WASHINGTON GRAY WOLF CONSERVATION AND MANAGEMENT 2014 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, 2014 through December 31, 2014.

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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 2013, the U.S. Fish and Wildlife Service (USFWS) published a proposed rule to remove gray wolves from the list of endangered and threatened wildlife where they are currently federally protected, including the western two-thirds of Washington. The USFWS subjected the proposed rule to an independent expert peer review to determine if the best available science was used during the decision making process and these results were published in early 2014. As a result, the USFWS reopened the public comment period for the proposed rule. A decision by the USFWS on the federal status of gray wolves is expected sometime in near future.

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 as an agent of the USFWS in the remaining areas of the state. Wolves that inhabit tribal lands in the Eastern Washington recovery area are managed by those specific tribal entities.

The minimum estimated wolf population in Washington increased by approximately 31% over 2013 levels to at least 68 known wolves in 16 known packs including at least 5 breeding pairs. Pack sizes ranged from 2 to 6 and averaged 3.7 wolves per pack. One pack that existed in 2013 was no longer considered a pack at the end of 2014. State and tribal biologists captured a total of 14 wolves from 9 different packs and monitored a total of 19 radio collared wolves from 11 different packs that existed at some point during 2014. We documented 10 mortalities in Washington during the year and the causes of mortality included natural causes (n = 3), human-caused (n = 4), unknown (n = 2), and agency control (n = 1).

Wolf populations were managed to ensure progress towards recovery goals while also minimizing chronic loss of livestock caused by wolves. Two cattle and 28 sheep were confirmed wolf-kills while an additional 2 cattle, 6 sheep, and 1 dog were confirmed injured by wolves. Two packs (12% of known Washington packs that existed at some point during the year) were involved in at least 1 confirmed livestock depredation. One wolf was removed during agency control actions to minimize chronic loss of livestock.

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 (STI), USDA-APHIS Wildlife Services (WS), and the U.S. Fish and Wildlife Service (USFWS). WDFW personnel who played a primary role during 2014 include WDFW Director Phil Anderson, Wildlife Program Assistant Director Nate Pamplin, Game Division Manager Dave Ware, and other WDFW personnel including Gary Wiles, Chris Anderson, Dan Anderson, Dana Base, Rich Beausoleil, Candace Bennett, Jeff Bernatowicz, Joe Bridges, James Brown, Mike Charron, John Cotton, Jason Day, Paul DeBruyn, Andrew Duff, Chris Erhardt, Severin Erickson, Scott Fitkin, Graham Grant, Ellen Heilhecker, Jeff Heinlen, Ryan John, Danyl Klump, Madonna Luers, Ben Maletzke, Richard Mann, Kristin Mansfield, Joey McCanna, Scott McCorquodale, Matt Monda, William Moore, Paul Mosman, Brian Murphie, Anthony Novak, Eric Oswald, Nick Parkert, John Pierce, Steve Pozzanghera, Dan Rahn, Scott Rasley, Kevin Robinette, Ella Rowan, Jay Shepherd, Gabe Spence, Jeff Tayer, Pam Taylor, Cal Tresser, Mark Vekasy, Dave Volson, Don Weatherman, Steve Wetzel, and Paul Wik. Although we could not list all who were involved, for those not listed, we also thank you for your efforts and patience.

Numerous other agencies and agency personnel also played a key role with wolf management efforts in Washington. In particular, we would like to thank personnel from the USFWS including Hilary Cooley, Richard Gamba, Mike Jimenez, Manisa Kung, Gregg Kurz, and Corky Roberts; WS personnel including Roger Woodruff, Terry Smith, Ken Gruver, Chad Heuser, and Wade Jones; CCT personnel including Randy Friedlander; the U.S. Forest Service including Mike Borysewicz, Chris Loggers, Andrea Lyons, Ray Robertson, John Rohrer, and Aja Woodrow; the National Park Service including Roger Christophersen; and the U.S. Air Force including Todd Foster and Major J.B. Marshal.

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).

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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-

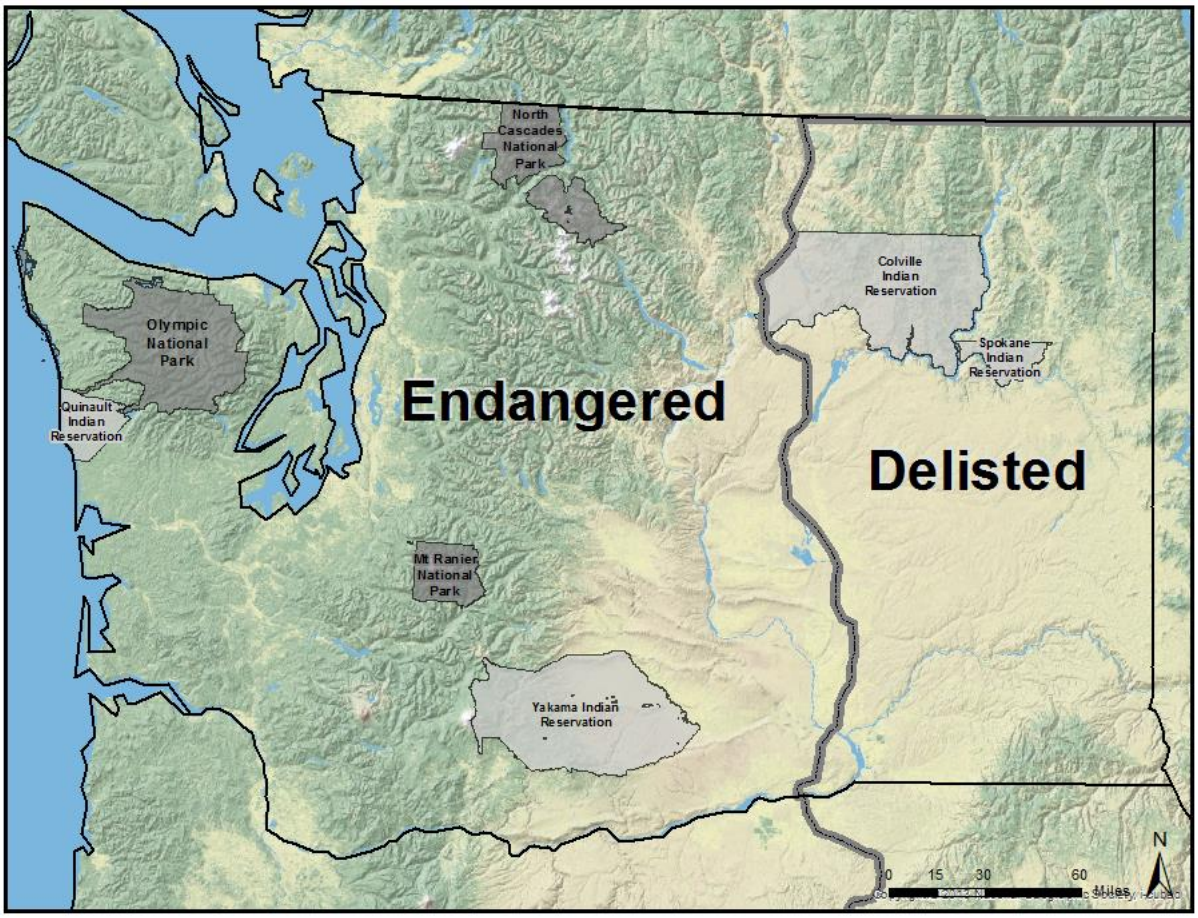

Figure 1. Federal classification of wolves in Washington State, 2014.

