							
Nc'icn (CCT)	E. Wash	5		1					
<u>Profanity Peak</u>	E. Wash	7			1				
Salmo	E. Wash	3							1
<u>Skookum</u>	E. Wash	5							
<u>Smackout</u>	E. Wash	8							1
Stranger	E. Wash	2							
Strawberry (CCT)	E. Wash	4							
Teaway	N Cascades	3						1	
<u>Tucannon</u>	E. Wash	5							1
Wedge	E. Wash	3							
Wenatchee	N Cascades	0							
Whitestone (CCT)	E. Wash	2							
Misc/Lone Wolves	Statewide	10		2					1
WASHINGTON TOTALS		90	0	3	1	3	0	1	5

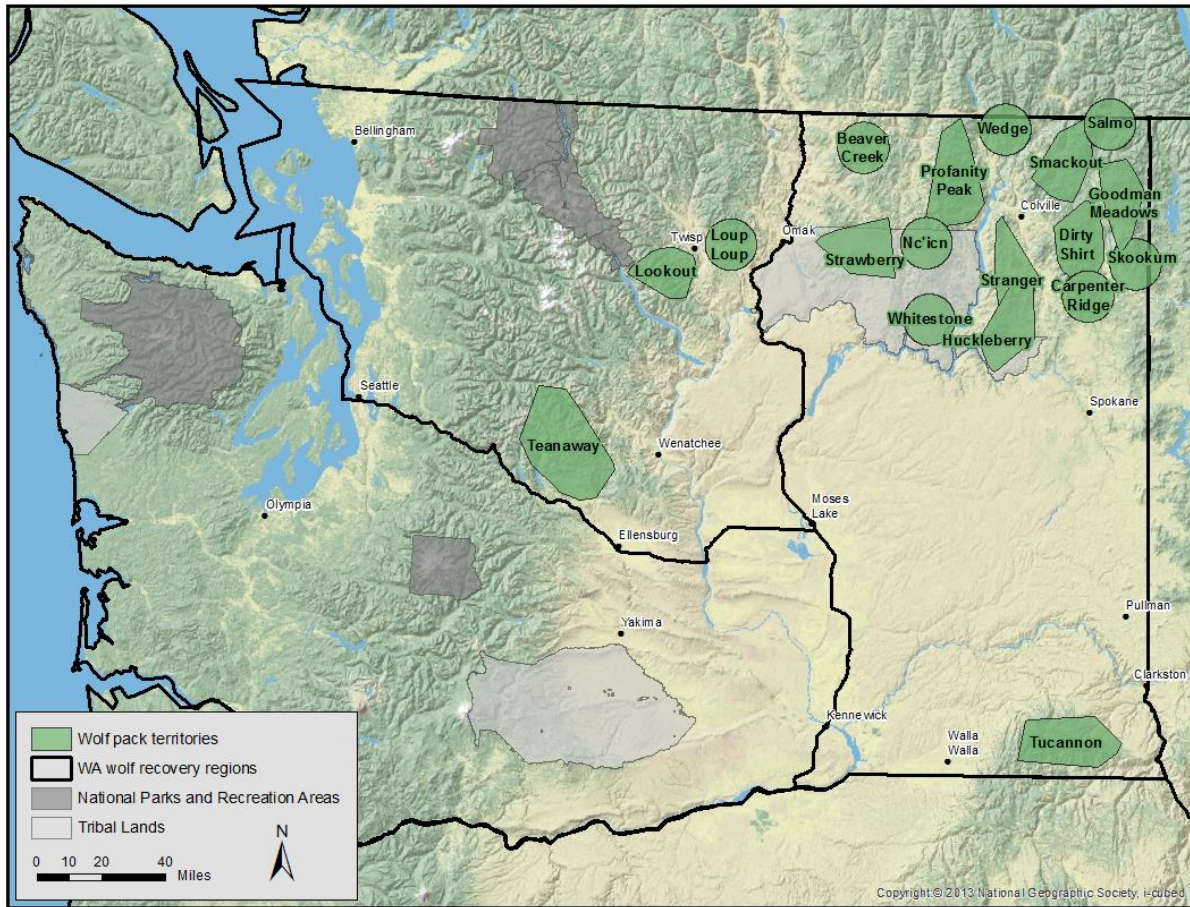


Figure 7. Known wolf packs and pack territories in Washington, 2015. Suspected packs and border packs from other states and provinces were not included.

Wolf Captures and Monitoring

In 2015, state, federal, and tribal biologists captured 14 unique wolves a total of 15 times from 9 different packs (plus 1 lone individual). Nine adults, 2 yearlings, and 3 pups were captured of which 3 were males and 11 were females. Twelve wolves were fitted with either satellite or very high frequency (VHF) radio collars while one pup was marked and released without a collar due to its size. One additional lone wolf was captured and placed into captivity for displaying habituated behavior. State, federal, and tribal biologists monitored a total of 22 unique radio collared wolves (approximately 24% of the minimum known population) from 13 different packs (65% of known packs) that existed at some point in 2015. Due to known mortalities, dispersals, collar releases, and radio collar failures, biologists were actively monitoring 11 radio collared wolves (approximately 12% of the minimum known population) from 8 different packs (plus 1 individual with no pack affiliation) in Washington as of 31 December 2015.

