WASHINGTON GRAY WOLF CONSERVATION AND MANAGEMENT 2013 ANNUAL REPORT

A cooperative effort by the Washington Department of Fish and Wildlife, the Confederated Colville Tribes, the Spokane Tribe of Indians, and the 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, 2013 through December 31, 2013.

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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. Furthermore, 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. The results of the peer review were not available as of 31 December 2013, but the USFWS plans to reopen the public comment period for the proposed rule once the peer review is published sometime in early 2014. A decision by the USFWS on the federal status of gray wolves is expected sometime in 2014.

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 2% over 2012 levels to at least 52 known wolves in 13 known packs including at least 5 breeding pairs. Average pack size was 3.8 wolves per pack and the average litter size for breeding pairs was 2.4 pups per litter as of 31 December 2013. We documented 5 mortalities in Washington during 2013 and the causes of mortality included natural causes (n = 1), human-caused (n = 3), and legal harvest (n = 1). Two additional radio collared wolves that originated in Washington were legally harvested in Idaho and British Columbia, Canada and were counted towards their respective mortality totals for 2013.

Wolf populations were managed to ensure progress towards recovery goals while also minimizing chronic loss of livestock caused by wolves. One calf was a confirmed wolf-kill and an additional 3 dogs were confirmed injured by wolves. One pack (8% of known Washington packs) was involved in at least 1 livestock mortality. No wolves were removed during agency control actions to minimize chronic loss of livestock and the State of Washington paid $0.00 to compensate livestock producers who lost livestock to wolves in 2013.

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), and the U.S. Fish and Wildlife Service (USFWS). WDFW personnel who played a primary role during 2013 include WDFW Director Phil Anderson, Wildlife Program Assistant Director Nate Pamplin, Game Division Manager Dave Ware, Conflict Section Manager Stephanie Simek, 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, Ted Clausing, 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, 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, Paul Wik; CCT personnel include Randy Friedlander; USFWS personnel included Hilary Cooley, Richard Gamba, Gregg Kurz, and Corky Roberts. 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 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; the U.S. Department of Agriculture Wildlife Services including Roger Woodruff, Ken Gruver, and Chad Heuser; 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 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 and 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 and 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. No federal recovery requirements have been set for wolves in 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, 2013.

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*). Also in 2013, 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 not available as of 31 December 2013, but the USFWS plans to reopen the public comment period