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 during the decision making process. 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

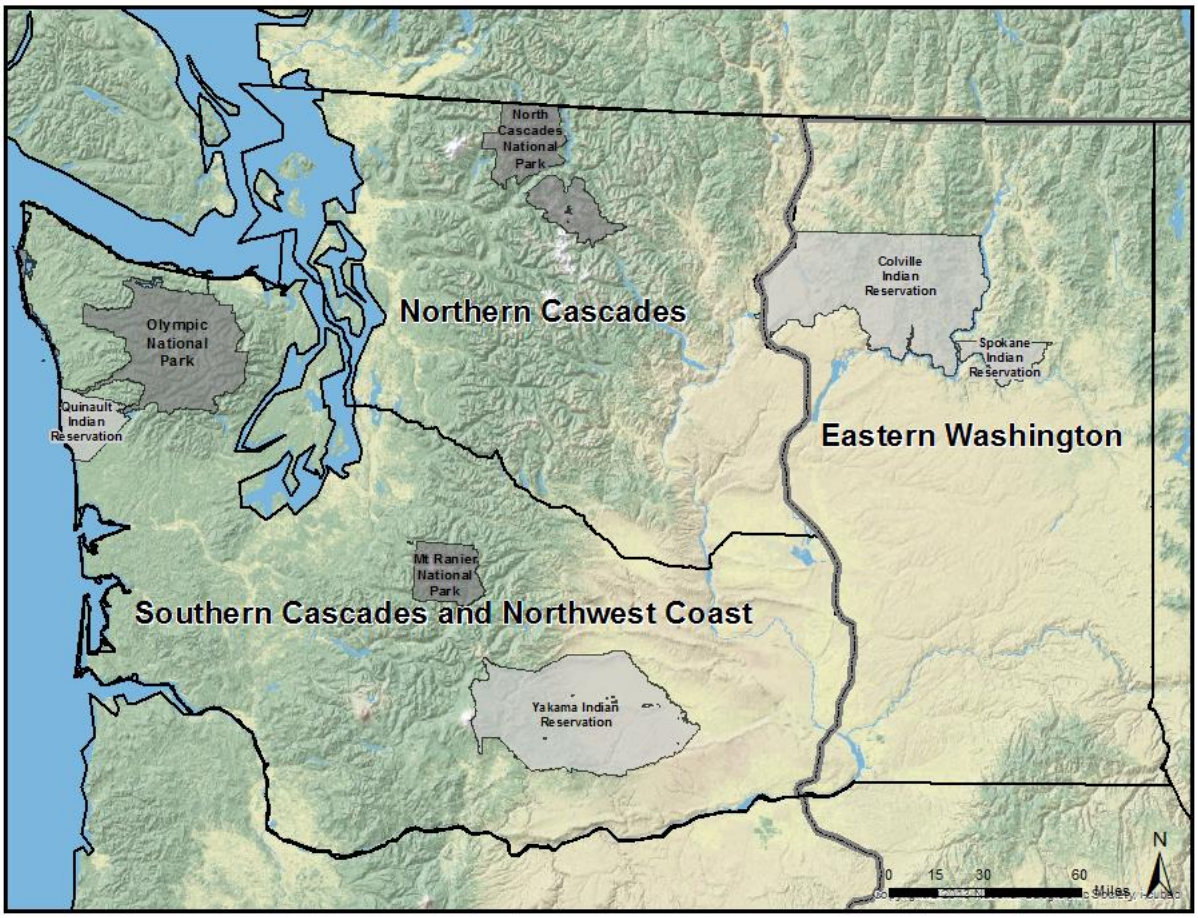

Figure 2. Washington wolf recovery areas as defined in the Wolf Conservation and Management Plan.

document. A decision by the USFWS on the federal status of gray wolves is expected sometime in the near future.

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.

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, howling surveys, 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 possible new areas of wolf activity, and mitigate conflicts with livestock in 2014.

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., pup production) 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 2003[1], page 170), our minimum known estimate was multiplied by 0.125 to account for unknown lone 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 exponentially in recent years. Remote cameras can return abundant 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.

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.

Although we were unable to obtain information about some cameras that were deployed to document wolves in 2014, WDFW personnel, partners, and volunteers deployed a minimum of 113 cameras statewide for a total of 4928 camera nights during the year (Figure 3). Five cameras were deployed in response to a reported conflict for a total of 94 camera nights (mean = 19 nights/camera); 26 cameras were deployed in response to wolf sighting reports provided by the public for a total of 1038 camera nights (mean = 40 nights/camera); 80 cameras were deployed to monitor known packs in the state for a total of 3656 camera nights (mean = 46 nights/camera); and 2 cameras that were deployed for other species also obtained images of wolves and these were out for a total of 140 camera nights (mean = 70 nights/camera). A minimum of 65 cameras were deployed in the Eastern Washington recovery area for a total of 2556 camera nights (mean = 39 nights/camera) while a minimum of 48 cameras were deployed in the Northern and Southern Cascades recovery areas for a total of 2372 camera nights (mean = 49 nights/camera).

