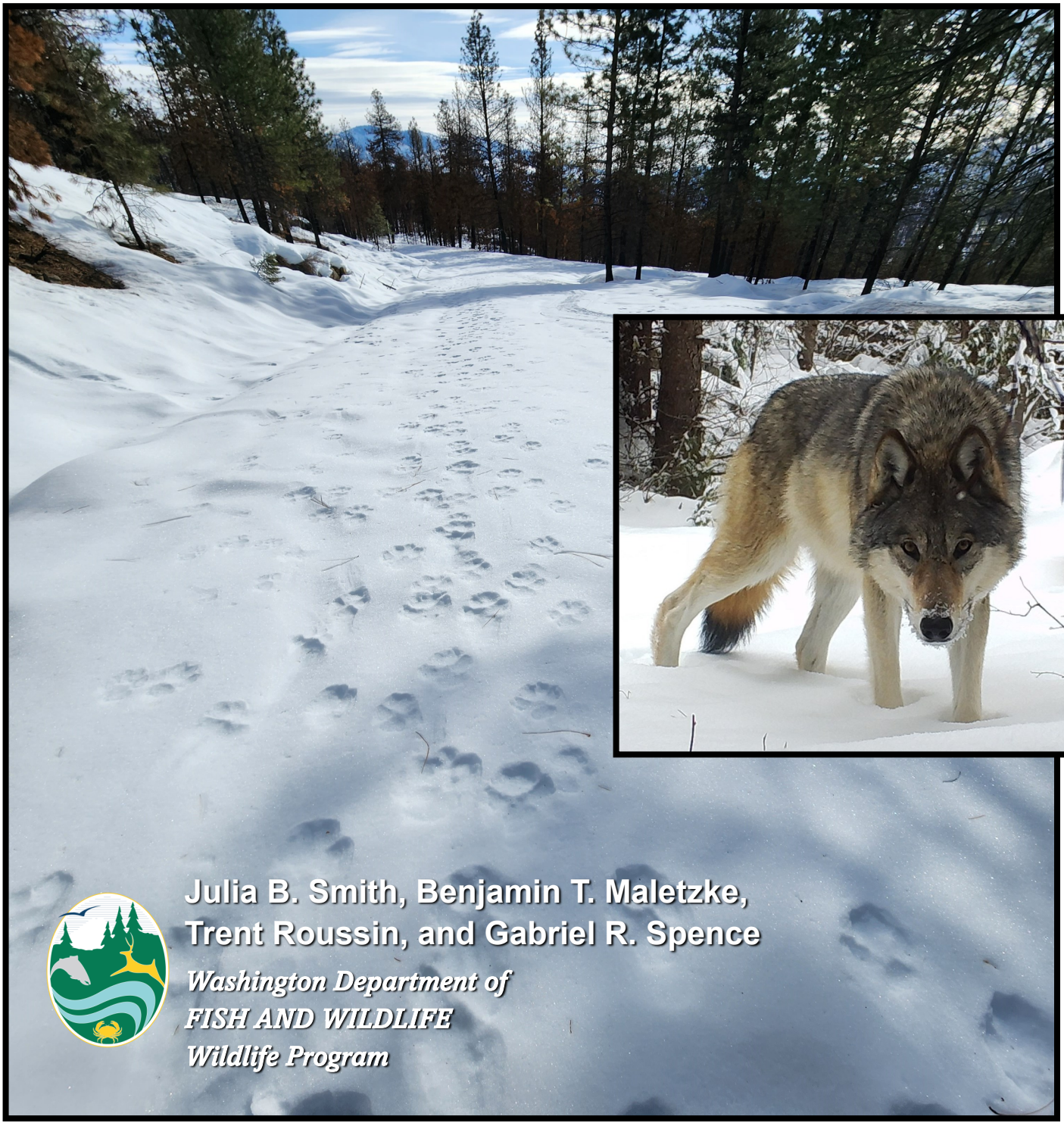
STATE OF WASHINGTON DRAFT May 2023

Periodic Status Review for the Gray Wolf



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

WDFW's procedures anticipate reviews of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing by the Washington Fish and Wildlife Commission. The periodic status reviews are designed to include an update of the species status report to determine whether the status of the species warrants its current listing status or deserves reclassification. The agency notifies the general public and specific parties who have expressed their interest to WDFW of the periodic status review at least one year prior to the end of the five-year period so that they may submit new scientific data to be included in the review. The agency typically notifies the public of its recommendation at least 90 days prior to presenting the findings to the Fish and Wildlife Commission. In addition, if the agency determines that new information suggests that the classification of a species should be changed from its present state, the agency prepares documents to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act.
In developing this draft periodic status review for the Gray Wolf, WDFW considered WAC 220-610-110 definitions and processes as well as the 2011 Wolf Conservation and Management Plan (Wolf Plan). In the event of a conflict between WAC 220-610-110 and the Wolf Plan, the WAC takes precedence. The WAC is the product of formal rule-making process through which a legally enforceable rule is established. The Wolf Plan provides important guidance that WDFW considers but it does not constitute a rule and is not binding.

This draft periodic status review for the Gray Wolf was reviewed by species experts and will be available for a 90-day public comment period from May 18, 2023 to August 16, 2023. All comments received will be considered during the preparation of the final periodic status review. WDFW intends to present the results of this periodic status review to the Fish and Wildlife Commission for action at the October 2023 meeting.
Please submit your comments through **ONE** of the following methods:

- Online through the Public Input comment portal for this proposal at: https://publicinput.com/psr-gray-wolf
- Email to psr-gray-wolf@PublicInput.com
- Call 1-855-925-2801 to record your input by phone. The project code is 2573.

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Cover photos by WDFW (inset) and Ben Maletzke (tracks from Chewuch pack documented in 2022)

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DRAFT

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EXECUTIVE SUMMARY

Gray wolves were formerly common throughout most of Washington, but they declined rapidly between 1850 and 1900. The primary cause of this decline was the killing of wolves by Euro-American settlers as ranching and farming activities expanded. Wolves were essentially eliminated as a breeding species from the state by the 1930s.

Gray wolves in Washington initially received federal protection in 1973, when Congress passed the Endangered Species Act (ESA). The 1987 Northern Rocky Mountain (NRM) Wolf Recovery Plan addressed gray wolf recovery in Idaho, Montana, and Wyoming, but did not include Washington. In 2008, the U.S. Fish and Wildlife Service (USFWS) published a final rule, which included wolves from the eastern third of Washington and Oregon, a small portion of northcentral Utah, and those from the three states in the NRM populations (known as a Distinct Population Segment [DPS]). The eastern third of Washington was included in the DPS designation to account for dispersing wolves from Idaho and Montana populations. However, federal recovery requirements applied only to the three states addressed in the 1987 recovery plan (Idaho, Montana, and Wyoming), and no federal wolf recovery requirements were, or have been, developed for any part of Washington. The federal status of wolves in Washington has changed from listed and delisted several times in different parts of Washington. As of this writing, wolves in the western two-thirds of the state are classified as endangered under the ESA and those in the eastern third are federally delisted as part of the recovered NRM wolf population.

Wolves were first listed as endangered by the Washington Department of Game in 1980 because of their historical occurrence in the state and subsequent extirpation. Since 1980, wolves have remained classified as endangered under state law (WAC 220-610-010) throughout Washington.

The first documented breeding pack in Washington was confirmed in 2008. The population has grown steadily since then; as of December 31, 2022, WDFW counted a minimum of 216 wolves in 37 packs with at least 26 successful breeding pairs. Documented mortality ranged from 0-18% annually and averaged 10% of the known population from 2008 – 2022. Legal harvest on tribal lands is the largest source of Washington's documented wolf mortality from 2008 – 2022 (36% of documented mortality), followed by agency lethal removal in response to conflicts with livestock (24%) and poaching (11%). All human-caused mortality during 2008 – 2022 constitutes 87% of known wolf mortality.

Since WDFW's first wolf population survey in 2008, the wolf population has increased for 14 consecutive years by an average of 23% per year. Although growth of the number of individual wolves documented has slowed in recent years, which is expected following initial recolonization of habitat formerly completely unoccupied by wolves, the number of documented packs and successful breeding pairs continues to increase. Northeast and southeast Washington wolf population growth has slowed due to wolf reoccupation of most of the available suitable habitat. The 2022 annual population revealed a continued increase in wolf packs and successful breeding pairs in the North and Central Cascades as well as novel presence in the South Cascades.

The Wolf Plan recognized that recovery objectives may need to be revisited as wolves recolonized Washington, stating, "The expectation is that over time, as wolves recolonize Washington, WDFW will be able to collect data from within the state to determine whether the model assumptions are appropriate. If future data reveal that the population dynamics of wolves in Washington are significantly different from those used in the model, these conclusions will need to be reevaluated. Incorporating wolf demographic data specific to Washington will allow WDFW to update predictions of population persistence during wolf recovery phases and to revise the recovery objectives, if needed" (pg. 67-68). It is worth noting that wolf population growth in Washington has largely occurred in the absence of federal protection as the majority (60-86% of packs 2011 – 2022, average 79%) of Washington wolf packs occur in the eastern third of Washington where wolves have not been federally protected since 2011.

Petracca et al. (2023a) developed a model to estimate current and project future population dynamics of wolves in Washington. The previous model (Maletzke et al. 2016) used to inform the Wolf Conservation and Management Plan for Washington (Wolf Plan) was developed using data from wolves in the NRM as there was not enough empirical data available from Washington wolves for such an effort at the time. The model from Petracca et al. (2023a) is the first effort of its kind developed using data from Washington's wolf population rather than data from wolves in other states. They used data from 74 collared wolves and yearly pup and pack counts to parameterize the model, and then projected statewide dynamics over 50 years. Model projections from Petracca et al. (2023a, 2023b) show mean population growth of 1.29 (95% CRI 1.26-1.33) during initial recolonization from 2009-2020 decreasing to 1.03 (IQR 1.00-1.05) in the projection period (2021-2070). Their projections suggest that wolves have a >99% probability of colonizing the Southern Cascades and Northwest Coast recovery region by 2030, regardless of alternative assumptions about how dispersing wolves select new territories. In the model, only scenarios that included harvest mortality (removal of 5% of the population every six months), increased lethal removals (removal of 30% of the population every four years), and cessation of immigration from out of state resulted in low probabilities (i.e., probabilities <0.30) of meeting recovery goals in the next 50 years. However, although the probability of meeting recovery goals was predicted to be low in those scenarios, all management scenarios that were analyzed resulted in a predicted geometric mean of population growth that was at or above 1, indicating long-term population stability or growth of Washington's wolf population, depending on the scenario.