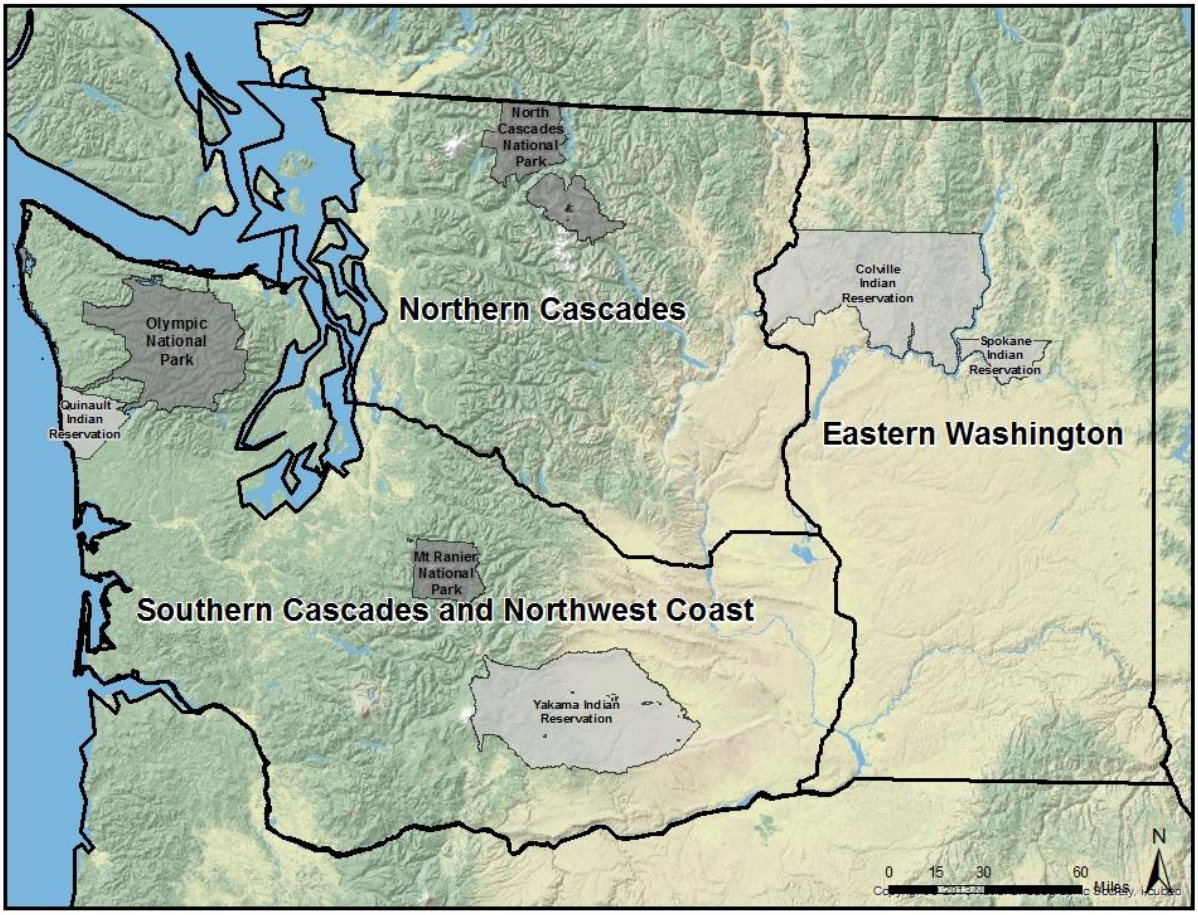

Figure 2. Washington wolf recovery areas as defined in the Wolf Conservation and Management Plan.

for the proposed rule once the peer review is published sometime in early 2014. A decision by the USFWS on the federal status of gray wolves is expected sometime in 2014.

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 trail 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.

State and tribal biologists, partners, and countless private citizens continued to survey areas in all three recovery areas, including the west side of the Cascade Mountains, in an attempt to document the presence of wolves in areas where they were not currently known to occur. Public wolf reports provided starting points for the majority of areas that were covered by the surveys. Survey techniques included the deployment of numerous trail cameras as well as surveying roads and trails for tracks and other sign that may be present. Although 4 new packs were identified in 2013, it is entirely possible that some wolves may have been present in other areas that were surveyed, but simply avoided detection.

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 estimate a minimum number that is known to exist on the landscape at the end of the calendar year. Thus, our estimates of wolf numbers, breeding pairs, and pup production are likely conservative and the actual number may be slightly higher. Lone wolves were accounted for when reliable information was available. 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 of the minimum known number of wolves (i.e., 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.

Population Status and Distribution

As of 31 December 2013, the minimum known number of wolves in Washington increased by approximately 2% over 2012 estimates and was composed of at least 52 wolves (Figure 3) in 13 known packs (Table 1, Figures 4). Pack sizes ranged from 2 to 9 and averaged 3.8 wolves per pack. Five of 13 known packs were considered successful breeding pairs (Figure 5) and produced at least 12 pups that survived until 31 December 2013 (mean = 2.4 pups/pack). Two radio-collared wolves were known to have dispersed out of Washington and into British Columbia, Canada in 2013 (Table 1).

During 2013, wolves continued to inhabit a mix of both public and private lands from northeast Washington to the east slopes of the Cascade Mountains (Figure 6). The estimated mean home range size of 11 packs with known territories was approximately 314 mi^2 and ranged from an estimated 61 mi^2 to 812 mi^2. A minimum known number of 37 wolves in 10 known packs (3

breeding pairs) plus one known lone wolf inhabited the Eastern Washington recovery area. A minimum known number of 13 wolves in 3 packs (2 breeding pairs) plus one known lone wolf was known to exist in the Northern Cascades recovery area. No wolves were documented in the Southern Cascades and Northwest Coast recovery area during 2013.

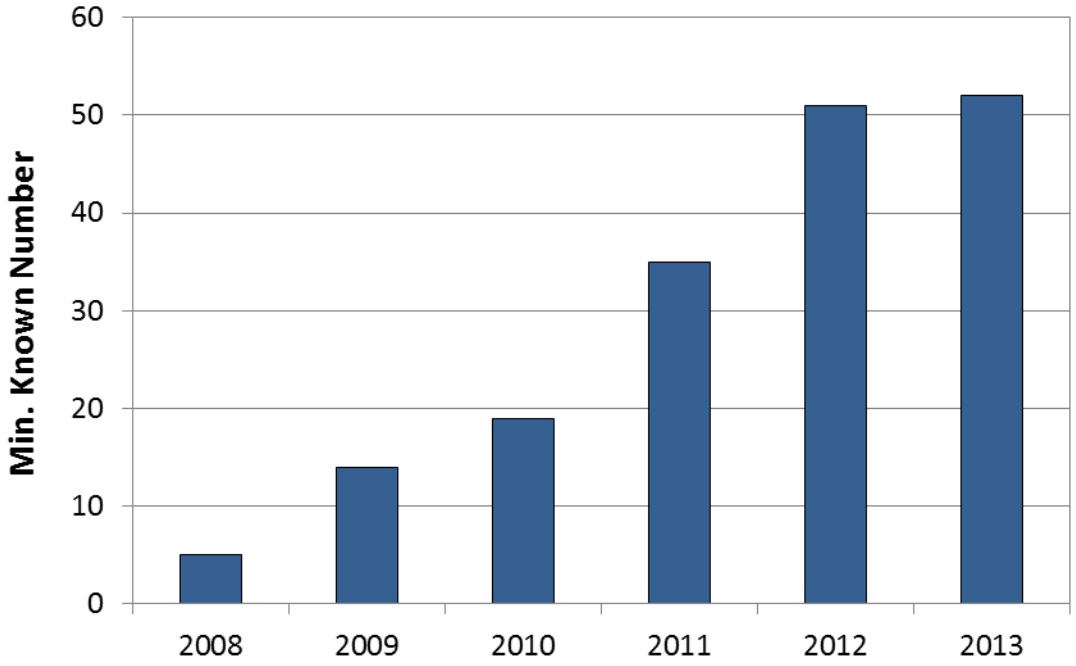

Figure 3. Minimum known number of wolves in Washington, 2008 – 2013.