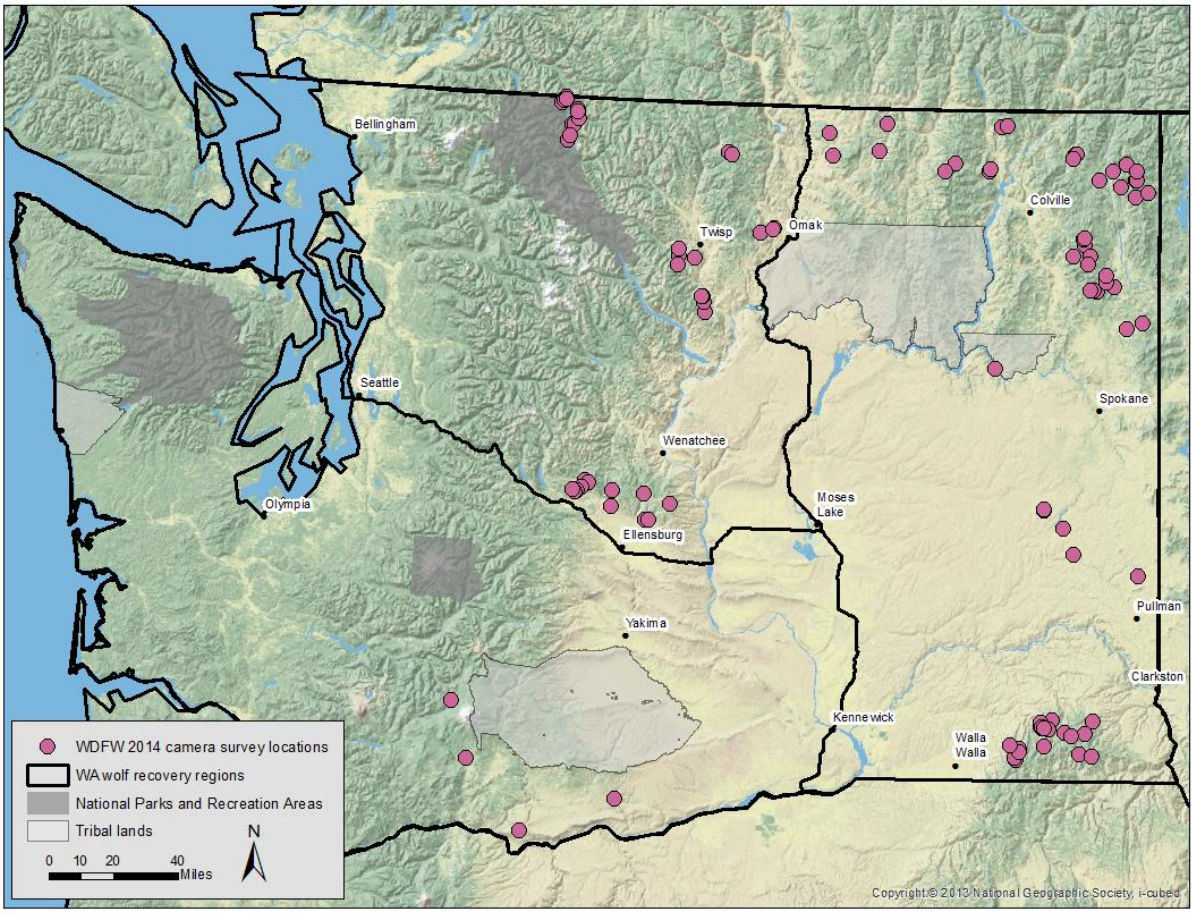

Figure 3. Locations of WDFW remote cameras deployed to document possible wolf activity and to monitor known packs in Washington, 2014.

As expected, not every camera deployed in Washington obtained images of wolves. Of the 113 cameras deployed in 2014, approximately 26% obtained images of wolves while the other 74% did not. Of the 29 cameras that obtained images of wolves, 27 were deployed to monitor known packs and 2 others were deployed to document the presence of other species. In combination with surveying countless miles of roads and trails for wolf sign, camera surveys assisted WDFW and tribal biologists in documenting the presence of 4 previously unknown packs in Washington (Goodman Meadows, Profanity Peak, Tucannon, and Whitestone). Although 4 new packs were identified in 2014, it is entirely 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 2014, the minimum known number of wolves in Washington increased by approximately 31% over the 2013 minimum estimate and was composed of at least 68 wolves (Figure 4) in 16 known packs (Table 1, Figure 5). Pack sizes ranged from 2 to 6 and averaged 3.7 wolves per pack. One pack that existed in 2013 was no longer considered a pack at the end of 2014 (Table 1). Five of 16 known packs were considered successful breeding pairs (Figure 6) while 2 additional packs produced offspring that survived to the end of the calendar year, but did not meet the definition of a successful breeding pair (Table 1). A minimum estimate of 18 pups survived to the end of the calendar year (Table 1).

During 2014, 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 12 packs with known territories was approximately 291 mi^2 (754 km^2) and ranged from an estimated 100 mi^2 (259 km^2) to 854 mi^2 (2210 km^2).

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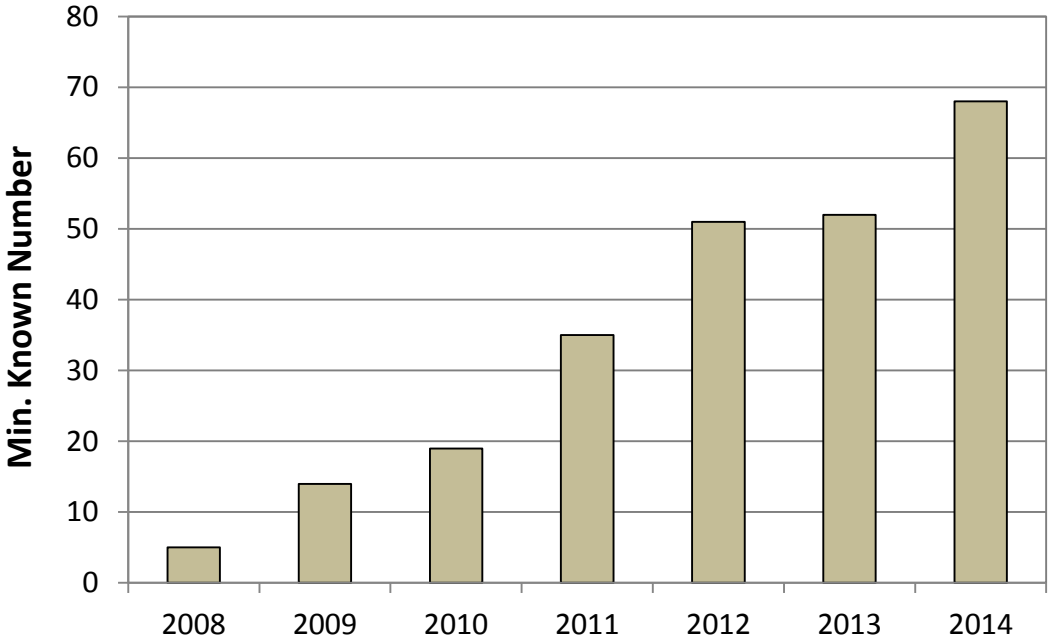

Figure 4. Minimum known number of wolves in Washington, 2008 – 2014.