Regulated Harvest

Regulated wolf harvest was allowed on Colville Confederated Tribal lands for tribal members only. The season runs from 1 August through 28 February. A harvest limit of 3 wolves was set for 4 of 7 tribal wolf management zones (WMZ; total quota = 12 wolves). Any WMZ meeting the harvest limit will close immediately while the remaining WMZs will remain open until the end of the season or when the harvest limit is reached. No hunting was allowed in the remaining 3 WMZs and trapping of any kind was not permitted in any WMZ. No wolves were legally harvested on the Colville Indian Reservation in 2015 (Table 2).

Regulated wolf harvest was allowed on the Spokane Indian Reservation for tribal members only in 2015. Wolf seasons are open year-round or until a harvest quota of 6 wolves is reached within the calendar year, at which time the season will close. Trapping and/or snaring is allowed by special permit only. Three wolves were legally harvested on the Spokane Indian Reservation in 2015 (Table 2). No regulated harvest occurred in Washington outside of the Colville and Spokane Indian Reservations in 2015.

Mortalities

A total of 7 wolves were known to have died in Washington during 2015 (Table 2). Causes of mortality included human-caused ($n = 3$), unknown ($n = 1$), and legal harvest ($n = 3$). In addition to known mortalities that occurred in Washington, 1 wolf originally captured in the state was legally harvested in Idaho and was included in their mortality totals for 2015.

MANAGEMENT

Livestock Depredations

Potential livestock depredations in Washington were investigated by personnel from WDFW and USDA-Wildlife Services with some assistance by deputies from local County Sheriff's Departments. Reported livestock depredations were classified as confirmed, probable, confirmed non-wild wolf, unconfirmed depredation, non-depredation, or unconfirmed cause of death based on specific criteria outlined in the Wolf Conservation and Management Plan for Washington (Plan).

The following livestock depredation statistics were based on reported livestock injuries and mortalities and do not reflect lost or missing livestock. Confirmed livestock mortalities caused by wolves in Washington included at least 7 cattle (Figure 8); investigators also confirmed 1 dog as being injured by wolves (Table 3). Most livestock mortalities occurred during the summer grazing season (Figure 9).

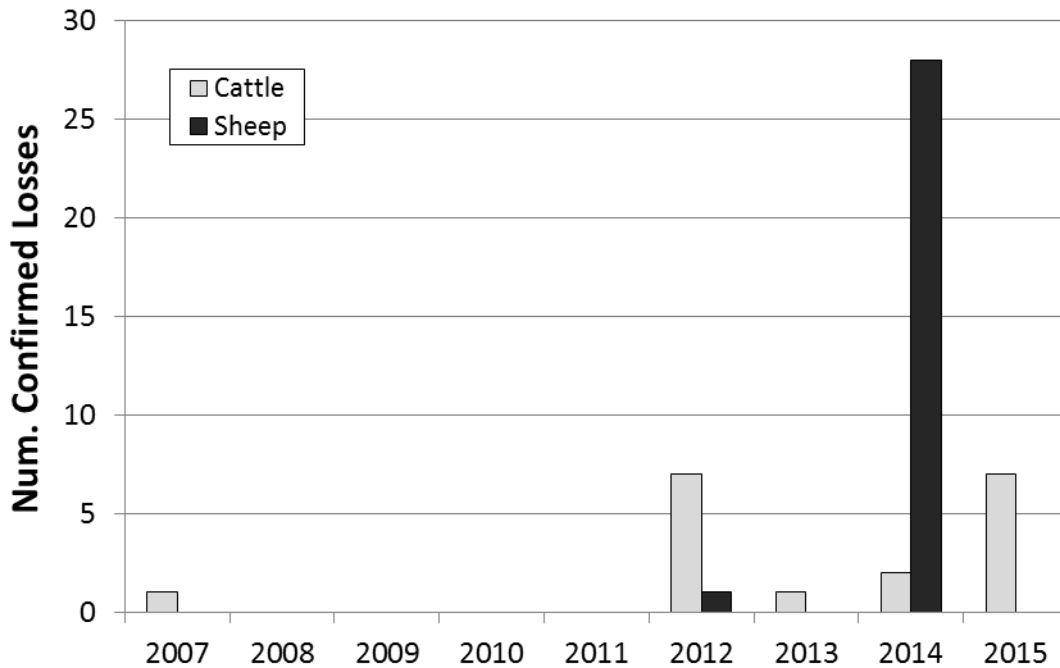


Figure 8. Total number of confirmed wolf-caused livestock losses in Washington, 2007 – 2015.

Table 3. Confirmed wolf-caused livestock and dog injuries and mortalities in Washington, 2012 – 2015.