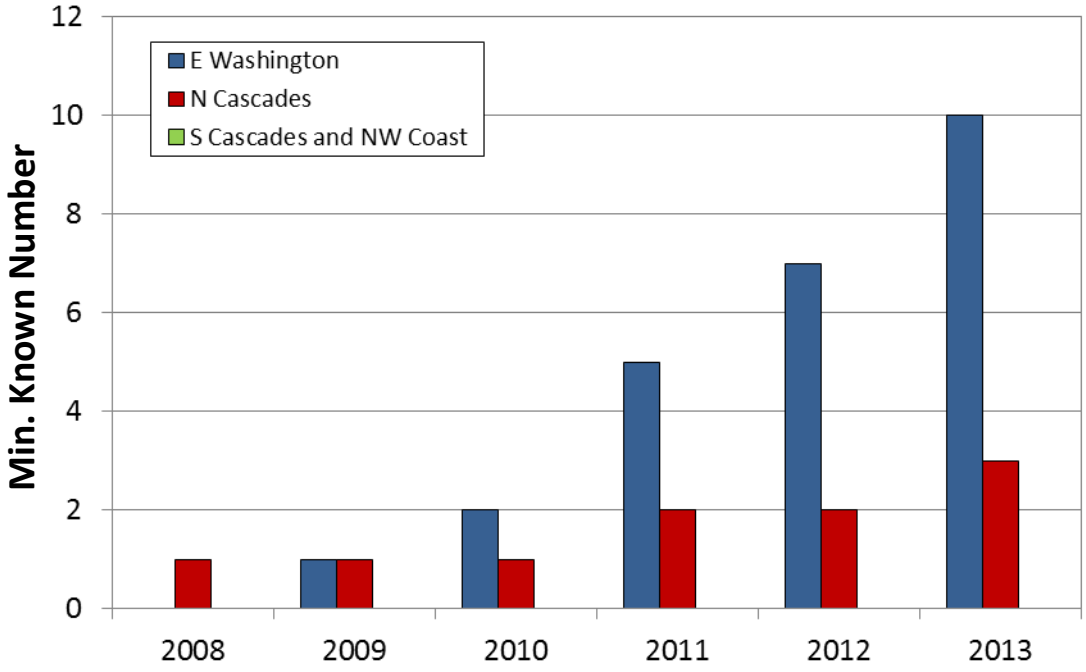

Figure 4. Minimum number of known packs by recovery area in Washington, 2008 – 2013.

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, 2013. Underlined packs were counted as breeding pairs. CCT = Colville Confederated Tribes; STI = Spokane Tribe of Indians.

		Minimum Known Pack Size Dec 2013			Documented Mortalities					Known
Wolf Pack	Recovery Area	Adult	Pup	Total	Natural	Human	Unkn	Harvest	Control	Dispersed
Carpenter Ridge	E. Wash	2	0	2						
Diamond	E. Wash	6	3	9						
Dirty Shirt	E. Wash	2	0	2						
Huckleberry (STI)	E. Wash	4	2	6		1		1		
Lookout	N Cascades	2	3	5						
Nc'icn (CCT)	E. Wash	5	0	5						
Ruby Creek	E. Wash	2	0	2						
Salmo	E. Wash	2	2	4						
Smackout	E. Wash	2	0	2						2
Strawberry (CCT)	E. Wash	3	0	3						
Teanaway	N Cascades	4	2	6	1					
Wedge	E. Wash	2	0	2						
Wenatchee	N Cascades	2	0	2						
Misc/Lone Wolves	E. Wash	1	0	1						
Misc/Lone Wolves	N Cascades	1	0	1		2				
Washington Totals		**40**	**12**	**52**	**1**	**3**	**0**	**1**	**0**	**2**