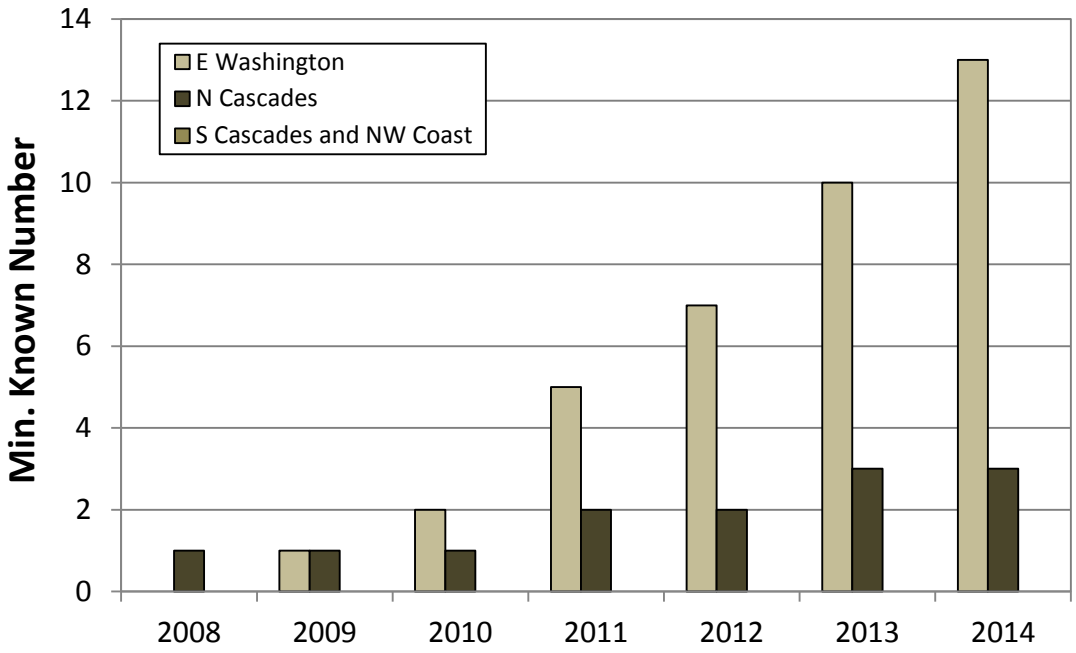

Figure 5. Minimum known number of packs by recovery area in Washington, 2008 – 2014.

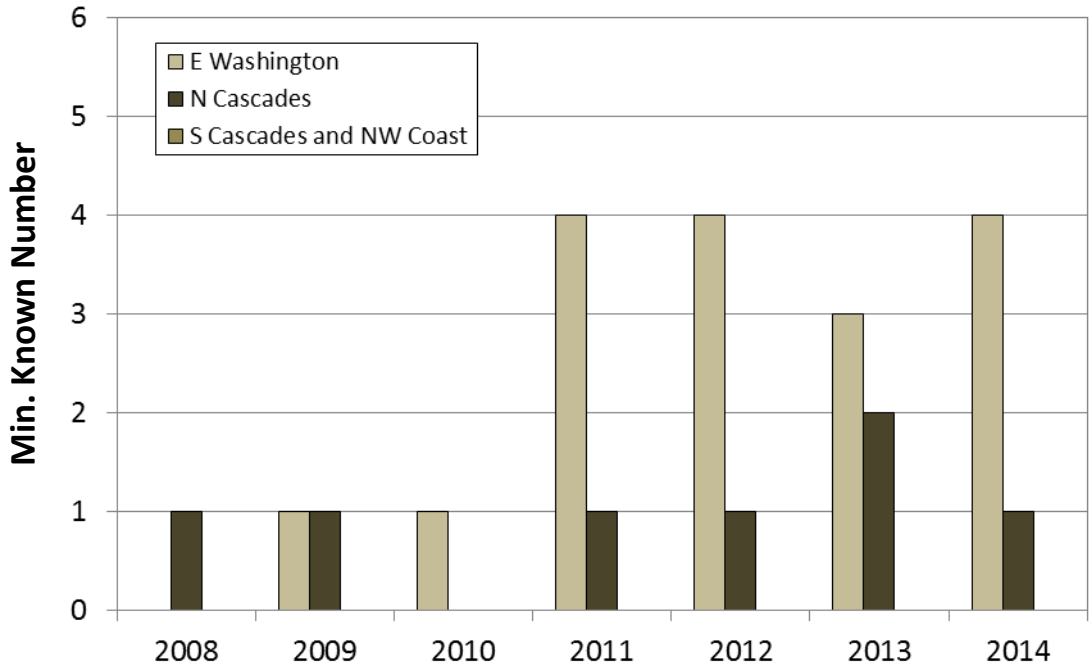

Figure 6. Minimum known number of breeding pairs by recovery area in Washington, 2008 – 2014.

Table 1. Known wolf packs in Washington by WDFW recovery area, minimum estimated size and composition of known packs, documented mortalities, and number of known wolves that dispersed, 2014. Underlined packs were counted as breeding pairs. Strikethrough packs did not exist at the end of the calendar year. CCT = Colville Confederated Tribes.

		Minimum Known Pack Size Dec 2014			Documented Mortalities					
Wolf Pack	Recovery Area	Adult	Pup	Total	Natural	Human	Unkn	Harvest	Control	Known Dispersed
Carpenter Ridge	E. Wash	2	2	4						
Diamond	E. Wash	2	0	2						1
Dirty Shirt	E. Wash	3	0	3						
Goodman Meadows	E. Wash	4	2	6						
Huckleberry	E. Wash	3	3	6			1		1	
Lookout	N Cascades	3	1	4	1					1
Nc'icn (CCT)	E. Wash	4	0	4						2
Profanity Peak	E. Wash	3	3	6			1			
~~Ruby Creek~~	E. Wash	0	0	0		1				
Salmo	E. Wash	3	0	3						
Smackout	E. Wash	1	4	5	1					
Strawberry (CCT)	E. Wash	3	0	3						
Teanaway	N Cascades	2	3	5		1				1
Tucannon	E. Wash	2	0	2						
Wedge	E. Wash	2	0	2						
Wenatchee	N Cascades	2	0	2						
Whitestone (CCT)	E. Wash	2	0	2						
Misc/Lone Wolves	Statewide	9	0	9	1	2				
Washington Totals		**50**	**18**	**68**	**3**	**4**	**2**	**0**	**1**	**5**