	2012		2013		2014		2015	
	Injuries	Mortalities	Injuries	Mortalities	Injuries	Mortalities	Injuries	Mortalities
Cattle	6	7	0	1	2	2	0	7
Sheep	2	1	0	0	6	28	0	0
Other	0	0	0	0	0	0	0	0
Dogs	0	0	3	0	1	0	1	0
Total	8	8	3	1	9	30	1	7

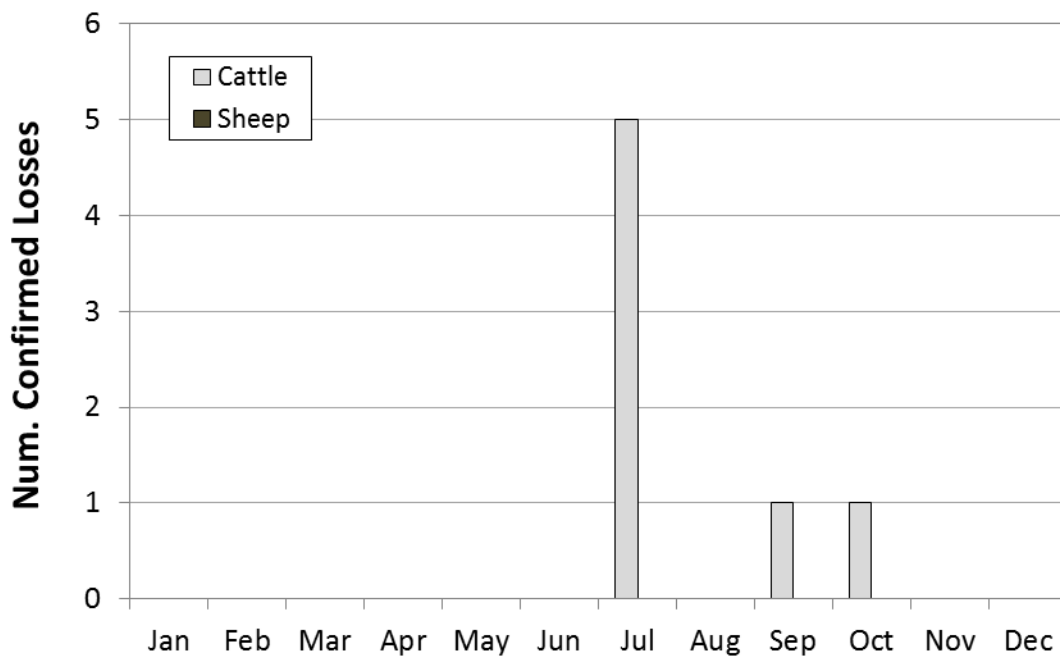


Figure 9. Number of confirmed wolf-caused livestock losses by month in Washington, 2015.

Number of Packs Involved in Livestock Depredations

Three of the 20 (15%) known packs that existed in Washington at some point during 2015 were involved in at least 1 confirmed livestock mortality (Figure 10). One additional pack was responsible for 1 confirmed dog injury investigated in 2015.

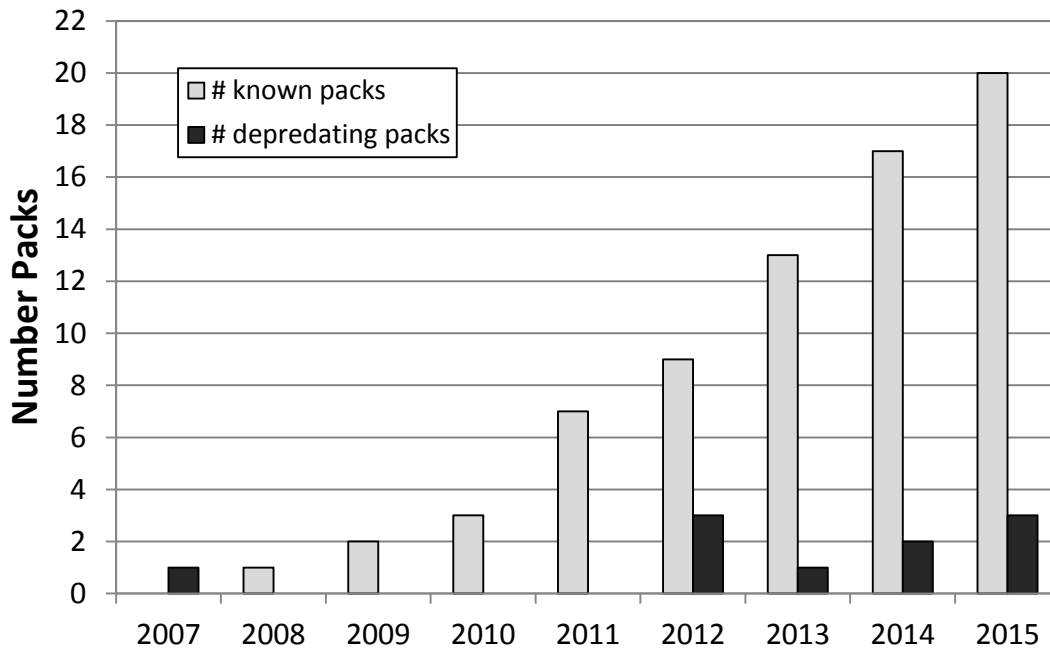


Figure 10. Minimum number of known packs that existed at some point during the calendar year and the number of confirmed depredating packs (livestock only) in Washington, 2007 – 2015.