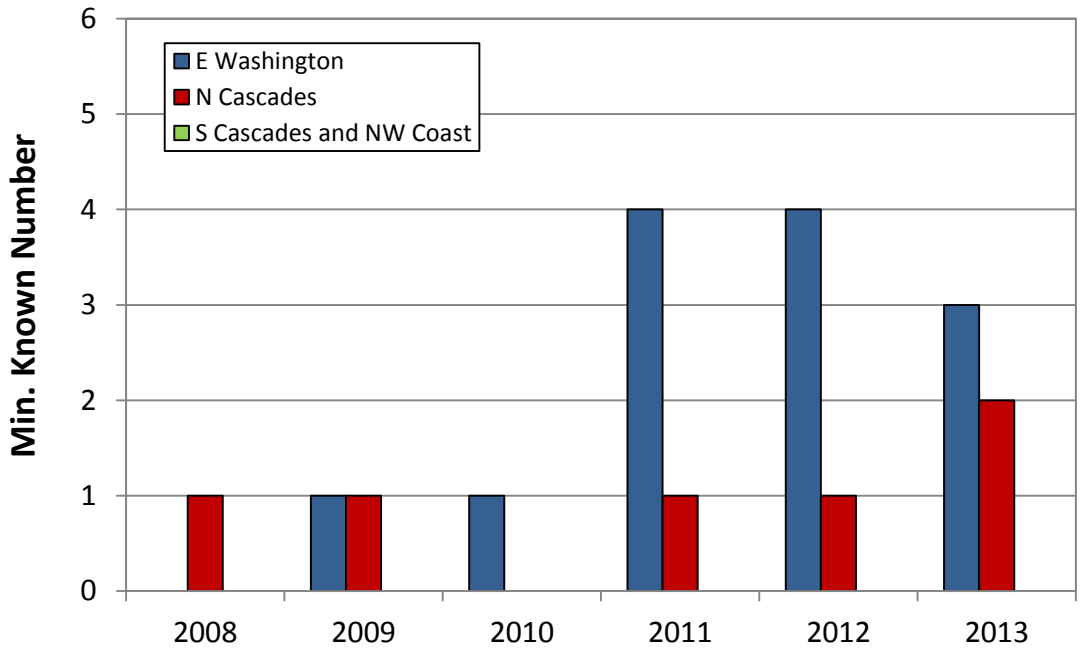

Figure 5. Minimum known number of breeding pairs by recovery area in Washington, 2008 – 2013.

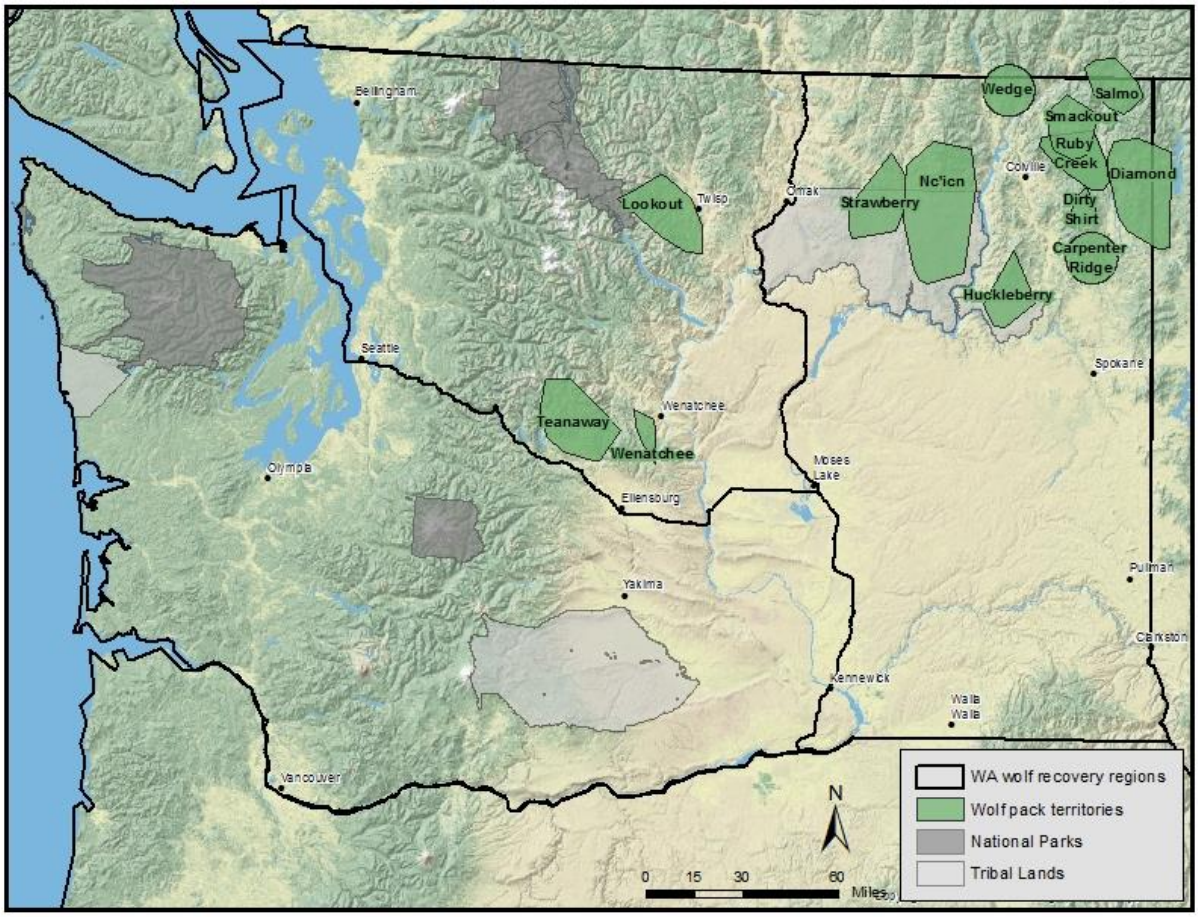

Figure 6. Known wolf packs and pack territories in Washington, 2013. Suspected packs and border packs from other states and provinces were not included.