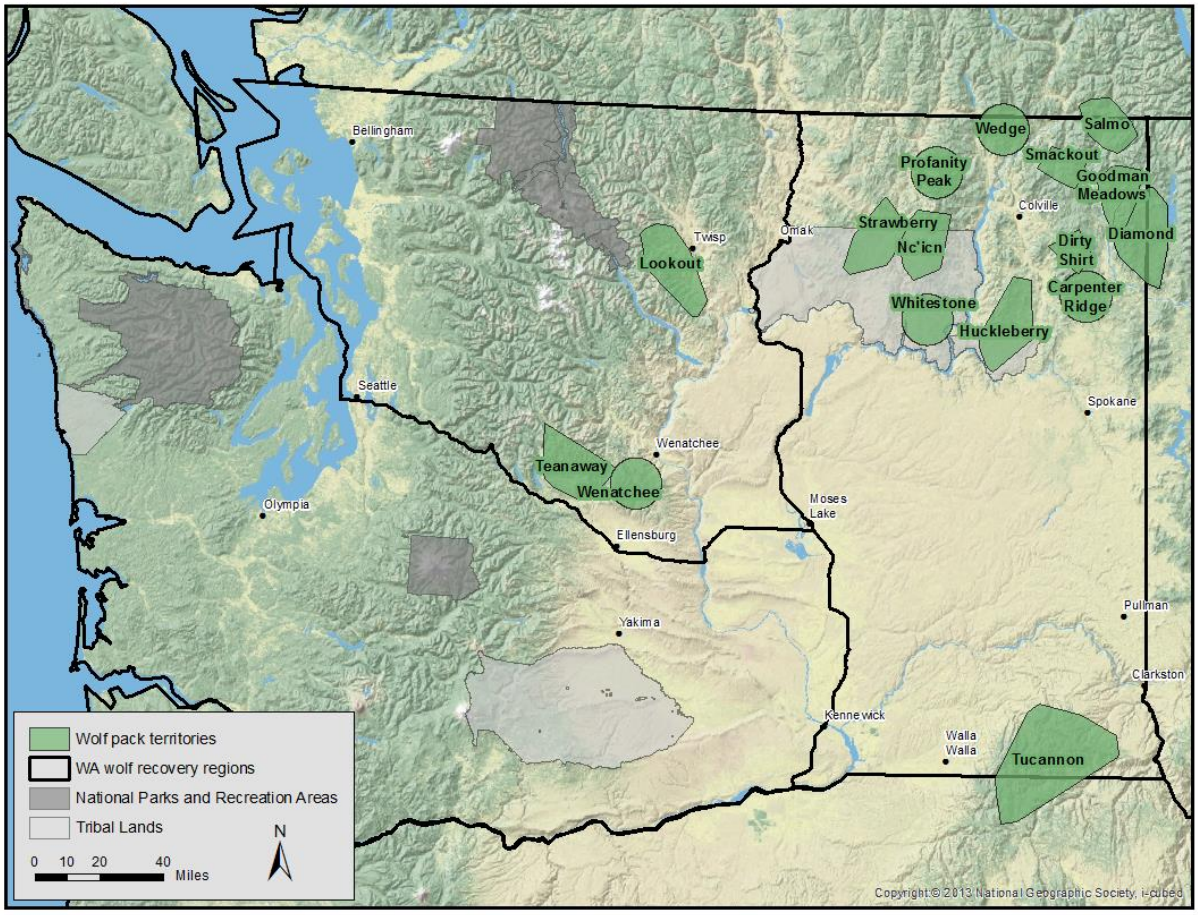

Figure 7. Known wolf packs and pack territories in Washington, 2014. Suspected packs and border packs from other states and provinces were not included.

Wolf Captures and Monitoring

In 2014, state and tribal biologists captured a total of 14 wolves from 9 different packs. Eight adults, 4 yearlings, and 2 pups were captured of which 6 were males and 8 were females. Thirteen 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. State and tribal biologists monitored a total of 19 radio collared wolves (approximately 28% of the minimum known population) from 11 different packs (65% of known packs) that existed at some point in 2014. Due to known mortalities, dispersals, and radio collar failures, biologists were actively monitoring 10 radio collared wolves (approximately 15% of the minimum known population) from 7 different packs (plus 2 individuals with no pack affiliation) in Washington as of 31 December 2014.

Regulated Harvest

Regulated wolf harvest was allowed on Colville Confederated Tribal (CCT) lands for tribal members only. The season runs from 1 August through 28 February. A harvest quota of 3 wolves was originally set for 3 of 7 tribal wolf management zones (WMZ), then in November 2014, an additional WMZ was opened to harvest also with a quota of 3 wolves (4 WMZs total; total quota = 12 wolves). No hunting was allowed in the remaining 3 WMZs and trapping of any kind was not allowed in any WMZ. No wolves were legally harvested on the Colville Indian Reservation in 2014 (Table 1).

Regulated wolf harvest was allowed on the Spokane Indian Reservation for tribal members only. The 2013/2014 hunting season closed on 28 February 2014 and the 2014/2015 season opened on 1 September 2014. The current season is open year-round or until a harvest quota of 6 wolves is met, at which time the season will close. Hunting was the only legal form of take. No wolves were legally harvested on the Spokane Indian Reservation in 2014 (Table 1). No regulated harvest occurred in Washington outside of the Colville and Spokane Indian Reservations in 2014.

Mortalities

A total of 10 wolves were known to have died in Washington during 2014 (Table 1). Causes of mortality included natural causes (n = 3), human-caused (n = 4), unknown (n = 2), and agency control (n = 1). In addition to known mortalities that occurred in Washington, 4 wolves originally captured in the state died outside its borders and were included in those specific state's or province's mortality totals for 2014.

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 2 cattle and 28 sheep (Figure 8); investigators also confirmed 2 cattle, 6 sheep, and 1 dog as being injured by wolves (Table 2). One additional sheep mortality was classified as a probable wolf-caused mortality. All but one confirmed livestock mortality occurred during the summer months (Figure 9).