Minimizing Wolf Conflicts with Livestock

One goal of the Wolf Conservation and Management Plan for Washington (Plan) is to manage wolf-livestock conflicts in a way that minimizes livestock losses while at the same time not affecting the recovery and long-term perpetuation of a sustainable wolf population. Preventative measures used in 2015 to minimize the potential for livestock depredations caused by wolves included the use of fladry and electrified fladry, RAG boxes, fox lights, livestock guarding dogs, hazing wolves from livestock and human residences, increased human presence around range livestock, range riders, providing wolf location data to livestock producers and range riders, and removal of injured and/or dead livestock from grazing sites. Other techniques that may be used to minimize livestock depredations include both nonlethal and lethal control of depredating wolves.

The WDFW has full management authority of wolves in the Eastern Washington recovery area (Figure 2) and, under state law RCW 77.12.240, can implement lethal measures to control depredating wolves when it is deemed necessary to deter repeated livestock depredations. In 2015, no wolves were removed through agency control actions (Table 2).

In the western two-thirds of Washington, where wolves remain classified as an endangered species under the federal ESA, USFWS is the lead management agency (Figure 2). Lethal control is not authorized in this part of the state, therefore, capture and relocation has been

identified as a potential management option when responding to repeated livestock depredations. No wolves were captured and relocated through USFWS actions in 2015.

Under state law (WAC 232-36-051) and the provisions of the Plan, WDFW may issue a permit to livestock producers and their authorized employees to lethally remove a specified number of wolves in the act of attacking livestock (defined as biting, wounding, or killing) on private land and public grazing allotments they own or lease after a documented depredation. These permits cannot be issued in the western two-thirds of the state where wolves remain federally listed. No permits were issued to livestock producers in 2015.

Furthermore, under state law (WAC 232-36-052), owners of domestic animals (defined as any animal that is lawfully possessed and controlled by a person), their immediate family members, or their authorized agents have the right to lethally remove one (1) gray wolf without a permit if the wolf is attacking their domestic animals. This rule only applies to the Eastern Washington recovery area where wolves are federally delisted; it does not apply to those areas of the state where wolves remain classified as endangered under federal law. Any wolf removed under this rule must be reported to WDFW within 24 hours and the owner of the domestic animals must surrender the carcass and cooperate with WDFW during an investigation. No wolves were removed under the provisions of this rule in 2015.

Damage Prevention Cooperative Agreements

Ranching and farming are essential components of Washington's economy and the lands that foster this industry also provide critical habitat for a wide variety of wildlife. The WDFW is responsible for protecting and managing wildlife and is committed to working with operators to minimize conflicts between wolves and livestock on both public and private lands. WDFW staff work directly with operators to provide assistance in selecting and implementing non-lethal conflict prevention measures that are suitable for each individual producer's operation. Interested producers may also enter into a Damage Prevention Cooperative Agreement (DPCA) with WDFW which provides a cost-share for the implementation of conflict prevention measures.

During calendar year 2015, WDFW had 33 active DPCAs with livestock producers across Washington worth in excess of \$265,000. Operators with an active DPCA received a specified cost-share percentage for each different conflict prevention measure up to a maximum amount. The most common non-lethal conflict prevention measures implemented during 2015 were increased human presence (e.g. range rider), improved sanitation (removal or treatment of injured or dead livestock), and fencing (e.g. fladry).

Additionally, WDFW contracted with 4 private organizations to provide range rider services in 2015. A total of 6 range riders were used to minimize wolf-livestock conflicts and to monitor livestock on open-range grazing allotments. Contractors were assigned to an area on an as needed basis and covered multiple grazing allotments during a single assignment thereby offering assistance to multiple operators.

WDFW Livestock Depredation Compensation Program

The Plan expands compensation for wolf depredation beyond what is currently provided for by Washington State laws RCW 77.36 and WAC 232-36 (see Plan: Appendix F). The Plan also expands the definition of livestock eligible for compensation from damage caused by wolves to include cattle, sheep, horses, swine, mules, llamas, goats, and actively working guarding/herding dogs. Currently, compensation is not allowed for domestic pets and hunting dogs that may be injured or killed by wolves. To receive compensation, the injury or mortality must be classified as confirmed or probable by WDFW personnel, or an authorized agent of WDFW, and operators must demonstrate that they are implementing methods that may minimize wolf damage.