Wolf Captures and Monitoring

In 2013, state and tribal biologists captured a total of 12 wolves from 6 different packs. Seven adults, 4 yearlings, and 1 pup were captured of which 9 were males and 3 were females. All wolves were fitted with either satellite or very high frequency (VHF) radio collars. State and tribal biologists monitored a total of 18 radio collared wolves (approximately 35% of the minimum known population) from 8 different packs (62% of known packs) during 2013. Due to known mortalities, dispersals, and radio collar failures, biologists were actively monitoring 11 radio collared wolves (approximately 21% of the minimum known population) from 8 different packs in Washington as of 31 December 2013.

Regulated Harvest

Regulated wolf harvest was allowed on CCT lands for tribal members only. The season runs from 1 August through 28 February. A harvest quota of 3 wolves was set for 3 of 7 tribal wolf management zones (WMZ; total quota = 9 wolves). No hunting was allowed in the remaining 4

WMZs and trapping of any kind was not allowed in any WMZ. No wolves were legally harvested on the Colville Indian Reservation in 2013 (Table 1).

Regulated wolf harvest was also initiated on the Spokane Indian Reservation for tribal members only beginning on 1 September 2013. A harvest quota of 6 wolves was set and hunting was the only legal form of take. One wolf was legally harvested on the Spokane Indian Reservation in 2013 (Table 1). No regulated harvest occurred in Washington outside of the Colville and Spokane Indian Reservations in 2013.

Mortalities

A total of 5 wolves were known to have died in Washington during 2013 (Table 1). Causes of mortality included natural causes (n = 1), human-caused (n = 3), and legal harvest (n = 1). In addition to known mortalities that occurred in Washington, 2 wolves known to have originated in the state were legally harvested in Idaho and British Columbia, Canada and were included in their respective mortality totals for 2013.

MANAGEMENT

Livestock Depredations

Potential livestock depredations in Washington were investigated by WDFW with some assistance by deputies from local County Sheriffs Departments. Personnel from WDFW classified reported depredations as confirmed, probable, confirmed non-wild wolf, unconfirmed depredation, non-depredation, or unconfirmed cause of death based on specific criteria outlined in the Plan. The following livestock depredation statistics were based on reported livestock injuries and mortalities and do not reflect lost or missing livestock.

In 2013, WDFW investigated 17 reported wolf-caused livestock depredations. Confirmed livestock depredations caused by wolves in Washington included at least 1 calf mortality (Table 2, Figure 7). All livestock mortalities occurred during the summer months (Figure 8). Investigators also confirmed 3 dogs as being injured by wolves (Table 2).

Table 2. Confirmed wolf-caused livestock and dog injuries and mortalities in Washington, 2011 – 2013.

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

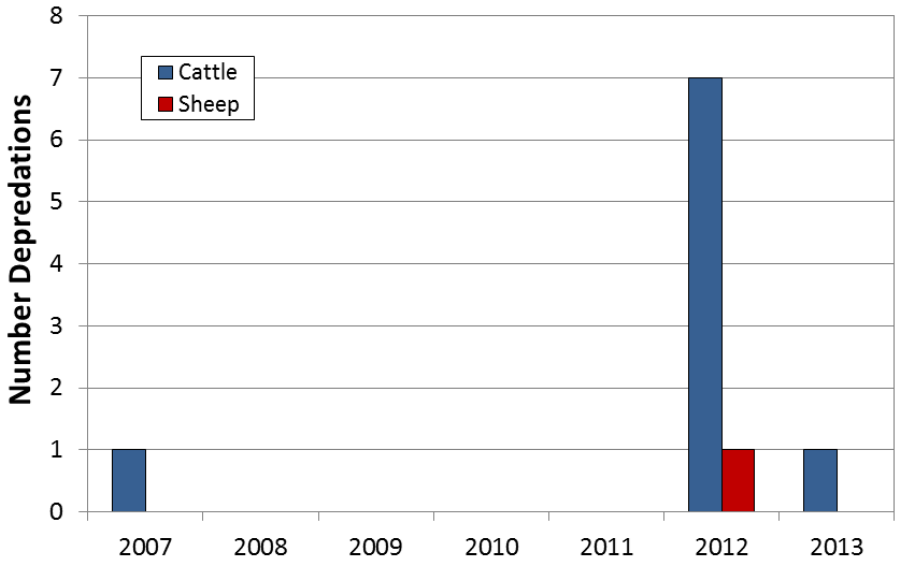

Figure 7. Total number of confirmed wolf-caused livestock mortalities in Washington, 2007 – 2013.