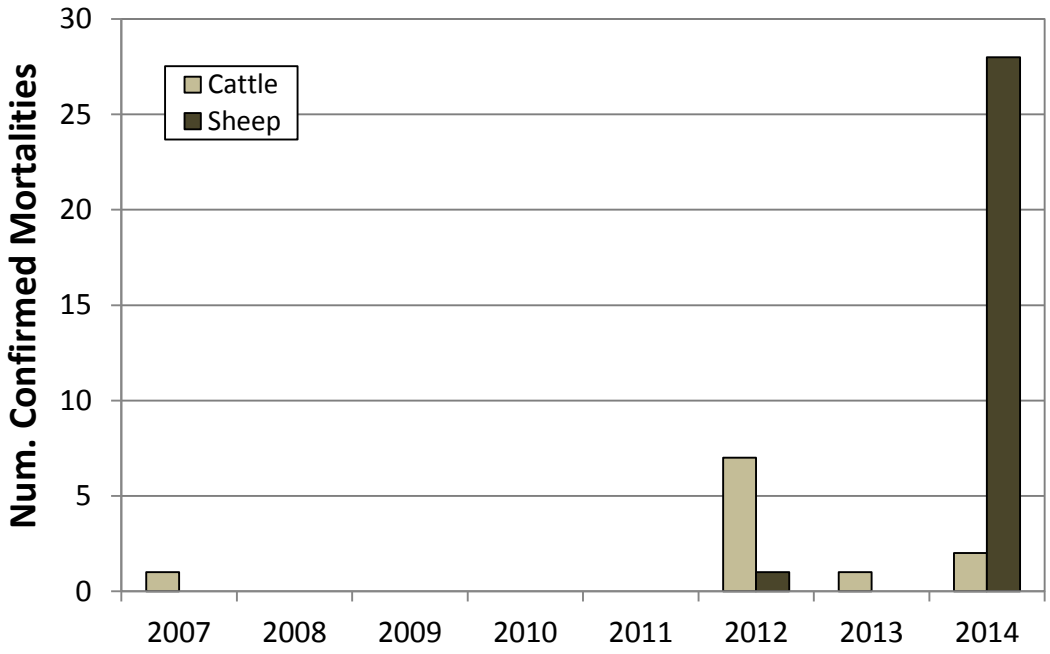

Figure 8. Total number of confirmed wolf-caused livestock mortalities in Washington, 2007 – 2014.

Table 2. Confirmed wolf-caused livestock and dog injuries and mortalities in Washington, 2011 – 2014.

	2011		2012		2013		2014	
	Injuries	Mortalities	Injuries	Mortalities	Injuries	Mortalities	Injuries	Mortalities
Cattle	0	0	6	7	0	1	2	2
Sheep	0	0	2	1	0	0	6	28
Other	0	0	0	0	0	0	0	0
Dogs	1	0	0	0	3	0	1	0
Total	**1**	**0**	**8**	**8**	**3**	**1**	**9**	**30**

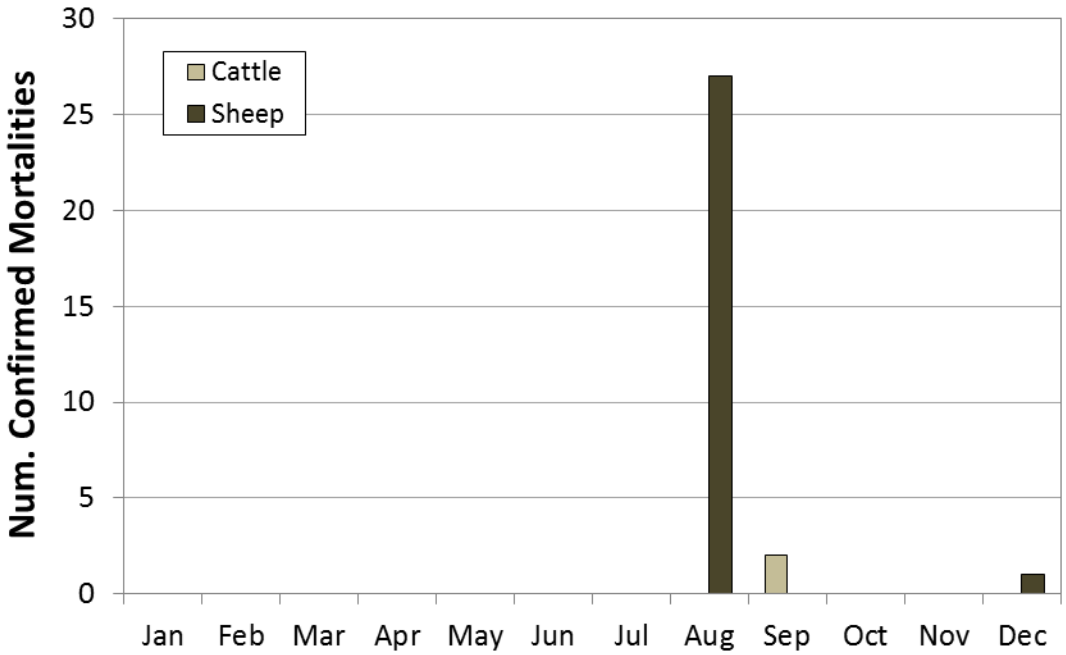

Figure 9. Number of confirmed wolf-caused livestock mortalities by month in Washington, 2014.

Number of Packs Involved in Livestock Depredations

Two of the 17 (12%) known packs that existed in Washington at some point during 2014 were involved in at least 1 confirmed livestock depredation (Figure 10). One additional pack was responsible for 1 confirmed dog injury investigated in 2014.

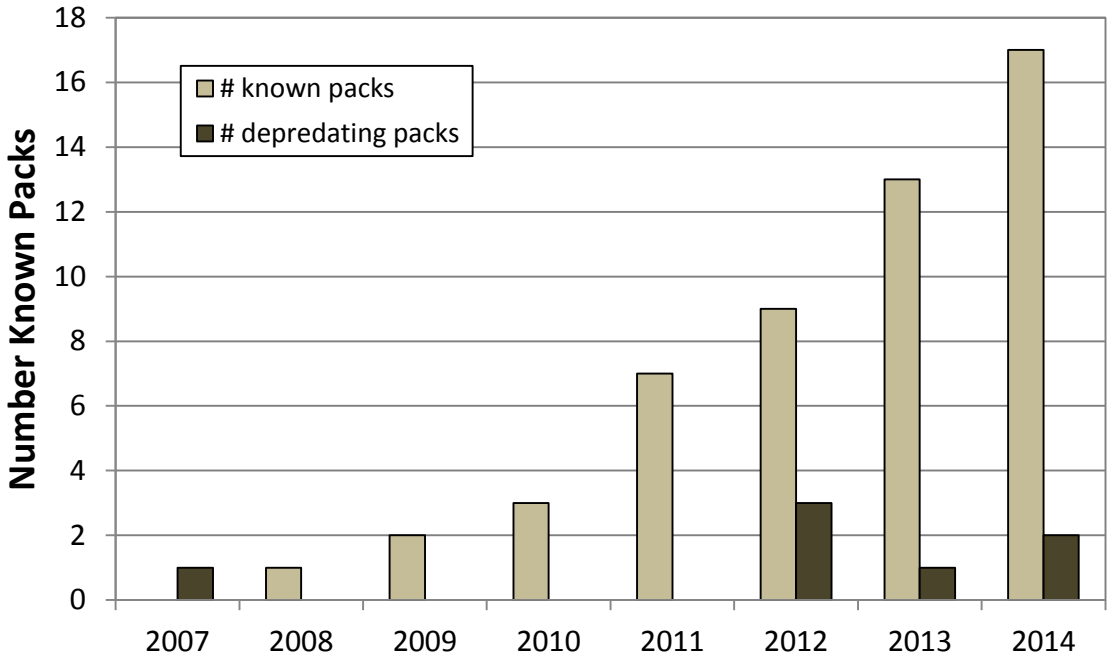

Figure 10. Minimum number of known packs that existed at some point during the calendar year and the number of confirmed depredating packs (livestock only) in Washington, 2007 – 2014.