Washington's wolf population has far exceeded the Wolf Plan objectives for delisting in terms of the number and persistence of successful breeding pairs. However, the Wolf Plan objectives also consider wolf presence in each of the state's three recovery regions (Figure 8); furthermore, all listed classifications (e.g., endangered, threatened, sensitive) consider a significant portion of the species' range within the state. WAC 220-610-110 (section 2.9) defines a "significant portion of its range" as "that portion of a species' range likely to be essential to the long term survival of the population in Washington."

Model projections from Petracca et al. (2023a, 2023b) indicate Washington's wolf population currently occupies an area essential to their long-term survival and is not in danger of extinction or becoming

endangered with their current distribution and population trend. However, the geographic distribution standards of the Wolf Plan have not yet been met for the Southern Cascades and Northwest Coast recovery region. No successful breeding pairs have been documented yet in the Southern Cascades and Northwest Coast recovery region, although the first known pack was documented in this region as of 2022. Although individual wolves have been detected in western Washington (i.e., west of the Cascades [where models indicate most unoccupied, suitable wolf habitat in the state remains; Maletzke et al. 2016, Petracca et al. 2023a]), no known packs or reproductive individuals have been documented as of 2022.

Based on 14 consecutive years of population growth, population modeling predictions that indicate Washington's wolf population is robust and will continue to grow and expand its range (including in the Southern Cascades and Northwest Coast recovery region), and ongoing state and federal protections, we conclude that the wolf does not meet the definition of State Endangered, which requires that the species is "seriously threatened with extinction" (WAC 220-610-110).

Similarly, WDFW believes that the wolf does not best fit the definition of State Threatened, which requires that a species is "...likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats" (WAC 220-610-110). Current information does not indicate that wolves are threatened with extinction or likely to be threatened with extinction in the foreseeable future in Washington state.

WDFW's draft recommendation is to reclassify the wolf to State Sensitive, "vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats" (WAC 220-610-110). This status reflects the significant progress toward recovery that Washington's wolf population has made since the original state listing in 1980 but recognizes that wolves remain vulnerable in western Washington and should continue to be managed for recovery within the state as a protected species. Continued population growth and range expansion will depend on the robustness of source populations in eastern Washington (as well as neighboring states and provinces) and cooperative management to ensure sources of human-caused mortality do not impede recovery.

WDFW recommends observing the Wolf Plan recovery targets for delisting of at least four successful breeding pairs in each recovery region. We believe that these targets are attainable through natural recolonization and ensure adequate distribution of reproducing wolves throughout the state. WDFW does not recommend delisting wolves at this time.

Downlisting wolves to state sensitive status would continue to protect them under RCW 77.15.130 and protections precluding hunting would remain in place. The definitions of State Threatened and State Sensitive under WAC 220-610-110 are very similar and both fall under the designation of protected wildlife under RCW 77.15.130. **Appendix A** shows differences in conservation/management provisions for wolves under endangered and protected state species classifications and can assist policy makers in

weighing the implications of future management actions. WDFW anticipates receiving additional information through the Draft Periodic Status Review public process that will help explore how to consider these complex issues.

WDFW remains committed to the recovery and long-term sustainability of Washington's wolf population. WDFW will continue to work closely with partners, stakeholders, and communities, just as we have over the past decade, on the recovery, conservation, and management of wolves in Washington, with a focus on reducing conflict between wolves and livestock and achieving statewide recovery objectives.

INTRODUCTION

This draft periodic status review summarizes the biology, population status, factors affecting continued existence, and recent management actions for gray wolves (*Canis lupus*) in Washington. This review also assesses whether this species should retain its current endangered status under state law or be reclassified. The Washington Department of Fish and Wildlife (WDFW) has not previously published a status report for gray wolves since their initial state listing in 1980.

DESCRIPTION

The gray wolf (Figure 1) was once the most widely distributed land mammal, and broadly acknowledged as one of the most adaptable and resilient, inhabiting all vegetation types in the Northern Hemisphere (Mech and Boitani 2003a). Gray wolves are the largest wild member of the canid family. Typical weights of adult gray wolves in Washington are 80-105 pounds for males (average 92 pounds) and 65-80 pounds for females (average 75 pounds). Pelage color varies in wolves from white to grizzled gray to brown to coal black (Mech 1970). Wolves in Washington may be gray or black; both black and gray color phases can be found in a pack or in one litter of pups. Animals with dark pelage sometimes progressively change to white over time, perhaps due to old age, physiological stress, or genetic factors (Gipson et al. 2002).

Figure 1. Gray wolf (*Canis lupus*) (*Photo by Craig M. Monette*).

Observers sometimes mistake coyotes for wolves, but a number of physical features separate the two (Figure 2). Wolf tracks are typically 4.0-4.5 to 5.0-5.5 inches long and are noticeably larger than those of coyotes (2.0-2.5 inches long).

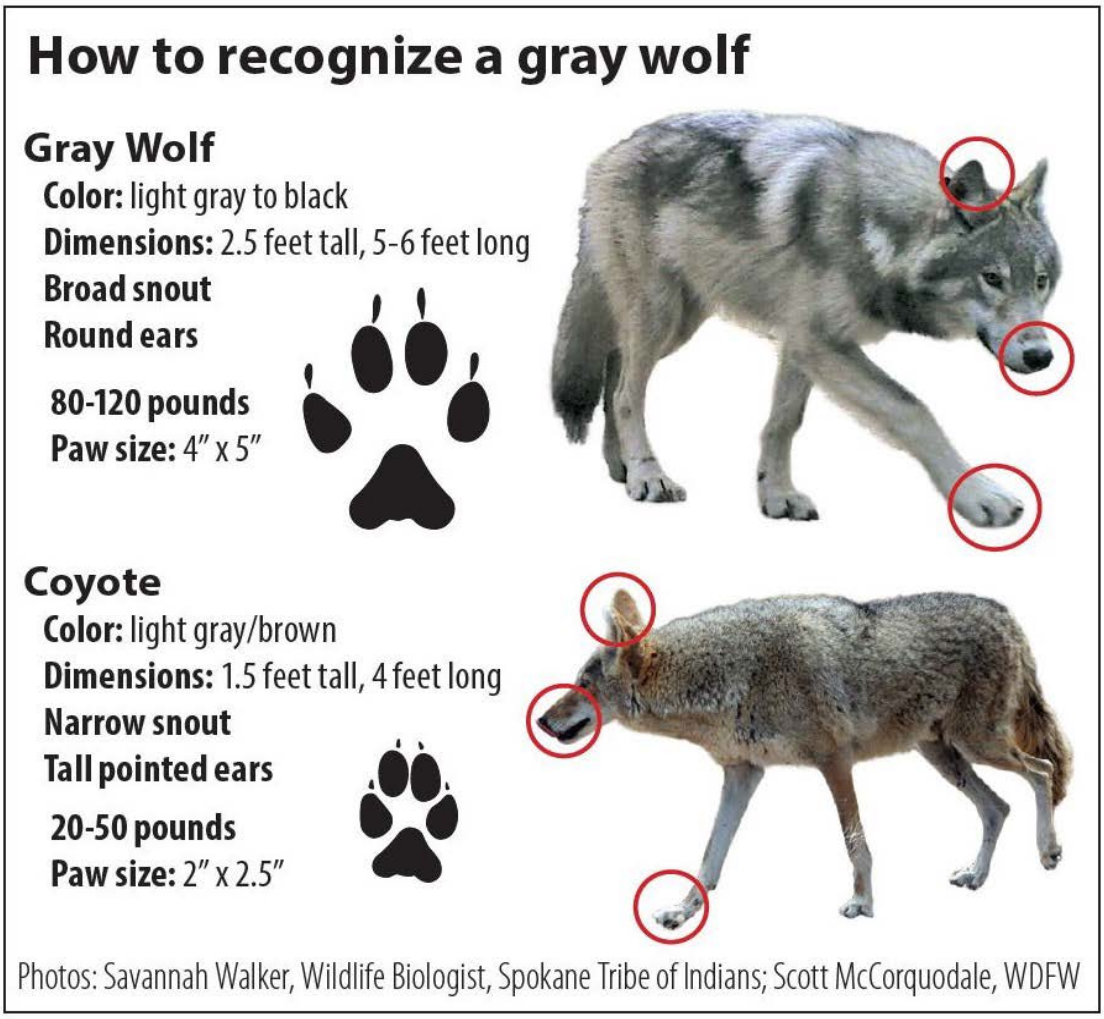

Figure 2. Characteristics of gray wolves compared with coyotes.

Some large domestic dog breeds and wolf-dog hybrids may also be misidentified as wolves. Wolves can be distinguished from dogs by their longer legs, larger feet, wider head and snout, narrow body, and straight tail. Other identifying characteristics require closer examination than is possible in field settings with live animals. Some wolf-dog hybrids are indistinguishable in appearance from wild wolves, but characteristics that can be used to distinguish them from wolves include a curled tail, broader chest, shorter legs, and a distinct husky mask. In many instances, behavior distinguishes wild wolves from hybrids and dogs (Boyd et al. 2001, Duman 2001).

LEGAL STATUS

Federal Status

The status of gray wolves under federal law has been litigated for many years and their federal status has changed several times. Since 2011, wolves in the eastern third of Washington have not been listed under the federal Endangered Species Act (ESA) but are currently classified as endangered under state law. Currently, wolves are federally delisted in Washington east of Highway 97 from the British Columbia border south to Monse, Highway 17 from Monse south to Mesa, and Highway 395 from Mesa south to the Oregon border. Wolves are federally listed west of these highways (Figure 3).