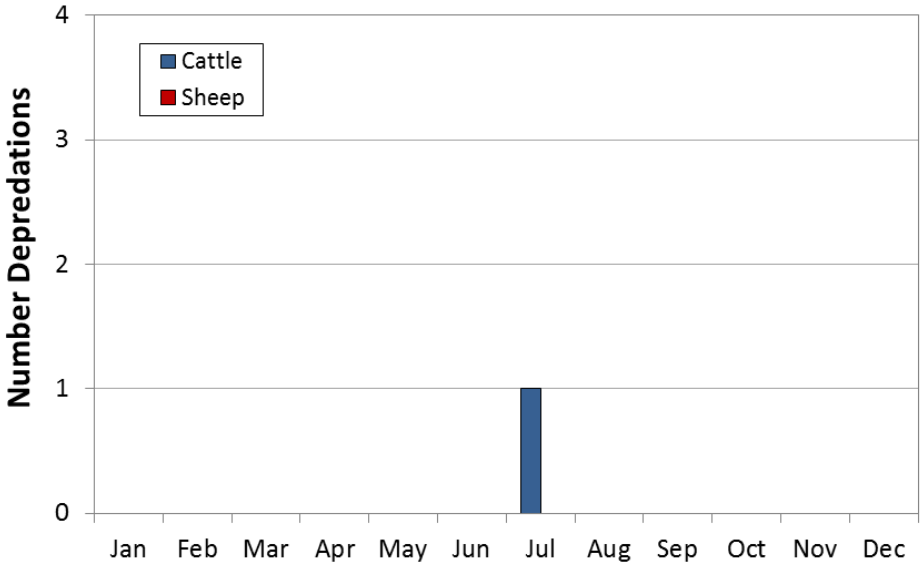

Figure 8. Number of confirmed wolf-caused livestock mortalities by month in Washington, 2013.

Number of Packs Involved in Livestock Depredations

One of the 13 known packs (8%) in Washington was involved in at least 1 confirmed livestock depredation in 2013 (Figure 9). Two packs were responsible for 3 confirmed dog injuries investigated in Washington during 2013.

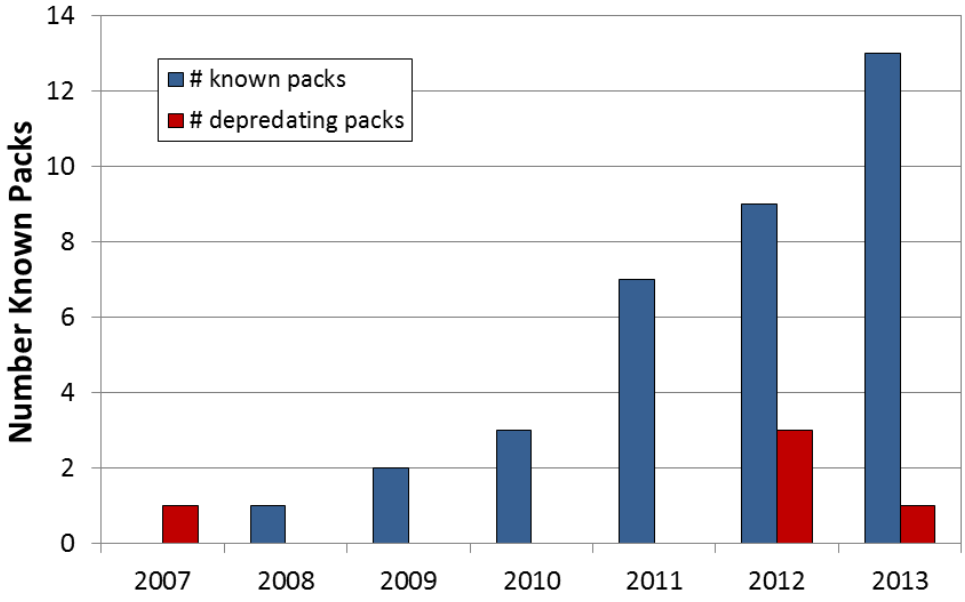

Figure 9. Minimum number of known packs and the number of confirmed depredating packs (livestock only) in Washington, 2007 – 2013.

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 impacting the recovery and long-term perpetuation of a sustainable wolf population. Techniques that may be used to minimize livestock depredations include both non-lethal and lethal control of depredating wolves. Livestock producers and WDFW can implement non-lethal and preventative control measures any time they deem necessary throughout Washington. Non-lethal and preventative control measures used in 2013 to minimize livestock injuries and mortalities caused by wolves included the use of fladry and electrified fladry, RAG boxes, hazing wolves from livestock, increased operator 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.

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 detour 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. No wolves were lethally removed by WDFW or its authorized agents in 2013 (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 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 2013.

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 new rule in 2013.

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 livestock producers must demonstrate that they are implementing methods that may minimize wolf damage.

The WDFW paid no money to compensate cattle producers and wool growers who lost livestock, or had livestock injured by, wolves during the 2013 calendar year. 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 injured by wolves up to the current market value of the livestock.