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. Techniques that may be used to minimize livestock depredations include both nonlethal and lethal control of depredating wolves. Preventative measures used in 2014 to minimize livestock injuries and mortalities caused by wolves included the use of fladry and electrified fladry, RAG boxes, fox lights, 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. Also in 2014, a carcass compost facility was completed at the Sherman Creek Wildlife Management Area in northeast Washington. This facility will provide a centralized location for livestock producers to dispose of carcasses keeping them out of reach of wolves and other large predators.

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 chronic livestock depredations. However, in the western two-thirds of Washington, where wolves remain classified as an endangered species under the federal ESA, WDFW must consult with USFWS to ensure that any management actions being considered are consistent with federal law prior to implementation. In 2014, WDFW implemented lethal measures to minimize chronic loss of livestock caused by

wolves in the Eastern Washington recovery area and removed 1 wolf through agency control actions (Table 1).

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 caught-in-the-act permits were issued to livestock producers in 2014. In lieu of a caught in the act permit, the director of WDFW may issue a removal order to livestock producers, their authorized employees, and WDFW personnel to lethally take a specified number of wolves. One authorization was given in 2014 and no wolves were lethally removed as a result.

In 2013, the WDFW Commission formally adopted WAC 232-36-052. This new rule allows 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 the ability 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 were federally delisted in 2011; 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 2014.

Damage Prevention Cooperative Agreements

Many preventative and nonlethal techniques have been developed that may minimize livestock damage caused by wolves. WDFW provides technical advice and/or assistance to livestock producers to adapt these preventative tools and nonlethal techniques to an individual's operation. If interested, livestock producers may enter into a Damage Prevention Cooperative Agreement (DPCA) with WDFW which provides a cost-share for the implementation of conflict prevention measures.

During 2014, WDFW had 37 active Damage Prevention Cooperative Agreements with livestock producers across the state. Livestock producers with an active DPCA receive a specified cost-share percentage for each different conflict prevention measure up to a maximum amount. The three most common conflict prevention measures selected for cost-sharing were increased human presence (e.g., range rider), improved sanitation (removal or treatment of injured or dead cattle), and hazing.

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 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.

The WDFW paid no money to compensate cattle producers or wool growers who lost livestock, or had livestock injured by, wolves during the 2014 calendar year; however, one claim was filed, but remained pending as of 31 December 2014. 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 were confirmed, but the grazing site was less than 100 acres, or if the depredation were 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 and the market value of reduced livestock weight gains resulting from the presence of wolves. Compensation to individual operators who experience damage shall not exceed $10,000 per claim.

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; 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 mule and white-tailed deer (WA wolf-deer project)
***Graduate Student*:** Justin Dellinger, 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: The Washington wolf-deer project was initiated in 2012 and is a research collaboration among WDFW, University of Washington, the U.S. Forest Service, and the Colville Confederated Tribes Fish and Wildlife Department. The project seeks to understand how recent recolonization of gray wolves to Washington state impacts mule deer and white-tailed deer via consumptive and non-consumptive pathways. The primary objectives of this research project are to determine: 1) how deer alter foraging and vigilance activity budgets in areas with and without wolves in varying terrain types; 2) how overlap in resource use between the two deer species changes in areas with and without wolves; 3) how deer alter seasonal habitat use in areas with and without wolves; and 4) how deer survival and sources of mortality differ between areas with and without wolves. To date we have GPS collared 38 and 36 mule deer and white-tailed deer, respectively, and have camera collared 34 and 32 mule deer and white-tailed deer, respectively. Both collar types have been deployed in wolf and non-wolf areas. To date we have had 24 deer die, with hunting being the primary cause of mortality and wolves being responsible for only 1 death. Lastly, we have had 64 remote game cameras spread out across the landscape in a grid cell fashion collecting occupancy data on multiple predators and prey throughout the year for two years now. Altogether, the field data collected on this project will help improve our understanding of the extent to which recolonizing large carnivores like wolves influence the behavior and survival of large ungulates such as deer. The field component of this project was initiated in winter 2012 and will conclude winter 2016.

Title: Livestock mortality rates in wolf occupied areas of Washington
Graduate Student: Jeffrey Brown, Washington State University
Major advisor: Dr. 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, U.S. Department of Agriculture, Western Wildlife Outreach
Project Summary: The project is a collaboration with WDFW, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, Colville Confederated Tribes, Western Wildlife Outreach, 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. Within wolf-occupied areas, two herds will be chosen per pack territory summing to twelve herds total across the state. Calves will be ear tagged with radio transmitters, a minimum of 30 individuals per herd, to track their fate and determine causes of mortality. Herd matriarchs will be fitted with GPS collars to track herd movement and compare with wolf movement data. During the first field season in 2014, radio ear tags were placed on 222 beef calves and 60 sheep. We monitored 7 cattle herds and 1 flock of sheep. No mortalities of any cause were detected for either tagged or untagged calves. Sheep mortalities were reported, but none were from tagged animals. Herd movements were tracked from 31 GPS collared cows and 4 GPS collared sheep. The project greatly benefited from collaboration with ranchers. Expansion is planned to include more livestock herds and wolf packs during the 2015 grazing season.

Title: Evaluating livestock depredation risk by recolonizing wolves 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 intend to investigate why some wolf packs in Idaho and Montana have historically (i.e. from first pack re-establishment in 1985 through 2013) engaged in livestock depredations using risk modeling and apply best-fit model(s) to a predictive risk map of livestock depredation by wolves in Washington. Risk models 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. Models will be validated using a subset of historical depredations from Idaho and Montana. The best-fit model(s) will be further validated with Washington depredations from 2007 – 2014 and used to map livestock depredation risk by wolves in-state. Data compilation and formatting began in February 2014 and is still in progress.

Title: Wolf kill rates during the grazing season in 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, US Department of Agriculture, USDA Forest Service, Colville Confederated Tribes, and Western Wildlife Outreach.
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 by monitoring wolves. The Washington Department of Fish and Wildlife will attmempt to place GPS collars in wolf packs that have territories which overlap summer grazing areas in northeast Washington and in the North Cascades of Washington. We will investigate GPS location clusters from the collared wolves to locate and identify livestock and natural prey kills. From this data we will determine 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 2014 we used wolf collar GPS positions to collect kill data from nine wolves in 5 different packs between May 1 and October 31. We are preparing for data collection for season two, field work will begin in May 2015.