Washington's payment plan is two-tiered dependent on the size of the grazing site. For each confirmed depredation on grazing sites greater than or equal to 100 acres, WDFW would compensate producers for the full market value (defined as the value of an animal at the time it would have gone to market) of that animal plus full market value of one additional animal if some were unaccounted for at the end of the grazing season. The additional payment would not apply if all livestock were accounted for at the end of the grazing season. If the depredation was confirmed, but the grazing site was less than 100 acres, or if the depredation was classified as probable on a grazing site greater than or equal to 100 acres, WDFW would compensate for the full market value of the affected animal only. If the depredation was classified as probable and the grazing site was less than 100 acres in size, WDFW would compensate for half the current market value of livestock. The WDFW also compensates producers for veterinary costs associated with treatment of livestock and guarding/herding dogs injured by wolves. Under the provisions of the Plan, compensation to individual operators who experience damage shall not exceed \$10,000 per claim without an appeals review.

The WDFW processed 3 claims and paid a total of \$15,174.60 (plus an additional \$1,080.00 in assessor fees) to compensate livestock producers who experienced livestock depredations caused by wolves. Two of the 3 claims (totaling \$7,974.60) were payments for losses that originally occurred in 2014 while the other claim (totaling \$7,200.00) was for losses that were incurred during the 2015 grazing season. One other claim for losses that occurred in 2015 was filed; however, it was filed in early 2016 and is currently under review.

In 2015, WDFW solicited applications for the Livestock Review Board (LRB) whose primary objective will be to review claims filed for indirect losses (e.g. greater than normal losses, reduced weight gain, reduced pregnancy rates) that may have been caused by wolves and provide recommendations to WDFW to pay or deny claims. The LRB is comprised of five citizen members with two representing the livestock industry, two representing conservation interests, and one at-large member. During 2015, two claims were filed to compensate livestock producers for indirect losses caused by wolves that occurred during the 2014 grazing season. Board review of these two claims, as well as any compensation that may be paid to the claimants, are pending.

Also in 2015, the WDFW Commission formally adopted revisions to WAC 232-36-210 (application for cash compensation for livestock damage or domestic animal—Procedure). These revisions increased the period of time an operator has to notify WDFW of their intent to file a claim for compensation from 10 days to 30 days and it increased an operator's time to file

the completed claims package to WDFW from 60 days to 90 days. Additional revisions include a provision which allows an operator to comply with either a WDFW approved checklist, a damage prevention cooperative agreement, or a director's waiver in order to be considered for compensation.

RESEARCH

Title: Monitoring and modeling wolf population dynamics and spatial ecology in Washington

Principal Investigator: Brian Kertson, Washington Department of Fish and Wildlife

Collaborators: Donny Martorello (WDFW), Scott Becker (WDFW), Trent Roussin (WDFW), Ben Maletzke (WDFW), John Pierce (WDFW)

Project Summary: Implementation of Washington's Wolf Conservation and Management Plan requires not only information on pack occurrence and breeding activity, but also an understanding of how patterns of survival, mortality and space use govern population change and persistence. To meet these information needs, we are employing a combination of intensive field efforts and rigorous, quantitative modeling of wolf population dynamics and spatial ecology. Specifically, we are using motion sensing cameras, howl surveys, aerial surveys and GPS/VHF radio collars to document and monitor wolf pack status, distribution and reproductive activity. We are modeling wolf population viability and persistence using the distribution of known packs in conjunction with vital rates, movement patterns and landscape suitability estimated from GPS relocation data, RAMAS GIS and multivariate resource utilization functions. Collectively, these efforts will support the successful implementation of Washington's Wolf Plan and sound management of wolves into the foreseeable future.

Title: Impact of recolonizing gray wolves on deer, mesocarnivores, and deer-plant interactions

Graduate Students: Justin Dellinger, Carolyn Shores, and Apryle Craig, University of Washington

Major advisor: Aaron Wirsing, University of Washington

Cooperators: Washington Department of Fish and Wildlife, Colville Confederated Tribes Fish and Wildlife, U.S. Forest Service

Project Summary: Beginning in the winter of 2012, we initiated a study of the ecological impacts of gray wolf (*Canis lupus*) recolonization in eastern Washington. Our study is situated in the Okanogan Highlands and employs a natural experimental setup with two study sites established in areas where wolves are absent ('controls') and two study areas with resident wolf packs (the 'Strawberry' and 'Nc'icn' packs). We have four primary objectives as part of this ongoing predator-prey study: (1) determine whether the presence of wolves alters patterns of space use and foraging in two ungulate prey species – mule (*Odocoileus hemionus*) and white-tailed (*O. virginianus*) deer; (2) test the hypothesis that these two deer species manifest divergent responses to the presence of wolves, with mule deer shifting to rugged, upland terrain that favors their stotting escape tactic and white-tailed deer moving to gentle, lowland terrain that facilitates their sprinting escape tactic; (3) examine the possibility that mesocarnivores (especially coyotes, *Canis latrans*) shift their space use and diet in response to wolf recovery; and (4) explore the possibility that wolf recolonization could exert divergent indirect effects on plants that are transmitted by different responses of mule and white-tailed deer, with the presence of wolves leading to enhanced mule deer herbivory in upland areas and increased white-tailed deer herbivory in lowland habitats. This study is funded primarily by the National Science Foundation, is being conducted in collaboration with the USFS, WDFW, and the Colville Confederated Tribes, and will continue through 2017.