Gray wolves in Washington initially received federal protection in 1973 under the predecessor of the ESA; they were protected under the ESA in 1974. The 1987 Northern Rocky Mountain (NRM) Wolf Recovery Plan addressed gray wolf recovery in Idaho, Montana, and Wyoming, but did not include Washington. In 2008, the U.S. Fish and Wildlife Service (USFWS) published a final rule, which included wolves from the eastern third of Washington and Oregon, a small portion of northcentral Utah, and those from the three states in the NRM populations (known as a Distinct Population Segment [DPS]). The eastern third of Washington was included in the DPS designation to account for dispersing wolves from Idaho and Montana populations. However, federal recovery requirements applied only to the three states addressed in the 1987 recovery plan (Idaho, Montana, and Wyoming), and no federal wolf recovery requirements were, or have been, developed for any part of Washington.

In 2009, the USFWS published a final rule to remove the NRM wolf population, excluding Wyoming, from protection under the ESA (74 FR 15123, April 2, 2009). However, the rule was vacated the following year by a federal judge whose action restored federal protection. The situation changed again in 2011, when federal lawmakers (in a section of the Department of Defense and Full-Year Appropriations Act) directed the Secretary of the Interior to reissue the 2009 delisting rule. As a result, wolves in the NRM DPS, except Wyoming and including the eastern third of Washington, were once again removed from ESA protection. Throughout this time, wolves in the western two-thirds of Washington remained classified as endangered under the ESA (Figure 3).

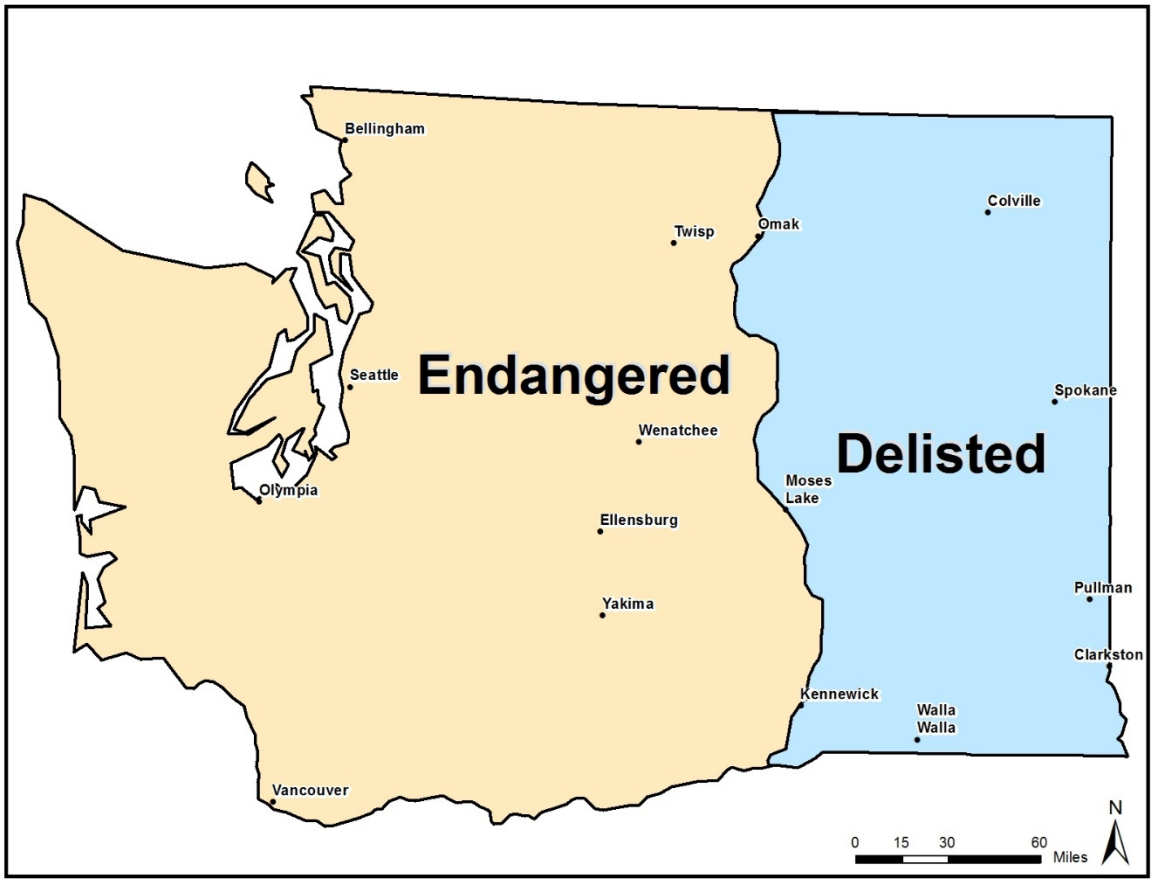

Figure 3. Federal classification of wolves in Washington.

In 2013, the USFWS issued a proposed rule (78 FR 35664, June 13, 2013) to end ESA protection for gray wolves in the contiguous United States, including those in the western two-thirds of Washington, by removing them from the list of endangered and threatened wildlife. Further, the proposed rule would maintain endangered status for the Mexican wolf (*Canis lupus baileyi*) and would reclassify the Eastern wolf (*Canis lupus lycaon)* from a subspecies of the gray wolf to a separate species (*Canis lycaon*). The rule also served as the final status review for wolves in the Pacific Northwest, determining that listing was not warranted.

On November 3, 2020, the USFWS published a final rule (85 FR 69778, November 3, 2020) to remove the gray wolf (in the lower-48 United States excluding the delisted NRM and Mexican gray wolf) from the List of Endangered and Threatened Wildlife because they found that the best available scientific information indicated that the listed gray wolves no longer met the definitions of a threatened species or endangered species under the Endangered Species Act due to recovery. The final rule went into effect on January 4, 2021 and wolves in the western two-thirds of Washington were federally delisted, until February 10, 2022, when a U.S. District Judge's order vacated the delisting rule. As a result of this vacatur, wolves in the western two-thirds of Washington were once again listed as a federally

endangered species. Wolves had been (since 2011) and remained federally delisted in the eastern third of Washington.

Multiple parties appealed the district court's February 10, 2022 order to the U.S. Court of Appeals for the Ninth Circuit, and the parties have been engaged in mediation. In January 2023, an abeyance in the appeals process was ordered by the court. As part of the abeyance, the USFWS committed to conduct a status review of wolves in the lower-48 states and deliver a proposed rule to the federal register by February 2, 2024 and commence a stakeholder engagement effort.

WDFW is the primary agency responsible for managing wolves in the eastern third of Washington and cooperates with the USFWS under Section 6 of the ESA in the western two-thirds of the state. Tribal governments manage wolves that inhabit their tribal lands and the National Park Service manages wolves that inhabit national parks. One tribe, the Confederated Tribes of the Colville Reservation, also have off-reservation hunting rights in an area referred to as the former "North Half" and adopt wolf hunting regulations in that area.

Federal status review of the gray wolf in the western U.S. Following legislation that became state law in Idaho and Montana to increase wolf harvest and reduce wolf populations, the USFWS received a petition (on June 1, 2021, dated May 26, 2021) to list the gray wolf NRM DPS or a new western U.S. DPS as a threatened or endangered species under the ESA. The USFWS received a second, similar petition on July 29, 2021. The first petition proposed listing a NRM DPS consisting of Montana, Idaho, Wyoming, the eastern one-third of Washington and Oregon, and a small portion of north-central Utah. Both petitions also proposed some alternative Western U.S. DPS to include all, or part, of the NRM states with the addition of California, Colorado, Nevada, Utah, and in one petition, northern Arizona. This initiated a 90-day finding to determine if petitioners presented information that the requested action may be warranted. As a result of the 90-day finding, the USFWS found that the petitions presented substantial, credible information indicating that a listing action may be warranted and initiated a comprehensive status review of the gray wolf in the western U.S.

The USFWS found the petitioners presented substantial information that potential increases in human-caused mortality may pose a threat to the gray wolf in the western U.S. The USFWS also found that new regulatory mechanisms in Idaho and Montana may be inadequate to address this threat. Therefore, the Service found that gray wolves in the western U.S. may warrant listing.

Substantial 90-day findings require only that the petitioner provide information that the proposed action may be warranted. The next steps for the USFWS include in-depth status reviews and analyses using the best available science and information to arrive at a 12-month finding on whether listing is warranted. If so, listing a species is done through a separate rulemaking process, with public notice and comment. As of this writing, the 12-month finding has not been issued.

State Status

Wolves were first listed as endangered by the Washington Department of Game in 1980 because of their historical occurrence in the state and subsequent extirpation. Since 1980, wolves have remained classified as endangered under state law (WAC 220-610-010) throughout Washington. State law RCW 77.15.120 protects endangered species from hunting, possession, malicious harassment, and killing; penalties for illegally killing a state endangered species range up to $5,000 and/or one year in jail. Other statutory provisions apply to protected wildlife: RCW 77.15.130(1)(c) prohibits the hunting, possession or malicious harassment of threatened or sensitive wildlife unless authorized by rule of the commission, a WDFW permit, or a federal permit; the maximum penalty for violations is 90 days in jail and/or a $1,000 fine.

DISTRIBUTION

Globally, wild gray wolf populations are circumpolar, found in North America, Europe, and Asia (Boitani et al. 2018). In North America, gray wolves are robust and widespread throughout Alaska and Canada, and currently occupy ~90% of their historical range there (Boitani 2003). Wolves occupy a fraction of their historical range in the lower 48 United States and Mexico but exist in two biologically recovered populations in the Northern Rocky Mountains (Idaho, Montana, Wyoming, and parts of Oregon and Washington) and Western Great Lakes (Michigan, Minnesota, and Wisconsin) (USFWS 2020, Figure 4). Small numbers of gray wolves inhabit California and Colorado and a growing population of Mexican gray wolves occurs in Arizona, New Mexico, and Mexico (Figure 4). In Washington, wolves historically occurred throughout most of the state before 1800 (Young and Goldman 1944). Currently, in Washington, wolves occur in the northeast portion of the state, the Blue Mountains in the southeast, the North and Central Cascades range, with one pack in the South Cascades (WDFW et al. 2023, Figure 5).