Damage Prevention Cooperative Agreements

Many non-lethal conflict prevention methods have been developed that may minimize livestock losses caused by wolves and WDFW provides assistance to adapt these methods to individual producer situations. Livestock producers can work proactively with WDFW to minimize conflicts with wolves by receiving technical assistance or under a Damage Prevention Cooperative Agreements (DPCA); which enable producers to receive cost-sharing for deploying prescribed non-lethal conflict prevention measures.

During 2013, WDFW had 29 active Damage Prevention Cooperative Agreements with livestock producers across the state. WDFW staff work directly with the livestock producer to select non-lethal conflict prevention measures that are suitable for the producer's operation. 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 more common non-lethal 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.

RESEARCH

Numerous wolf-related research projects were initiated in Washington during 2013 and are summarized below.

***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 is a research collaboration of the Washington Dept of Fish and Wildlife, University of Washington, the U.S. Forest Service, and the Colville Confederated Tribes Fish and Wildlife Dept initiated in 2012. 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 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. The project relies on a sample of 40 GPS-collared mule deer and white-tailed deer combined each year for three years, an additional 20 camera collared mule and white-tailed deer combined each year for four years, and 1-2 GPS collard wolves in each of two resident wolf packs. Initial data is still being analyzed with no conclusions having been reached yet at this point. Altogether, the field data collected on this project will help improve our understanding of the extent to which recolonizing large carnivores such as 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: Robert Wielgus, Washington State University
Cooperators: Washington Department of Fish and Wildlife, Western Wildlife Outreach, U.S. Fish and Wildlife Service, U.S. Department of Agriculture
Project Summary: This project is a research collaboration among the Washington Department of Fish and Wildlife, Western Wildlife Outreach, U.S. Fish and Wildlife Service, U.S. Department of Agriculture and Washington State University. The primary focus of the study will be to investigate the different mortality rates of cattle herds during the grazing season (May-October) in relation to wolf pack presence. The study area will span parts of northeastern and central Washington, focusing on the herds that are most likely to interact with wolves. Twelve herds will be chosen within wolf occupied areas, two herds per pack. Thirty calves per herd will be fitted with ear tag transmitters to track their fate and determine causes of mortality. Three herd matriarchs will be fitted with GPS collars to track herd movement and compare with wolf movement data. The degree of space use overlap between cattle and wolves will be compared to cause specific mortality rates to explore the relationship. Cattle kill rate will be checked with simultaneously collected predator centered kill rate data to ensure accurate results.

Title: Modeling livestock depredations by wolves in the northern Rocky Mountains
***Graduate Student*:** Zoë Hanley, Washington State University
Major advisor: Robert Wielgus, Washington State University
***Cooperators*:** Washington Department of Fish and Wildlife, Western Wildlife Outreach, U.S. Fish and Wildlife Service, U.S. Department of Agriculture
Project Summary: Some wolf packs in Idaho, Montana, and Wyoming engage in livestock depredations and cause economic losses to livestock operators in any given year. Some wolf packs living in close proximity to livestock do not. In addition, there are often greater livestock losses as time goes by and the wolf population increases and in areas where natural prey population is low. First, I intend to determine the underlying causes of why some wolf packs in the Idaho, Montana, and Wyoming portions of Northern Rocky Mountain Distinct Population Segment have (i.e. from first pack re-establishment in 1985 through 2013) engaged in livestock depredations while others did not. Risk models will be developed to test the widely held hypotheses that wolf depredations on livestock are associated with multiple factors including vegetation composition, livestock herd composition, grazing season and location, proximity to humans, prey abundance, and wolf population demography. I intend to test the reliability of the historic risk models with field data collected at wolf-occupied areas in Washington from 2014 – 2018 by the Large Carnivore Lab at Washington State University. These data will be used to map areas at high risk of livestock depredation by wolves in Washington.

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, Western Wildlife Outreach, U.S. Fish and Wildlife Service, U.S. Department of Agriculture

Project Summary: This project intends to determine the kill rate of wolves on livestock by monitoring wolves. We will put GPS collars on at least 1 wolf in each of 6 packs that have territories that overlap summer livestock grazing areas; 3 packs in northeast Washington and 3 packs in the North Cascades. We will then investigate GPS clusters to locate and identify possible livestock kills. This technique will also allow us to investigate selection of natural prey by wolves. From this data we will determine the kill rate (kills/day/pack) of wolves on both livestock and wild prey during the grazing season (May – October). In addition, all GPS locations from wolves will be analyzed for space use, and relative densities of livestock and wild prey will be calculated. We intend to determine how wolf kill rates relate to the density of prey and livestock (functional response). Additionally we will analyze how wolf use of grazing areas relates to cattle use and density. The project is currently in the planning stages; field work will begin in May 2014.