Title: Impacts of wolf recovery on the predator and prey community in NE Washington

Project Leader: Julianne Ubigau, Conservation Canines, Center for Conservation Biology, University of Washington

Principal Investigator: Sam Wasser, Center for Conservation Biology, University of Washington

Cooperators: Washington Department of Fish and Wildlife

Project Summary: This project has several objectives: (1) determine how many wolves are in the 5,000 km² study area in NE Washington (NEWA), their distribution over the landscape as well as their health and pregnancy rates; (2) assess how the functional densities and diets of wolves across the landscape affect the same in the following predators and prey: coyote, cougar, black bear, grizzly bear, bobcat, lynx, red fox and wolverine; elk, white-tailed deer, mule deer, moose, caribou, and snowshoe hare; (3) assess how proximity to human habitation affects the relations in #2 above; (4) examine whether the microbiome of each species change with the respective pressures they are under; and (5) educate local communities about the roles wolves play in the environment. We use our detection dog teams to attract K-12 students into our outreach programs in NEWA, where we teach local kids about the science we are using (genetics and physiology) and what this tells us about wolf ecology and their role in human wildlife conflict.

Our project benefits greatly from our ability to get a wide variety of genetic and physiological information from geo-referenced scat samples and the incredible capacity of dogs to locate these samples simultaneously from multiple species. We conduct four, 4 week sampling sessions, one session for each season of the year, covering the period when females of most of these study species are pregnant, the early period of lactation when young first become mobile, late fall when mobility is high, and winter when many predators and prey move down into the valleys. Three dogs locate an average of 1500 samples during each 4 week session, providing excellent coverage of all study species over our large study area. DNA from scat samples are used to identify species and sex of each predator, prey species and the microbiome found in their scat, and for wolves only, individual identities. Spring pregnancies are also determined by measurement of progesterone and testosterone concentrations in scats of female wolves. This approach is proving to be a highly cost-effective tool to gather data about wolves. As a result, we will be able to understand their impacts on the predator-prey community and their role in local issues of human wildlife conflict, which could be extremely useful for managing this system.

Our detection dogs also greatly improve our ability to educate the local community in northeast WA about the role of wolves in the environment. The USFS has funded a supplementary education outreach program that will bring dog teams into K-12 classrooms throughout Spokane, Stevens and Pend Oreille counties. They will show students how the dogs work, explain why we have them search for scat, and what the genetic and hormonal information in the scats can tell us about the animal and environment. This education in basic science fills an important need in rural communities. We hope that the educational value of this program will also make kids and their families open to discussions about the role of wolves in this ecosystem. By clearing up misinformation about wolves among the local community, we hope to ease some of the pressures they are placing on wildlife managers in this area.

Title: Livestock mortality rates in wolf occupied areas of Washington

Graduate Student: Jeffrey Brown, Washington State University

Major advisor: Robert Wielgus, Washington State University

Cooperators: Washington Department of Fish and Wildlife, U.S. Forest Service, U.S. Fish and Wildlife Service, Colville Confederated Tribes

Project Summary: The project is a collaborative effort among Washington Department of Fish and Wildlife, United States Forest Service, United States Fish and Wildlife Service, Colville Confederated Tribes, and Washington State University. The primary focus of the study is to investigate the difference in mortality rates of cattle herds during the grazing season (May-October) in relation to wolf pack presence. The study area spans parts of northeastern and central Washington. Calves were ear tagged with radio transmitters, a minimum of 30 individuals per herd, to track their fate and determine causes of mortality. Herd matriarchs were fitted with GPS collars to track herd movement and compare with wolf movement data. During the 2015 field season, radio ear tags were placed on 366 calves and 116 sheep. We monitored 8 cattle herds and 1 flock of sheep. No mortalities were detected for tagged calves, although deaths due to fire, vehicle collision, unknown cause, and cougar were detected. Herd movements were tracked from 59 GPS collared cows and 4 GPS tagged sheep. The project greatly benefited from collaboration with area livestock producers. Completion of data analysis and thesis defense is anticipated to occur in spring 2016.

Title: Wolf predation in livestock occupied areas of Washington State

Graduate Student: Gabriel Spence, Washington State University

Major advisor: Robert Wielgus, Washington State University

Cooperators: Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, U.S. Forest Service, Colville Confederated Tribes.

Project Summary: As wolves recolonize Washington State, fears about the effects wolves might have on the livestock industry are increasing. Wolf depredation rates on livestock are often estimates, with the actual number of depredations unknown. The goal of this research is to help determine the actual extent of wolf depredation on livestock in Washington State by monitoring wolves. Wolves were captured and fitted with GPS collars in the North Cascades and northeast Washington. We then investigated GPS location clusters to locate and identify livestock and natural prey kills. From this data we will estimate the kill rate (kills/pack/day) of wolves on both livestock and wild prey for the grazing season (May – October). We also intend to determine how wolf kill rates relate to the density of prey and livestock (functional response). In 2015 we used wolf collar GPS positions to collect kill data from seven wolves in five different packs between May 1 and October 31. We visited 171 kill sites in 2015 and 114 kill sites in 2014, for a total of 285 kill sites visited. Completion of data analysis and thesis defense is anticipated to occur in spring 2016.