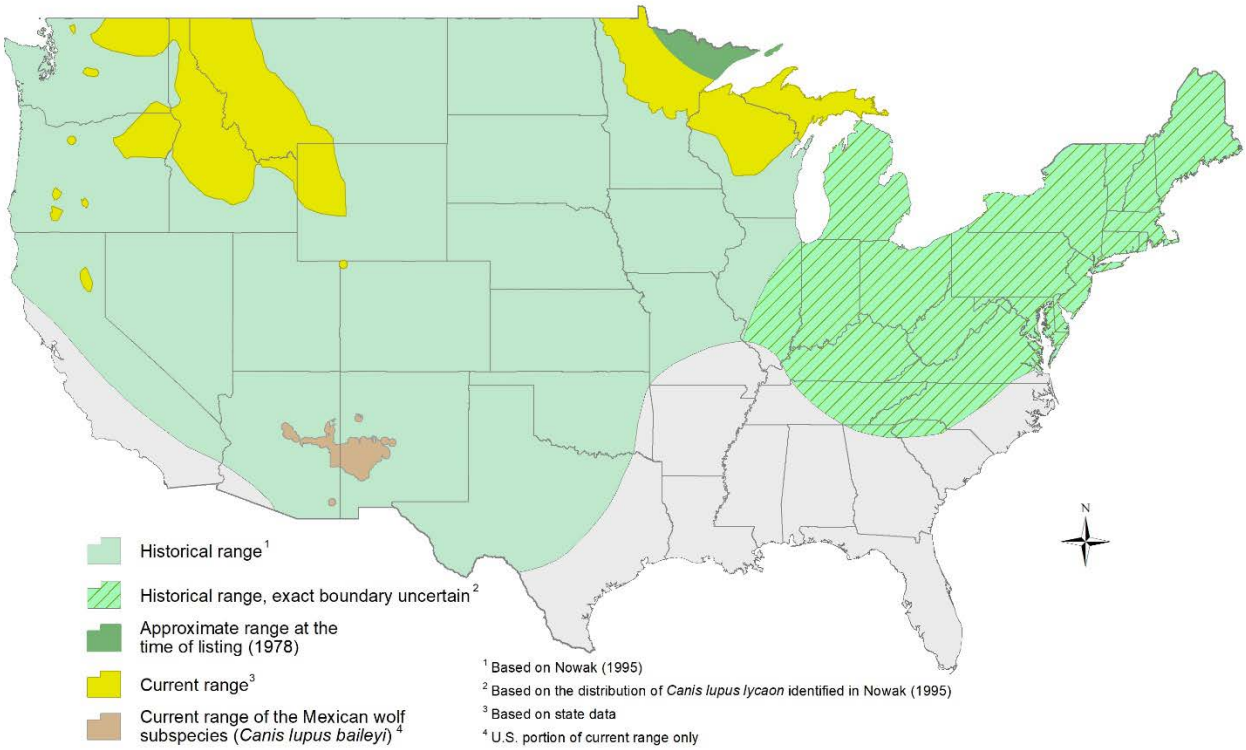

Figure 4. Historical range and current range of the gray wolf (*Canis lupus*) in the lower 48 United States (USFWS 2020b). The range of wolves in Washington state has expanded since 2020 as shown in Figure 5.

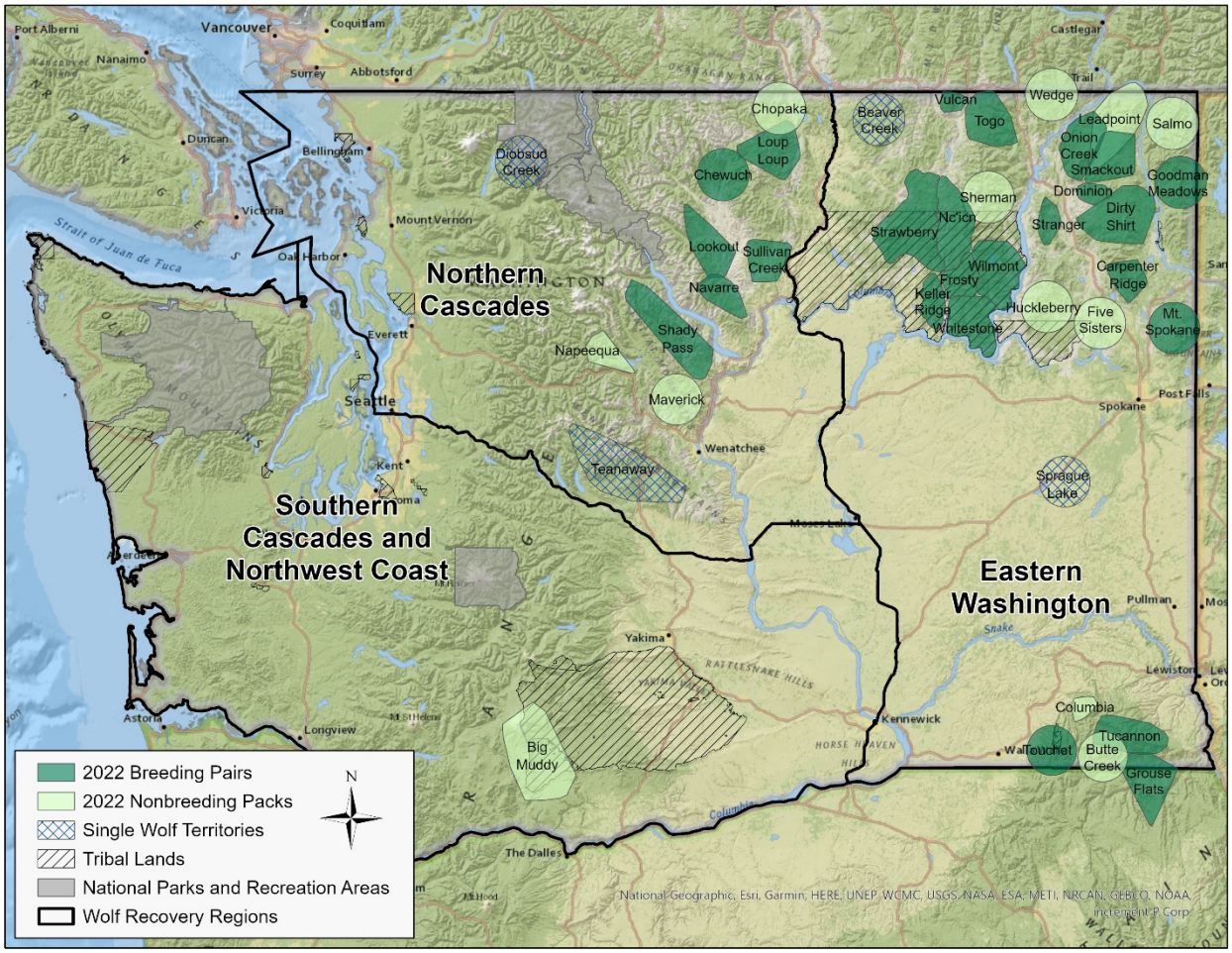

Figure 5. Known wolf packs, breeding pairs, and single wolf territories in Washington, 2022, not including unconfirmed or suspected packs or border packs from other states and provinces (WDFW et al. 2023).

NATURAL HISTORY

(Text adapted and updated from 2011 Wolf Conservation and Management Plan, Wiles et al. 2011)

Habitat Requirements

As with other aspects of their ecology, wolves are generalists in their habitat use. Within their historical geographic distribution, wolves occurred in every habitat with large ungulates, including forests, deserts, prairies, swamps, tundra, and coasts (Fuller et al. 2003). Elevations ranging from sea level to mountains were occupied. Wolves are adaptable enough that they will also enter and forage in towns and farms, cross highways and open environments, and den near sites heavily disturbed by people such as logging sites and military firing ranges (Fuller et al. 2003). Surviving wolf populations in much of western North America, including the northern Rocky Mountain states and British Columbia,

predominantly inhabit forests and nearby open habitats, with prey availability and extent of human tolerance strongly influencing occupancy.

Petracca et al. (2023a) used a resource selection function to determine the relative suitability of wolf territories for wolf colonization in Washington using daily locations of Washington wolves within 99% minimum convex polygons of annual pack territories. Wolves were more likely to select home ranges with greater relative deer abundance, forest cover, shrubland cover, distance from state highways, and where public grazing allotments were present. Wolves were also more likely to select home ranges in areas with lower human population density, agricultural cover, road density, grassland cover, and terrain ruggedness. Wolves also selected for areas at intermediate elevation. Areas of greatest relative selection for wolf territories largely followed forested, undeveloped areas, including the national forests in the Northeast, the Northern and Southern Cascades, and the Olympic Peninsula (Figure 6, Petracca et al. 2023a).

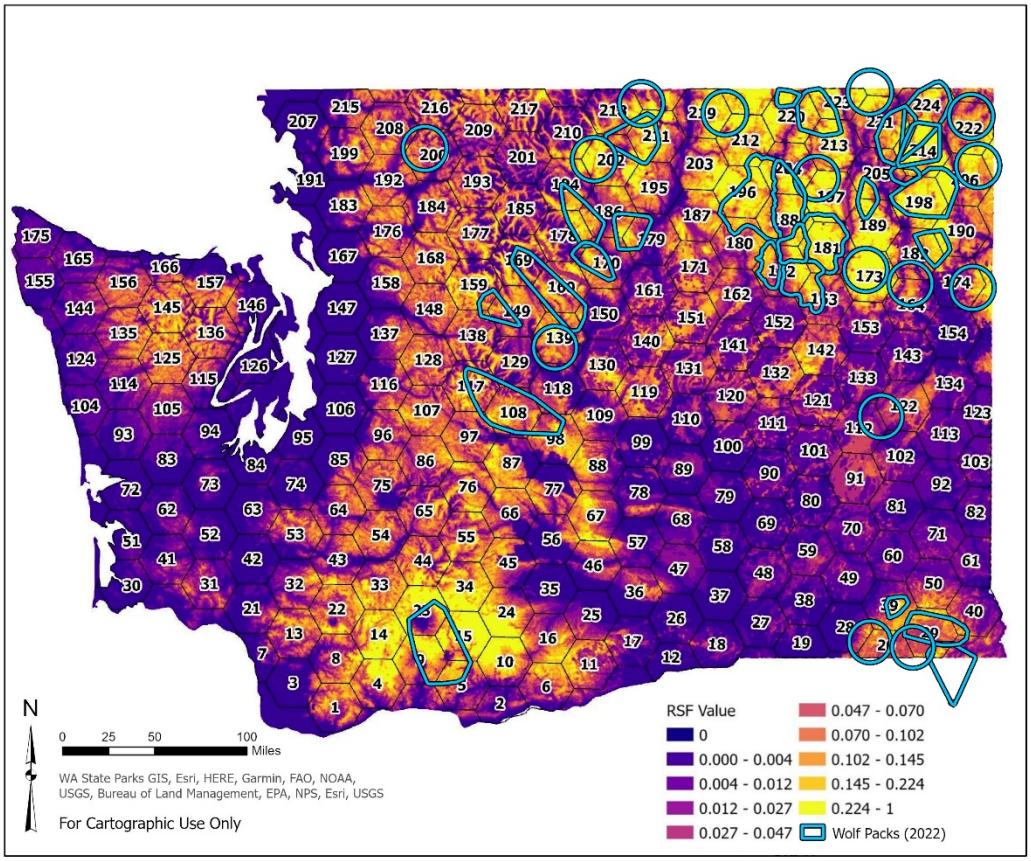

Figure 6. Predicted estimate of second-order resource selection function for wolves in Washington State, USA, based on daily GPS collar data from 74 individuals (with 2022 known wolf pack territories superimposed). Figure reproduced from Petracca et al. 2023a.