Project Title: Minimizing and reducing wolf/livestock interactions in Washington
***Graduate Student*:** Azzurra Valerio, Washington State University
Major advisor: Rob Wielgus, Washington State University
***Cooperators*:** Washington Department of Fish and Wildlife, Colville Confederated Tribes Fish and Wildlife Department, US Fish and Wildlife Service, USDA, and US Forest Service.
Project Summary: The wolf/livestock interaction project is a research collaboration of WDFW, Colville Confederated Tribes Fish and Wildlife Department, US Fish and Wildlife Service, USDA, and US 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 Large Carnivore Lab, under the direction of Dr. Rob Wielgus, at Washington State University (WSU) has undertaken a multi-year research project to investigate wolf/livestock interactions. I will study the non-consumptive effects of wolves on livestock productivity (i.e., calf weight loss and pregnancy loss), and cattle space use. I will also evaluate the effectiveness of non-lethal preventative measures (e.g., range riders, guard dogs, fences, etc.) at reducing livestock depredations and non-consumptive effects. The timeline for data collection in the field is across 4 annual field seasons (2014-2017) and we anticipate the final report for these objectives by 2018. The primary objectives of my research project are: a) to determine if the relative presence of wolves (expressed using utilization distribution overlap index - UDOI) influence cattle behavior (e.g., vigilance, foraging, and selection of lower quality habitat), and consequently cattle weight and pregnancy rate; b) to compare wolf activity and movement in presence and absence of range riders, guard dogs, and fences to determine if these management tools can be effective in reducing depredations and non-consumptive

effects. The study commenced in 2014 and will be carried out in three different study areas, northeast WA (NE), Cascades WA (CA), and the Colville Reservation, WA (CCT). However, only within the CCT study area, we are attempting to investigate the potential underlying physiological mechanism that can mediate non-consumptive effects of wolves on livestock productivity. In particular, within the CCT study area we are monitoring cattle nutritional status and stress in relation to the relative wolf presence by applying the metabolomics technique on cattle fecal samples.

The project relied on location data provided by 31 adult cows (females with calves) fit with "store on board" GPS collars (divided amongst 7 separate livestock herds), and 5 radio-collared sheep (1 sheep flock), and 9 adult wolves fit with GPS collars in 7 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 rider movements on 4 cattle grazing allotments, and 6 guarding dog movements in 2 sheep flocks. Analysis of the data for 2014 has begun and results for the spatial analyses are not yet available. We collected 500 cow fecal samples for nutritional and metabolomic analysis from 7 separate livestock herds located within 7 different wolf pack territories. Preliminary data analysis for the first year (2014) on cattle behavior, space use, productivity, nutritional status and stress are currently underway. To help improve our understanding of wolf-livestock interactions in Washington, I will use telemetry to automatically collect animal interaction. I will use GPS collars with proximity sensors on both wolves and cows in a pilot study in CCT. These remote-sensing devices transmit a unique signal and automatically record frequency and duration of contacts when tagged animals come within a pre-set distance of one another. Thus, proximity sensors deployed on both wolf and cattle GPS collars can be useful for quantifying pattern of wolf/livestock interactions to help address behavioral and ecological questions at a finer spatial-temporal scale.

Title: Developing a wolf economy for Washington (The Wolf Economy Project)
***Graduate Students*:** Carol Bogezi and Catherine Gowan, University of Washington
Major advisors: John Marzluff and Stanley Asah, University of Washington
***Cooperators*:** Washington Department of Fish and Wildlife
Project Summary: Wolves can benefit ecosystems by preying on large ungulates and suppressing herbivory. These benefits are not without costs however, as wolves may also prey on domestic livestock leading to economic losses and an erosion of public support. Consequently, the long term prospects for coexistence between wolves and people in Washington may require that people sharing the landscape with wolves also receive economic and social benefits from their presence. The Wolf Economy Project is a research collaboration between the University of Washington and the Washington Department of Fish and Wildlife investigating the feasibility of an environmental services market to offset the economic costs borne by livestock producers that work to coexist with wolves with financial support for conflict mitigation and revenue from product certification and ecotourism programs. Using a combination of key-informant interviews, focus group discussions, and telephone surveys, sociological, economic and ecological barriers to market development and implementation are being identified and alternative strategies explored. Interviews of livestock producers in wolf-occupied portions of Washington and state

wildlife managers were initiated in September 2013, with additional stakeholder interviews (e.g., policy makers, livestock producers in unoccupied habitats, NGO's, meat processors, recreational brokers) slated for spring and summer 2014. Future research efforts will include a telephone survey to gauge the general public's support for a wolf economy and a behavioral experiment of consumer willingness to purchase certified "wolf-safe" meats. Collectively, research findings will help to determine the extent in which citizens residing in Washington's urban centers are willing to pay for the ecological services provided by wolves and the potential of economic incentives to foster coexistence with wolves in rural communities.

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 provide WDFW with recommendations to guide its implementation of the Wolf Conservation and Management Plan (Plan). The WAG is composed of members appointed by the director that serve a two year term with each member representing a different stakeholder group. The mission of the WAG is to allow a diverse group of stakeholders to advise WDFW on implementation of the Plan. Specific issues the WAG advised WDFW about include: 1) encourage the use of proactive, preventative measures to minimize the risk of conflict, 2) provide compensation for economic loss due to wolf predation, 3) monitor recovery of the wolf population and its effect on prey species, and 4) provide information to the public on wolf recovery in Washington.

The WAG also assists WDFW with outreach efforts through each of their respective organizations. Groups currently represented include: Farm Bureau, Cattle Producers of Washington, Conservation Northwest, Humane Society of United States, Hunter's Heritage, Quad-County Commissioners, Sierra Club, Washington State Cattlemen's Association, and Wolf Haven, International. During 2014, the WAG was comprised of 9 members that met on 5 different occasions to address topics such as revising Washington Administrative Codes related to wolves, review of wolf location data sharing criteria, improve the non-lethal prevention checklist, review operational protocol criteria for lethal actions, assess and review research and outreach projects. In October 2014, WDFW began accepting applications for an additional nine members to the WAG to broaden stakeholder representation.

Western Wildlife Outreach Project

During 2014, WDFW contracted Western Wildlife Outreach (WWO) to create a statewide wolf outreach program with emphasis on wolf-livestock conflict avoidance. The primary goal was to assist WDFW with expanding the distribution of factual information regarding wolves in Washington. WWO focused their efforts on the following objectives: 1) provide the public with information on the current status of wolves and basic biological information about wolves in the state; 2) provide information about techniques that may minimize wolf-livestock conflicts; and 3) provide science-based information about wolf-ungulate interactions across the West. Also in 2014, WWO completed a literature review of research about conflict avoidance.

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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

- 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/