Title: Forecasting livestock depredation risk by recolonizing gray wolves (*Canis lupus*) in Washington, USA

Graduate Student: Zoë Hanley, Washington State University

Major advisor: Rob Wielgus, Washington State University

Cooperators: Washington Department of Fish and Wildlife; US Fish and Wildlife Service; US Forest Service; Montana Fish, Wildlife, and Parks; Idaho Fish and Game

Project Summary: Some wolf packs engage in livestock depredations and cause economic losses to livestock operators in any given year while others living in close proximity to livestock

do not. In addition, there are often greater livestock losses as wolf populations increase and in areas where natural prey populations are low. I will investigate the characteristics of historic (i.e. from 1991 through 2008) wolf-livestock depredations in the Idaho and Montana portions of the Northern Rocky Mountain Gray Wolf Distinct Population Segment using risk modeling to develop predictive risk maps of livestock depredations by recolonizing wolves in Washington. Predictive maps will be developed at two scales: (a) wolf pack territory and (b) livestock grazing allotment to test the hypotheses that wolf depredations on livestock are associated with multiple factors including wolf population demography, livestock herd composition, grazing season, prey abundance, and landscape characteristics. Risk maps will be validated by comparing predicted values from the best-fit model(s) with known depredation areas (pack territories and livestock allotments) using leave-one-out cross validation for Idaho and Montana depredations (included in the analysis) in addition to assessing predicted values for Washington depredations from 2007 – 2015 (not included in analysis). To date, raw datasets of historic livestock depredations, wolf population demography, and ungulate harvest statistics were collected from the Idaho and Montana wildlife agencies in addition to allotment-level livestock datasets from 19 National Forests, 11 Bureau of Land Management Ranger Districts, 2 timber companies, and the Washington Department of Natural Resources. Data compilation and formatting is still in progress.

Title: Risk effects of wolves on livestock in Washington.

Graduate Student: Azzurra Valerio, Washington State University

Principal Investigator: James Pratt, Washington State University

Cooperators: Colville Confederated Tribes, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and U.S. Forest Service

Project Summary: The wolf/livestock interaction project is a research collaboration among Colville Confederated Tribes, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and U.S. Forest Service initiated in January 2014. Presently, wolves are recolonizing Washington State and conflicts with livestock are likely to increase as the population of wolves grows throughout the State. Therefore, it is important to develop wildlife management programs that allow predator populations to coexist with livestock by minimizing conflicts and building human tolerance. The Washington State University (WSU), under the direction of Dr. James Pratt, has undertaken the multi-year research to investigate wolf/livestock interactions. The primary objectives of our research project are: (a) to determine changes in cattle behavior (i.e., stress, vigilance, foraging, and selection of lower quality habitat) in areas with high wolf presence versus areas with low wolf presence; (b) to compare wolf activity and movement in presence and absence of range riders, and to determine if range riders can improve cattle foraging efficiency. The study commenced in 2014 and will be carried out in three different study areas, North East WA (NE), Cascades WA (CA), and the Confederated Tribes of Colville Reservation, WA (CCT). However, only within the CCT study area, we are attempting to investigate the potential causes related to non-consumptive effects of wolves on livestock. In particular, within the CCT study area we are monitoring cattle nutritional status and stress in relation to wolf presence by applying the metabolomics technique on cattle fecal samples. During the 2015 field season, we employed 3 technicians, 3 interns, and 4 graduate students from June-October. The project relied on location data provided by 41 adult cows (females with calves) fit with “store on board” GPS collars (divided amongst 7 separate livestock herds), 5 radio-collared sheep (1

sheep flock), and 8 adult wolves fit with GPS in the 5 different wolf packs. Daily monitoring of cows and wolves fit with GPS collars (via onboard VHF radio) was accomplished by ground based telemetry. To assess preventative measures, we monitored wolves and range riders movements on 4 cattle grazing allotments, and 6 guarding dog movements in 2 sheep flocks. We collected > 800 cattle scats for the glucocorticoid, DAPA, and metabolomic analysis from 6 separate livestock herds located within wolf territories. Preliminary data analysis for the first year and second year (2014-2015) on wolf movement in relation to range riders, cattle space use, weight and pregnancy loss, nutritional status and stress are currently underway.

Title: Role ambiguity and perceived organizational politics in wolf recovery: Washington State wildlife agency personnel perspectives.