Diet and Foraging

Gray wolves are opportunistic carnivores that are keenly adapted to hunt medium to large prey species, such as deer, elk, and moose. Ungulate species comprise different proportions of wolf diets, depending on their relative abundance and distribution within territories (Peterson and Ciucci 2003). In the central and northern Rocky Mountains of the United States and Canada, elk are often the primary prey of wolves, but deer and moose are more important in some areas (Peterson and Ciucci 2003). In Washington, primary prey species for wolves include white-tailed deer, mule deer, moose, and elk (Spence 2017, Satterfield et al. 2022). In northeast Washington, white-tailed deer and moose are the primary prey items for wolves (Spence 2017, Satterfield et al. 2022). In central Washington, wolves feed primarily on mule deer (Spence 2017, Satterfield et al. 2022).

Wolves also prey on smaller animals, scavenge carrion, and even eat fish and vegetation. In addition to deer, moose, and elk, fecal DNA metabarcoding technology detected six smaller prey species in wolf fecal samples from northeast Washington, including small mammals (snowshoe hare, red squirrel, meadow vole, and deer mouse) and birds (ruffed grouse and European starling; Shi et al. 2021). Research in northwestern Montana has also documented non-ungulate prey such as tree squirrels, other small mammals, ruffed grouse, ravens, striped skunks, beavers, coyotes, porcupines, and golden eagles (Boyd et al. 1994, Arjo et al. 2002). In coastal Alaska and British Columbia, wolves include salmon, sea otters, and marine mammals in their diet (Person et al. 1996, Darimont et al. 2003, 2008, Watts et al. 2010, Roffler et al. 2021, Roffler et al. 2023), with greater use of these prey groups on islands compared to mainland sites (Darimont et al. 2009).

Wolves scavenge opportunistically on vehicle- and train-killed ungulates, winterkills, and on kills made by other carnivores, particularly cougars. Wolves scavenge the remains of domestic livestock and game at carcass disposal sites. Wolves also kill and feed on domestic livestock such as cattle, sheep, llamas, horses, and goats.

Home Range and Movements

A pack establishes an annual home range or territory and defends it from trespassing wolves. From mid-April to early May until September or early October, pack activity is centered at or near the den or rendezvous sites, as adults hunt and bring food back to the pups. Rendezvous sites are specific resting and gathering areas that are used by wolf packs after pups emerge from the den. These sites are often in wet meadows (Ausband et al. 2010) or forest openings near the den, but sometimes are several miles away within the pack territory. By late summer/early fall, pups are large enough to travel, feed on kills, and possibly hunt with the pack. The pack hunts throughout its territory until the following spring. Wolves use different areas of their territory daily, which suggests rotational use that may improve hunting success (Demma and Mech 2009), and territory boundaries and sizes may vary from year to year. Similarly, a wolf pack may travel in its territory differently from one year to the next because of changes in prey availability or distribution, conflicts with neighboring packs, or the establishment of a

new neighboring pack. Other attributes such as elevation, land use, land ownership patterns, prey species presence, and relative prey abundance make each pack's territory unique. Rich (2010) reported that territory size in general increases with greater terrain ruggedness (which tends to reduce prey availability and vulnerability), higher human densities, and higher levels of lethal control, but decreases with larger numbers of neighboring packs. Mean territory size of wolves in Washington (2009 – 2020) was 760.03 (SE = 57.12) km^2 (Petracca et al. 2023a).

Gray wolves rarely disperse before 10 months of age, and most commonly disperse between one to three years of age (Mech and Boitani 2003b, Jimenez et al. 2017). Generally, by the age of three years, most wolves will have dispersed from their natal pack to locate social openings in existing packs or find a mate and form a new pack (Mech and Boitani 2003b, Jimenez et al. 2017). Dispersers may become nomadic and cover large areas as lone animals, or they may locate unoccupied habitats and members of the opposite sex to establish their own territorial pack (Mech and Boitani 2003b). Wolves appear to disperse preferentially to areas occupied by other wolves, using scent marking and howling to locate other animals (Ray et al. 1991, Mech and Boitani 2003b). Boyd and Pletscher (1999) indicated that dispersers in their study moved toward areas with higher wolf densities than found in their natal areas. Dispersal distances in North America typically range from 65 to 154 km (40 to 96 miles) (Boyd and Pletscher 1999, Jimenez et al. 2017), although dispersal distances of several hundred kilometers are occasionally reported. The ability to disperse long distances allows wolf populations to quickly expand to recolonize vacant habitats as long as rates of human-caused mortality are sustainable.

Reproduction and Survival

Wolves are highly social and live in packs (Mech and Boitani 2003b). The fundamental unit of wolf social structure is the male and female breeding pair (Mech 1970, Mech and Boitani 2003b). Packs are formed when male and female wolves develop a pair bond, breed, and produce pups. The pack typically consists of a socially dominant breeding pair, their offspring from the previous year, and new pups. Other breeding-aged adults may be present, but they may or may not be related to the breeding pair (Mech and Boitani 2003b). The pack hunts, feeds, travels, and rests together. Maintaining the pack social unit is important for acquiring food (Stahler et al. 2006, Sand et al. 2008) and enhancing pup survival (Brainerd et al. 2008, Stahler et al. 2020). The pack also shares pup-rearing responsibilities, including hunting and tending pups at the den or at a series of rendezvous sites. The average pack size in Washington (2009-2020) was 4.67 (SE = 2.54; Petracca et al. 2023a).

Several studies show numerous advantages of living in packs and maintaining larger pack sizes, such as better success hunting elk (MacNulty et al. 2012), ability to adapt to prey size (Barber-Meyer et al. 2016), higher pup production (Stahler et al. 2013, Stahler et al. 2020), better success in defending against territorial attacks from other wolves (Cassidy et al. 2015), greater ability to compete with scavengers (Wilmers et al. 2003, Vucetich et al. 2004), more successful recovery from mange infestation (Almberg et al. 2015), and moderating the impacts of human-caused mortality (Cassidy et al. 2023).

Wolves normally do not breed until at least two years of age (Fuller et al. 2003). Breeding usually occurs only between the dominant male and female in a pack. In the northern Rockies, mating peaks in mid- to late February (Boyd et al. 1993). Wolves localize their movements around a den site and give birth in late March to early May (typically about April 15) after a 63-day gestation period. Pups are moved to a series of rendezvous sites after reaching about eight weeks of age, which is about the time that weaning occurs.

Litters usually average four to six pups (Fuller et al. 2003). Most packs produce only one litter annually, but on some occasions more than one female in a pack may breed, resulting in multiple litters (Fuller et al. 2003, Stahler et al. 2020). In Washington, from 2009-2020, the mean size of 6-month-old litters (i.e., integrating both litter size at birth and survival to 6 months of age) was 1.5 (SE = 1.73; Petracca et al. 2023a). VonHoldt et al. (2008) documented an average generation time (i.e., average age at which females give birth to their offspring) of 4.16 years among wolves at Yellowstone National Park.

Pup survival is highly variable and is largely influenced by disease, predation, and nutrition (Johnson et al. 1994, Fuller et al. 2003, Mech et al. 2008). In the northern Rocky Mountain states from 1982 to 2004, annual pup survival was lower in northwestern Montana (40%) than in central Idaho (89%) and the greater Yellowstone area (76%; Smith et al. 2010). In Yellowstone National Park, pup survival varied between 73 and 81% from 1996 to 1998, declined to 45% in 1999 because of a likely outbreak of canine distemper, and rebounded to 77% the following year (Smith et al. 2000, Smith and Almberg 2007). Pup survival again dipped to low levels in 2005 (32%) and 2008 (29%) due to canine distemper (Smith et al. 2006, Smith et al. 2009). Wolf pup survival from birth to midwinter averaged 29% (range 14 to 58%) in Wisconsin over a 28-year period (Wydeven et al. 2009a). In this population, the lowest pup survival occurred in years coincident with an outbreak of parvovirus (Wydeven et al. 1995).