Title: Minimizing and mitigating wolf/livestock conflicts in Washington
Graduate Student: Azzurra Valerio, Washington State University
Major advisor: Robert Wielgus, Washington State University
Cooperators: Washington Department of Fish and Wildlife, Western Wildlife Outreach, U.S. Fish and Wildlife Service, U.S. Department of Agriculture.
Project Summary: Minimizing and mitigating wolf/livestock conflicts in Washington Project is a research collaboration among Washington State University, Washington Department of Fish and Wildlife, Western Wildlife Outreach, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture that was initiated in January 2014. Wolves are currently recolonizing Washington State. They are state-listed as endangered throughout the state and are federally listed as endangered in the western two-thirds of Washington. Wolf-livestock conflicts may increase as wolves recolonize their former range and increase in numbers. The purpose of this research is to evaluate the effectiveness of techniques that may minimize and mitigate these conflicts as quickly and effectively as possible while adhering to state and federal wolf recovery plans. The two primary objectives are: A) to evaluate the impact of wolf residency on livestock productivity beyond direct depredation. We intend to determine the effects of wolf presence (expressed as UDOI – utilization distribution overlap index which ranges from 0 to 100%) on calf weaning weights, pregnancy rates, and cattle space-use in order to document, assess, and reduce such indirect negative effects. Monitoring the relationship between UDOI and calf weights at weaning and pregnancy rates will allow us to determine the actual weight and pregnancy losses due to wolves. Monitoring space use of both cattle and wolves will allow us to determine the effects of wolf presence on cattle avoidance of wolf occupied areas. B) To evaluate the effectiveness of non-lethal preventative or remedial measures for reducing livestock depredations and indirect effects. Non-lethal methods will include range riders, guard dogs, fladry, bio-fencing, and carcass removal. We intend to find the most cost effective non-lethal interventions to reduce wolf livestock depredations and indirect effects in Washington. We will determine short term (current year) and long term (following years) relative effectiveness of non-lethal control measures by regressing depredation rates, mortality rates, calf weaning weights, pregnancy rates, and space-use of grazing allotments on UDOI - both pre-and post- intervention. Analyses will be conducted both within herds (same herd with different UDOI over 3-4 years) and among herds (different herds with different UDOI over 3-4 years) in a nested or repeated measures design.

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, WDFWs 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 this year.

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.

Besides web-based information, WDFW also continues to develop various brochures and other printed materials. The WDFW published a livestock conflict brochure, a general wolf information brochure, and magnets on how to identify wolves and what to do if you suspect a wolf depredation.

Wolf Advisory Group

In 2013, WDFW created the Wolf Advisory Group (WAG) to provide a broad range of perspectives to help inform the Department in ongoing wolf management efforts. Each member of the WAG is appointed by the Director for a specified period of time. Their mission is to allow a diverse group of stakeholders to advise WDFW in implementation of the Wolf Conservation and Management Plan. The main objective of the WAG is to foster the development of usable and useful mechanisms for the Department to implement the Wolf Conservation and Management Plan. This group is currently tasked with recommending strategies for minimizing conflicts and managing wolf recovery as outlined in the state's Wolf Conservation and Management Plan. Specific issues include: 1) encouraging the use of proactive, preventative measures to decrease the risk of loss, 2) providing compensation for economic loss due to wolf predation, 3) monitoring recovery of the wolf population and its effect on prey species, and 4) providing information to the public on wolf recovery in Washington.

The WAG is comprised of representatives from nine different stakeholder groups; which further assists WDFW with outreach efforts through each of their respective members. Groups currently appointed are: 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. The WAG met on 8 different occasions during 2013 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 action, assess and review research and outreach projects.

Webinar with Game Managers from Idaho and Montana

In 2013, WDFW invited experts from Idaho and Montana to participate in a live webinar, aired statewide through the WDFW website, to discuss the effects of wolves on hunting opportunities. Jon Rachael, Idaho Department of Fish and Game's state wildlife manager and Jim Williams, Montana Fish, Wildlife and Parks' northwest wildlife program manager discussed the impacts wolves have had on deer, elk and other big game animals in their states. They also discussed strategies that successful big game hunters have adopted while hunting in their states. Dave Ware, WDFW statewide game program manager, described the status of wolves and big game hunting in Washington. The public was given an opportunity to email questions to WDFW for response. Questions with common themes were submitted directly to the speakers; which answered and addressed those questions live on air.

Western Wildlife Outreach Project

During 2013, WDFW contracted Western Wildlife Outreach (WWO) to create a statewide wolf outreach and implementation program with emphasis on wolf-livestock conflict avoidance. The primary goal is to assist WDFW with expanding the distribution of information, and method of distribution, for minimizing wolf conflict with livestock producers, hunters, and recreationists. WWO will focus their efforts on the following objectives: 1) assist Washington livestock producers with including wolf/livestock conflict avoidance practices in their livestock operations to reduce or eliminate livestock losses to wolves and other large predators, 2) inform Washington residents of the current status of Washington's wolves and their behavior, biology and ecological roles, as well as safety messages for living and recreating in wolf country and 3) provide Washington hunters information on identifying wolves versus coyotes or domestic dogs, and provide hunters with science-based information on the interaction between wolves and ungulate populations across the West. Through this venture WDFW anticipates increasing collaboration with other government and non-government organizations to assist in informing Washington residents and visitors on wolf recovery in Washington.

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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/