Graduate Student: Catherine Gowan, University of Washington

Principal Investigator: Stanley Asah, University of Washington

Cooperators: Washington Department of Fish and Wildlife

Project Summary: Wolf recovery in Washington (WA) State provokes contentions amongst stakeholders: livestock owners, environmental groups, government organizations, and the public. Wolf recovery in WA also incites internal disputes and strains working relationships within state government entities charged with wolf management. These divisions undoubtedly undermine wolf recovery and conservation efforts. WA State is in the early stages of wolf recovery. Consequently, it is important to understand, in order to preemptively manage, emerging issues among disputing parties in the recovery process. To this end, we conducted 60 in-depth, semi-structured key informant interviews and two focus group interviews from October 2013 through March 2015 with primary stakeholders in the wolf recovery efforts: livestock owners, conservation organization officials, and Washington Department of Fish and Wildlife (WDFW) employees. The purpose was to ascertain salient perspectives regarding wolf recovery in WA, with an original focus on economic programs to aid ranchers affected by wolves. Non-directive moderation techniques were used for all interviews. Interviews were recorded and transcribed verbatim before analysis. Data analysis followed the grounded theory approach, a predominantly inductive process, which allows for salient perspectives to emerge from the data rather than as predetermined by the researcher. Preliminary coding suggested that a major issue of conflict about wolf recovery in WA State is distrust among relevant stakeholders. During second cycle coding, role ambiguity and perceived organizational politics emerged as factors that are relevant to goal alignment and trust within the WDFW and subsequent interactions with other stakeholders. Hence, these matters of occupational and organizational psychology constitute the focus for this thesis. Occupational and organizational factors are pertinent to interactions that rely on trust to ensure cooperation, such as signing contracts for cost-share measures to prevent livestock depredation by wolves. Our findings suggest that role ambiguity and perceived organizational politics are intricately tied to effective and trustworthy interactions with livestock owners, environmental groups, and the general public as well as the occupational performance of WDFW employees. If the WDFW focuses on reducing role ambiguity and changing the nature of organizational politics, there should be an increase in goal alignment and trust within the organization. Improvement in both of these areas will increase the effectiveness of the Agency by promoting organizational ambidexterity and a variety of positive occupational outcomes. The interviews exposed a great need to further explore the internal workings of the WDFW.

OUTREACH

In addition to numerous, daily interactions (i.e. phone calls, emails, personal communications) with the general public concerning wolves and wolf management in Washington, WDFW personnel also provided various formal presentations to school groups, universities, wildlife symposiums, state and federal management agencies, livestock association meetings, state legislature committees, Washington's Fish and Wildlife Commission, local interest groups, and conservation groups. Department personnel were also interviewed by local radio, newspaper, and television outlets on many occasions.

The WDFW maintains numerous pages on its website related to wolves and wolf management in Washington. In addition to general wolf information and links to other wolf-related sites, the website also provides interested parties with access to archives of Plan development, WDFW news releases related to wolves, and weekly updates of wolf management activities. The website also has a wolf observation reporting system where members of the public can report information regarding wolf sightings, or evidence of wolf sign, which assists WDFW personnel with monitoring existing packs and documenting potential wolf activity in new areas. The website also provides telephone numbers to report suspected livestock depredations.

Wolf Advisory Group

In 2013, WDFW created the Wolf Advisory Group (WAG) which was developed to advise WDFW on implementation of the Wolf Conservation and Management Plan (Plan). The WAG is composed of citizen members appointed by the director that serve a two year term with each member representing a different stakeholder interest.

During 2015, the WAG was increased from 9 members representing the livestock industry and conservation interests to 18 members now including sportsmen/women and members of the public at large who are not officially affiliated with a special interest group. The WDFW also contracted with Human-Wildlife Conflict Collaboration (HWCC) to complete an assessment of the social conflict surrounding wolf recovery and management in Washington. The report titled, "People and Wolves in Washington: Stakeholder Conflict Assessment and Recommendations for Conflict Transformation" was completed in March 2015. The report highlighted the deep-rooted nature of social conflict surrounding wolves and provided recommendations for addressing the conflict. To address the deep-rooted conflict, WDFW hired a consultant from HWCC for stakeholder engagement, strategic guidance, and facilitation of the WAG meetings.

During 2015, the WAG met on 5 occasions. Core to the transformation of deep-rooted conflict is reconciling and building resilient relationships between stakeholder groups, including WDFW. As such, the expanded 18-member WAG spent time developing relationships that foster respect, honest dialogue, and mutual learning. The WAG provided advice to WDFW on expectations for preventative and non-lethal measures to minimize wolf-livestock conflicts, cost-share agreements associated with DPCAs, and an individual pilot producer plan that balanced the expectations of preventative and non-lethal measures and potential agency management actions to address repeated depredations. All WAG meeting agendas, notes, handouts, and meeting minutes are posted on the WDFW website.

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- To report a suspected livestock depredation, a dead wolf in the Eastern Washington recovery area, or any type of illegal activity, please call: **1-877-933-9847, your local WDFW conflict specialist, or your local WDFW enforcement officer**
- To report a dead wolf in western Washington, please contact the nearest USFWS special agent or your local WDFW enforcement officer
- For information about wolf management in Washington and to report a wolf sighting, please visit: http://wdfw.wa.gov/conservation/gray_wolf/
- For information about wolf management on lands owned by the Colville Confederated Tribes and to report a wolf sighting on tribal lands, please visit: <http://www.colvilletribes.com/>
- For information about wolf recovery in the Northern Rocky Mountains, please visit: <http://www.westerngraywolf.fws.gov/>