Pack size and breeder presence and turnover have been shown to be important factors in pup survival and recruitment as well as maintenance of the pack social unit. Mitchell et al. (2008) showed that larger packs of 10 or more wolves in Idaho, Montana, and Wyoming have a 90% or greater chance of successfully rearing two or more pups through December of a given year, whereas smaller packs are much less likely to do so. For example, depending on location within these states, packs of four to five animals had only a 20-73% chance of successfully raising at least two pups to year's end. The unexploited wolf packs in Yellowstone National Park have maintained a long-term average of 10 individuals per pack and sometimes support larger numbers (Stahler et al. 2020), providing additional evidence that this pack size may be advantageous. Ausband and Mitchell (2021) found that reproductive rates were generally lower for wolves in small groups (1–4 adults) compared to those in large groups (≥8 adult wolves). Pup survival, however, was slightly higher for wolves in small groups compared to large groups except at very high densities. Large pack size resulted in less birthing failure, more female breeders per group, larger litter sizes, and ultimately more pups recruited per group.
In Brainerd et al.'s (2008) study of the impacts of the loss of breeding wolves from a pack, they found that at least one pup survived in 84% of cases regardless of the sex of the remaining breeder. In packs of six or more, pups survived more frequently compared with smaller groups; non-breeding wolves in the pack benefited pup survival. The number of adult-sized wolves remaining after breeder loss, along with

pup age, had the greatest influence on pup survival. Wolves holding the territory reproduced the following season about half the time, and a greater proportion reproduced where one breeder was replaced versus cases where both breeders needed to be replaced. Wolf packs dissolved and abandoned their territories following breeder loss in 38% of cases. Where groups dissolved, wolves reestablished territories in over half of cases, with neighboring wolves taking over territories in a few cases. Fewer groups dissolved where breeders remained versus cases where all breeders were lost. Pack size following breeder loss was smaller where packs dissolved compared with cases where packs did not dissolve. Similarly, Borg et al. (2015) found that the loss of a breeder preceded about three quarters of cases of pack dissolution; packs were more likely to dissolve if a female or both breeders were lost and pack size was small. Packs that lost breeders exhibited lower denning and recruitment rates. Cassidy et al. (2023) found that the human-caused mortality of any wolf in a pack decreased odds of pack persistence by 27% and reproduction the following year by 22%; the human-caused mortality of a pack leader decreased the odds of pack persistence by 73% and the odds of reproduction by 49%. Although these studies show the importance of breeders in maintaining pack cohesion, breeder loss and pack dissolution had no significant effects on short- or long-term population dynamics (similar to findings of Brainerd et al. [2008]), indicating the wolf's ability compensate for such losses through mechanisms such as reduced natural mortality, increased reproductive output/recruitment, and immigration via dispersal.

Ausband et al. (2017a) also illustrated the importance of breeders to pup survival—in their study of harvest and group effects on wolf pup survival, the number of breeders present when pups reached 15 months of age was a strong predictor of pup survival. Large pack sizes and breeder stability increased pup survival in harvested wolf populations, but turnover of breeding males and the presence of older, non-breeding males decreased pup survival. In years where harvest occurred, the average effect of one additional adult in a pack was associated with a 1.14 times increase in pups reaching 15 months old. At 15 months of age, increasing the number of breeders present by one was associated with a nearly four times increase in the probability of survival during years with harvest. Turnover of breeding males was associated with more than three times decrease in the probability of pup survival. Although increasing pack size generally had a positive effect on pup survival, each additional two-year-old or older non-breeding male present when pups reached 15 months of age was associated with a nearly three times decrease in the probability of pup survival. Ausband et al. (2017b) further elucidated how breeder turnover affects breeding opportunities of subordinates and the number and sex ratios of subsequent litters of pups. Breeder turnover led to shifts in the reproductive hierarchies within groups and the resulting changes to group composition were highly variable and depended on the sex of the breeder lost. Harvest had no effect on the frequency of breeder turnover, suggesting that even in unexploited wolf populations, breeder turnover may be common.

Few wolves in the wild live more than 4-5 years (Fuller et al. 2003), although maximum age can reach 15 years (Ausband et al. 2009). Wolves die from a variety of causes, which are usually classified as either natural or human-caused. Natural deaths result from territorial conflicts between packs, injuries while hunting, old age, disease, starvation, or accidents. In protected populations where human-caused mortality may be lower, most wolves die from being killed by wolves from neighboring packs, disease, or starvation (Fuller et al. 2003, USFWS 2020). Because most wolves live in human-dominated landscapes,

natural mortality probably does not regulate most wolf populations. Humans are the largest cause of wolf mortality as a whole and are the only cause that has the potential to significantly affect population recovery; effects of human-caused mortality are more pronounced in smaller populations (Mitchell et al. 2008, Smith et al. 2010, USFWS 2020). Mitchell et al. (2008) reported that humans were responsible for 71-87% of wolf deaths in five of six regions of Idaho, Montana, and Wyoming from 1979 through 2005, whereas only 23% of mortalities in Yellowstone National Park were human-related. Cassidy et al. (2023) reported high levels of human-caused mortality (22-58% of mortalities of collared wolves) even in national parks. Human-caused mortality includes control actions to resolve conflicts, illegal killings, legal harvest, and vehicle collisions.

Human-caused mortality may fracture packs and affect pup survival and recruitment depending on which pack members are removed (Mech and Boitani 2003b, Cassidy et al. 2023). However, pack social structure is adaptable and resilient. Typically, the loss of offspring (young of the year, yearlings, or older offspring) does not result in the disruption of the pack because the breeding pair continues to hold the territory (Mech and Boitani 2003b). A wolf pack will generally maintain its territory if both members of the breeding pair survive, and even if one member of the breeding pair is killed, the pack may hold its territory until a new breeder arrives (Mech and Boitani 2003b). If both members of the breeding pair are killed, the remaining members of the pack may disperse, starve, or remain in the territory until an unrelated dispersing wolf arrives and mates with one of the remaining pack members (Mech and Boitani 2003b, Brainerd et al. 2008). If breeders are killed, they can typically be quickly replaced from either within or outside the pack, and pups can be reared by another pack member if their parents die (Packard 2003, Mech 2006, Brainerd et al. 2008, Borg et al. 2015).

Documented mortality ranged from 0-18% annually and averaged 10% of the known population from 2008 – 2022 (Table 1). With this level of documented mortality, Washington's wolf population has grown at an average rate of 23% annually since breeding wolves were first documented in the state (Table 2). Legal harvest on tribal lands is the largest source of Washington's documented wolf mortality from 2008 – 2022 (36% of documented mortality), followed by agency lethal removal in response to conflicts with livestock (24%) and poaching (11%; Table 1, Figure 6). All human-caused mortality (including all sources of mortality in Table 1 except "Natural" and "Unknown") during 2008 – 2022 constitutes 87% of known wolf mortality.

Table 1. Causes of documented wolf mortality in Washington, 2008–2022.

Year	Minimum wolf count	Natural	Under investigation and/or illegal killing	Killed by people feeling threatened	Caught-in-the-act	Vehicle collision	Unknown	Legal harvest	Agency removal	Total known mortalities
2008	5	0	0	0	0	0	0	0	0	0
2009	14	0	0	0	0	0	0	0	0	0
2010	19	0	0	0	0	0	2	0	0	2
2011	35	0	0	0	0	0	0	0	0	0
2012	51	0	0	1	0	0	1	0	7	9
2013	52	1	0	3	0	0	0	1	0	5
2014	68	3	0	4	0	0	2	0	1	10
2015	90	0	0	3	0	0	1	3	0	7
2016	115	0	2	2	0	0	0	3	7	14
2017	122	0	4	0	2	2	0	3	3	14
2018	126	0	2	0	0	0	0	6	4	12
2019	145	1	1	1	2	0	1	6	9	21
2020	178	2	0	1	0	1	1	8	3	16
2021	206	0	2	0	0	4	0	22	2	30
2022	216	7	9	0	3	0	1	11	6	37
Total	-	14	20	15	7	7	9	63	42	177
% overall known mortality	-	8	11	8	4	4	5	36	24	

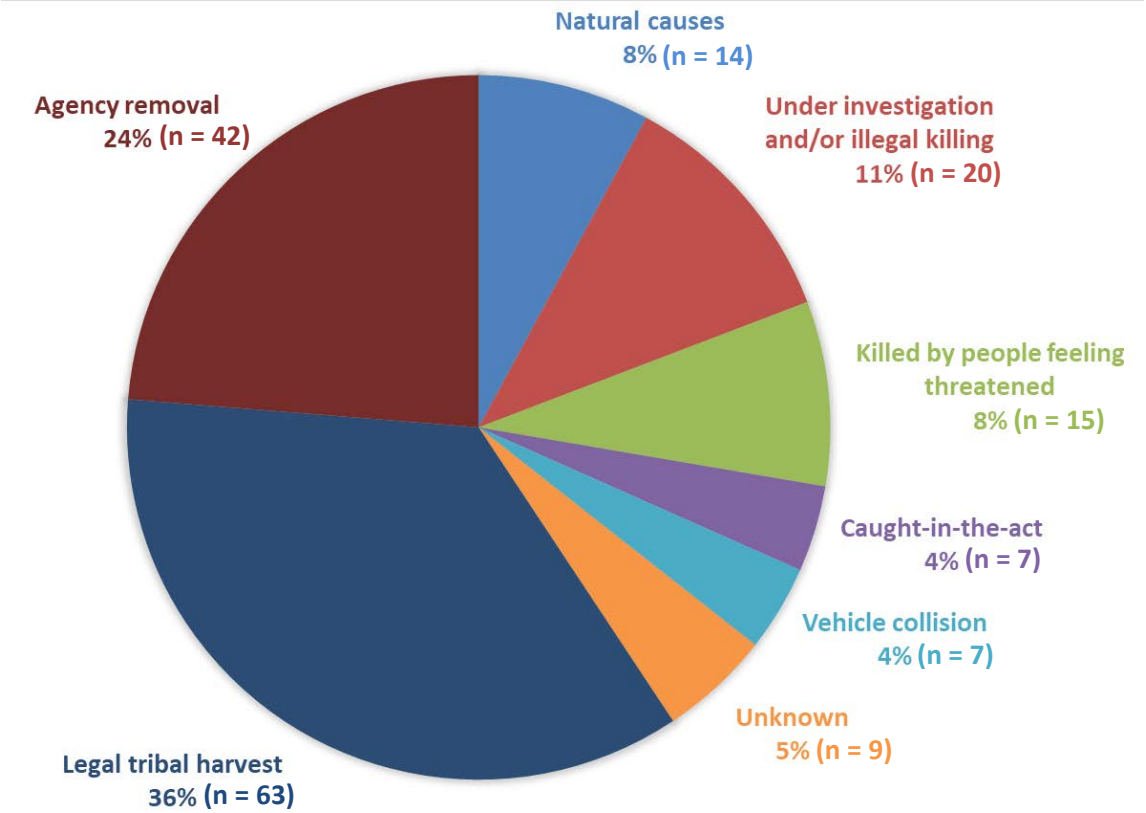

Figure 7. Causes of documented wolf mortality in Washington, 2008-2022. The extent of undocumented mortality is not known or represented.

POPULATION AND HABITAT STATUS

North American Population

Historically, wolves ranged over nearly all North America north of Mexico City, except possibly parts of California (Boitani 2003). Alaska and Canada historically and currently support a large, widespread, and contiguous population of wolves (Boitani 2003), which has been estimated at approximately 8,000-11,000 individuals in Alaska, about 15,000 wolves in western Canada, and about 12,000-14,000 wolves in eastern Canada (USFWS 2020b). Extirpation of wolf populations began shortly after European settlers arrived, and gray wolves were eliminated from the lower 48 United States by the 1930s to 1940s save for remnant populations of wolves on Isle Royale, Michigan (~40 individuals) and ~700 animals primarily within the Superior National Forest in northeastern Minnesota (Mech 2009). In the United States, following protection of gray wolves under the Endangered Species Act of 1973 and earlier listings under the ESA's legislative predecessors, gray wolf populations have rebounded in two regions: the northern Rocky Mountains (due to both natural recolonization and reintroduction), including Idaho, Montana, Wyoming, and parts of Oregon and Washington (as well as California and Colorado though not considered part of the NRM); and the western Great Lakes (solely due to natural recolonization), including Michigan, Minnesota, and Wisconsin (USFWS 2020b). In addition to these two robust

metapopulations, there are ongoing recovery efforts for a subspecies of the gray wolf, the Mexican wolf, in the Southwest (USFWS 2020b). Gray wolves in the lower 48 United States currently number over 6,000 individuals (USFWS 2020b).

Washington Population

Gray wolves were formerly common throughout most of Washington, but they declined rapidly between 1850 and 1900. The primary cause of this decline was the killing of wolves by Euro-American settlers as ranching and farming activities expanded. Wolves were essentially eliminated as a breeding species from the state by the 1930s. Reports of wolves in Washington increased as wolf abundance and distribution increased in the NRM; following the recovery of wolves in Idaho, Montana, and Wyoming, the first documented breeding pack in Washington was confirmed in western Okanogan County and adjacent northern Chelan County in 2008. As of July 2011, there were five confirmed packs in the state: two in Pend Oreille County, one in Pend Oreille/Stevens counties, one in Kittitas County, and one in Okanogan/Chelan counties. As of December 31, 2022, WDFW counted a minimum of 216 wolves in 37 packs with at least 26 successful breeding pairs (WDFW et al. 2023, Table 2). Human-caused mortality—particularly tribal-regulated harvest, lethal control actions to resolve conflicts, and illegal killing—is the largest source of mortality for the species (Table 1).

Table 2. Wolf population growth trends in Washington, 2008–2022.

Year	Minimum count	Packs	Breeding pairs	Annual growth rate (%)	Documented mortality
2008	5	1	1	-	0
2009	14	2	2	-	0
2010	19	3	1	36	2
2011	35	7	5	84	0
2012	51	9	5	46	9
2013	52	13	5	2	5
2014	68	16	5	31	10
2015	90	18	8	32	7
2016	115	20	10	28	14
2017	122	22	14	6	14
2018	126	27	15	3	12
2019	145	26	10	14	21
2020	178	29	16	24	16
2021	206	33	19	16	30
2022	216	37	26	5	37

Petracca et al. (2023a) developed a model to estimate current and project future population dynamics of wolves in Washington. The previous model (Maletzke et al. 2016) used to inform the Wolf Conservation and Management Plan for Washington (Wolf Plan) was developed using data from wolves in the NRM as there was not enough empirical data available from Washington wolves for such an effort

at the time. The model from Petracca et al. (2023a) is the first effort of its kind developed using data from Washington's wolf population rather than data from wolves in other states. Petracca et al. (2023a) used data from 74 collared wolves in Washington and yearly pup and pack counts to parameterize the model, and then projected statewide dynamics over 50 years. In this model, wolf abundance at the state level increased from a median of 271 (95% prediction interval [PI] = 77-523) in 2030 to 544 (54-1363) in 2070, with λ growth of 1.03 (1.00-1.05) over the projection period (2021-2070). Median probability of recovery (i.e., four breeding pairs in each recovery region, with three additional breeding pairs anywhere in the state) across all years (2021-2070) was 0.72 (95% PI = 0.00-1.00). This probability of recovery increased over time, from 0.00 (0.00-0.00) in 2020 to 0.94 (0.02-1.00) in 2070. Median probability of quasi-extinction across all years (i.e., <92 adult wolves in the state and <24 adult wolves in each recovery region from 2021-2070), as well as median probability of extinction (i.e., zero wolves in 2070), were close to 0 ([0.00, 95% PI = 0.00-0.32] and [0.00, 0.00-0.00], respectively).

Petracca et al. (2023b) predicted the effects of 12 scenarios relating to management actions (e.g., lethal removals, translocation, harvest) and system uncertainties (e.g., immigration from out of state, disease) on the probability of meeting Washington's wolf recovery goals, along with other metrics related to population status. Most scenarios indicated a high probability of wolf recovery in Washington over the next 50 years, but scenarios related to harvest mortality (removal of 5% of the population every six months), increased lethal removals (removal of 30% of the population every four years), and cessation of immigration from out of state resulted in low probabilities (0.11, 0.18, and 0.27, respectively) of meeting recovery goals across all years (2021-2070). However, while recovery goals were not predicted to be met in those scenarios, all 12 management scenarios exhibited a geometric mean of population growth that was at or above 1, indicating long-term population stability or growth, depending on the scenario. These results suggest that long-term survival of Washington's wolf population is highly probable, wolves will continue to recolonize unoccupied, suitable habitat in Washington, and that recovery goals will be met if harvest and lethal removals occur at or near modeled levels (see section "Lethal control and harvest" below for discussion of sustainable levels of wolf mortality) and wolves continue to immigrate to Washington from surrounding states and provinces (see section "Management in other states" below for discussion of immigration).

2011 Wolf Conservation and Management Plan Recovery Objectives for Washington

The Wolf Plan, finalized in 2011, guides wolf recovery in Washington. The Wolf Plan designates three recovery regions: Eastern Washington, the Northern Cascades, and the Southern Cascades and Northwest Coast (Figure 7).

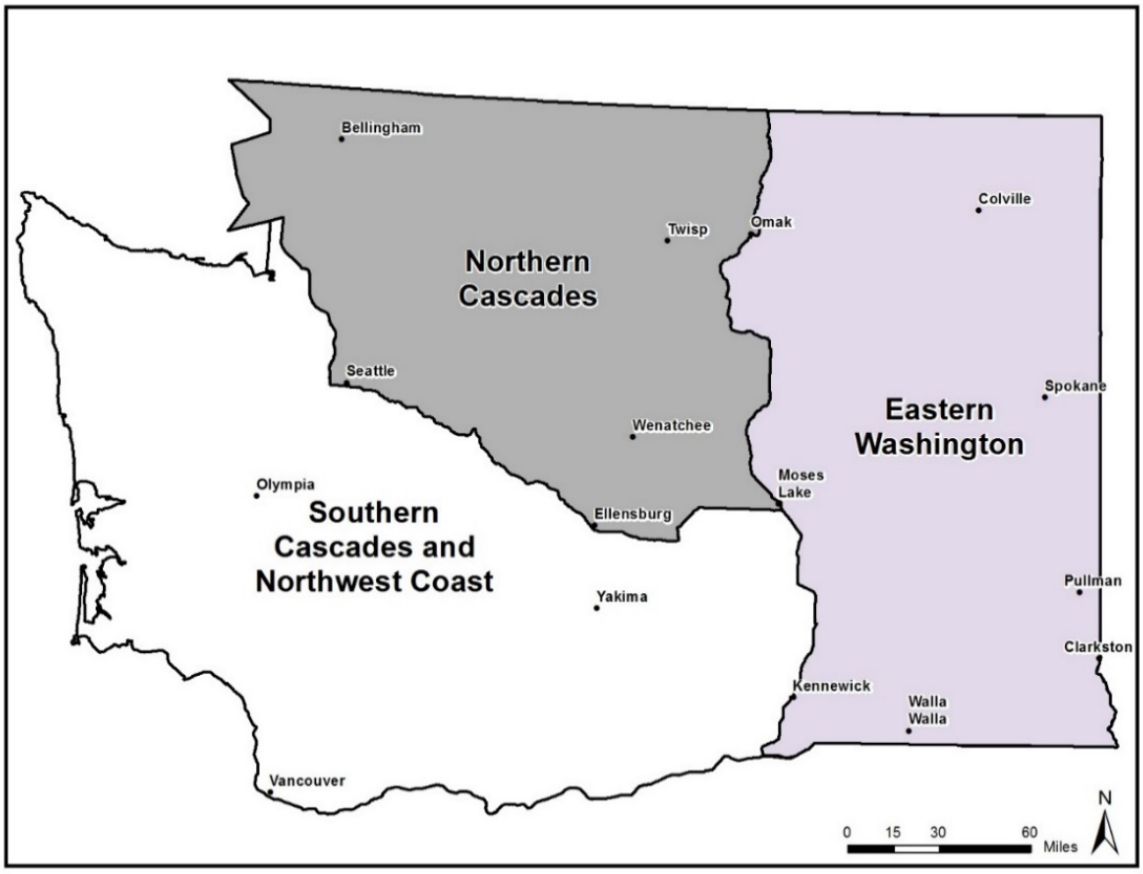

Figure 8. Washington wolf recovery regions as defined in the 2011 Wolf Conservation and Management Plan (Wiles et al. 2011).

The Wolf Plan designated target numbers and distribution for downlisting and delisting within the three recovery regions as follows:

- To reclassify from state endangered to state threatened status: 6 successful breeding pairs present for 3 consecutive years, with 2 successful breeding pairs in each of the three recovery regions.
- To reclassify from state threatened to state sensitive status: 12 successful breeding pairs present for 3 consecutive years, with 4 successful breeding pairs in each of the three recovery regions.
- To delist from state sensitive status: 15 successful breeding pairs present for 3 consecutive years, with 4 successful breeding pairs in each of the three recovery regions and 3 successful breeding pairs anywhere in the state.

In addition to the delisting objective of 15 successful breeding pairs distributed in the three geographic regions for 3 consecutive years, an alternative delisting objective was also established whereby the gray wolf will be considered for delisting when 18 successful breeding pairs are present, with 4 successful breeding pairs in the Eastern Washington region, 4 successful breeding pairs in the Northern Cascades

region, 4 successful breeding pairs distributed in the Southern Cascades and Northwest Coast region, and 6 anywhere in the state.

As of 2022, in terms of the **number and duration** of successful breeding pairs, both minimum objectives for delisting have been exceeded (15 successful breeding pairs for 3 consecutive years, and 18 successful breeding pairs for a year; Table 3). The objective of maintaining at least 4 successful breeding pairs has been met in 2 of 3 recovery regions (the Eastern Washington region and Northern Cascades region). No successful breeding pairs have been documented in the Southern Cascades and Northwest Coast region, thus the **geographic distribution** objective has not been met in this recovery region (however, although not a successful breeding pair, the first known pack was documented in this region as of 2022).

The Wolf Plan recognized that recovery objectives may need to be revisited as wolves recolonized Washington, stating, "The expectation is that over time, as wolves recolonize Washington, WDFW will be able to collect data from within the state to determine whether the model assumptions are appropriate. If future data reveal that the population dynamics of wolves in Washington are significantly different from those used in the model, these conclusions will need to be reevaluated. Incorporating wolf demographic data specific to Washington will allow WDFW to update predictions of population persistence during wolf recovery phases and to revise the recovery objectives, if needed" (pg. 67-68). Although the Wolf Plan accurately predicted that "recovery is…likely to happen more quickly through the reoccupation of eastern Washington than waiting for wolves to reach far western Washington" (pg. 60), the Wolf Plan did not predict exceeding the recovery objective in eastern Washington by five times prior to meeting geographic distribution objectives. Wolf Plan predictions of how **numbers** of wolves would correspond to state listing status (see Table 4 in the Wolf Plan, pg. 65) show that Washington's current wolf population **numbers** align with a non-endangered population.

The Wolf Plan's recovery objectives were established to address the status of the wolf population across a significant portion of their range. WAC 220-610-110 (section 2.9) defines a "significant portion of its range" as "that portion of a species' range likely to be essential to the long term survival of the population in Washington." Down- and delisting criteria in the Wolf Plan were set to describe the population's status based on occupancy by successful breeding pairs across three recovery areas (Figure 7). The numbers of successful breeding pairs needed per recovery region were identified to describe the status of wolves given a statewide distribution. However, the area in Washington currently occupied by wolves has greatly exceeded those minimum successful breeding pair numbers. Model projections from Petracca et al. (2023a, 2023b) indicate Washington's wolf population currently occupies an area essential to their long-term survival and is not in danger of extinction or becoming endangered with their current distribution and population trend.

Although current wolf distribution in Washington is not what was predicted in the Wolf Plan, the numbers of wolves and successful breeding pairs in the areas they do occupy represent a significant portion of the range to the extent that they are no longer seriously threatened with extinction or likely to be threatened with extinction in the foreseeable future in Washington state. However, WDFW believes the Wolf Plan recovery targets of at least four successful breeding pairs in each recovery region

for **delisting** are still appropriate, attainable through natural recolonization, and ensure adequate distribution of reproducing wolves throughout the state.

Table 3. Objectives for downlisting and delisting wolves in Washington by number, duration of occupancy, and geographic distribution of successful breeding pairs (Wiles et al. 2011). As of 2022, all plan recovery objectives have been met with the exception of a minimum of four breeding pairs in the Southern Cascades and Northwest Coast recovery region.

Successful breeding pair number and duration objectives	2011 WOLF PLAN DOWNLISTING AND DELISTING OBJECTIVES								
	Eastern Washington		Northern Cascades		Southern Cascades and Northwest Coast		Anywhere in state		Duration of occupancy
	Objective	*As of 2022*	*Objective*	*As of 2022*	*Objective*	*As of 2022*	*Objective*	*As of 2022*	
Threatened (6 pairs/ 3 years)	2	20	2	6	2	0	N/A	N/A	Objective met
Sensitive (12 pairs/ 3 years)	4		4		4		N/A	N/A	Objective met
Delist (15 pairs/ 3 years)	4		4		4		3	Objective met	Objective met
Delist (18 pairs)	4		4		4		6	Objective met	Objective met

FACTORS AFFECTING CONTINUED EXISTENCE

Adequacy of Regulatory Mechanisms

Federal regulatory protection. Wolves in Washington are federally protected under the ESA in most of Washington (the western two-thirds of the state [Figure 3] and in two of three state-designated recovery regions [Figure 7]). Wolves are not subject to lethal control or harvest where they are federally protected. The "caught in the act" provision (section 1) of WAC 220-440-080 only applies to the area of the state where the gray wolf is not listed as endangered or threatened under the ESA. It is worth noting that wolf population growth in Washington has largely occurred in the absence of federal protection as the majority (60-86% of packs 2011 – 2022, average 79%) of Washington wolf packs occur in the eastern third of Washington where wolves have not been federally protected since 2011.

State regulatory protection. The gray wolf was listed as endangered by the State of Washington in 1980 (WAC 220-610-010) and receives protection under state law (RCW 77.15.120) from hunting, possession, malicious harassment, and killing. WDFW does allow for agency lethal control, issue of depredation permits, and "caught in the act" removal (WAC 220-440-080) under state endangered status as laid out in the Wolf Plan. Wolves are not designated as a game species in Washington and therefore are not subject to state hunting seasons; they are subject to tribal harvest on reservation or by tribes that have off-reservation hunting rights where not federally protected. Downlisting wolves to state threatened or sensitive status would protect them under RCW 77.15.130 and would not change any of the allowed management actions (in the federally delisted portion of Washington) listed above.

Appendix A shows differences in conservation/management provisions for wolves under state endangered and protected species classifications. Potential reclassification to state threatened or sensitive status is not anticipated to affect future wolf population projections given the protections afforded under either listing.

Other Factors

Lethal control and harvest. Wolves in Washington are subject to lethal control in response to conflicts with livestock and harvest by tribes where they are not federally listed (currently, only the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians allow wolf hunting). WDFW only considers lethal removal of wolves if it is not expected to harm the wolf population's ability to reach recovery objectives statewide or within individual wolf recovery regions. WDFW uses empirical and predictive data to determine whether removal would harm recovery each time lethal removal of wolves is considered. WDFW only considers lethal removal of wolves in the portion of the state where the gray wolf is not listed as endangered or threatened under the federal ESA. WDFW has used lethal removal in an attempt to resolve conflicts with livestock in nine of 15 years of wolf recovery in Washington, and annually since 2016. Scenarios in Petracca et al. (2023b) related to harvest mortality (removal of 5% of the population every six months) and increased lethal removals (removal of 30% of the population every four years) resulted in low probabilities (0.11 and 0.18, respectively) of meeting recovery goals in the future (2021-2070) although a lower level of harvest (removal of 2.5% of the population every six months) resulted in a substantially higher predicted probability of recovery (0.44).

Since 2020 (and overall 2008-2022; Table 1), tribal harvest has been the largest source of wolf mortality in the state. The Confederated Tribes of the Colville Reservation currently allow for a year-round hunting season for wolves on both the North Half and South Half of the Colville Reservation with the use of any legal weapon, harvest of either sex, and no daily or season limits. Trapping and snaring seasons run November 1 – February 28 and include either sex harvest using any legal trap or snare and no daily or season limit. Regulated wolf harvest is also allowed for tribal members on the Spokane Indian Reservation. Wolf seasons remain open year-round or until a maximum of 10 wolves are taken during the calendar year. Trapping and/or snaring is allowed by special permit only with a season from October

1 –February 28. Statewide, the current geographic scope of harvest is localized and limited to the areas noted above, and not permitted where wolves are federally listed in the western two-thirds of the state. Because of the limited geographic scope and scale of tribal harvest, this practice is not expected to affect the overall viability and persistence of Washington's wolf population, but harvest may affect annual and mean population growth rates and time to reach statewide recovery goals. It is unknown how tribal harvest might be affecting wolf dispersal; however, collared wolf data shows dispersing wolves successfully moving through the areas where harvest is legal.

It has been estimated that wolf populations can remain stable to slightly increasing with anthropogenic mortality rates of 22-48% if reproduction and immigration are high (Hayes and Harestad 2000, Larivière et al. 2000, Fuller et al. 2003, Adams et al. 2008, Creel and Rotella 2010, Gude et al. 2012). Wolves can rebound and recolonize territory even following intensive lethal control (e.g., following intensive aerial reduction in the Yukon, Canada, the wolf population increased 88% in six years; Hayes and Harestad 2000). In most locations, sustainable mortality rates range from about 22-24% (Creel and Rotella 2010). The factors most influential to the percentage of a wolf population that can be killed by humans annually without reducing the population are its productivity and the rate of immigration from source populations (Fuller et al. 2003). If productivity is low and immigration limited, human-caused mortality can have a larger impact on population growth; if productivity is average or high, higher mortality rates can be sustained, especially if the controlled population is near a source population providing dispersers (Fuller et al. 2003).

Both the western United States (comprised of Idaho, Montana, Wyoming, Oregon, Washington, and California) and Great Lakes (comprised of Michigan, Minnesota, and Wisconsin) wolf metapopulations are connected to large and expansive populations of wolves in western Canada (estimated about 15,000 wolves) and eastern Canada (estimated about 12,000-14,000 wolves), respectively. The wolf populations within the states listed above are not discrete; in fact, they are extensions of the large populations in Canada and effective dispersal has been documented across state and international boundaries (USFWS 2020b).

Despite relatively high levels of mortality due to liberal harvest and lethal removal in response to livestock depredation, Idaho, Montana, and Wyoming have maintained stable wolf populations without federal protections for over a decade (Table 4, USFWS 2020a). From 2009 – 2015, Idaho removed an average of 10% of its wolf population in lethal control actions with total annual mortality from all causes averaging 45%; from 2009 – 2017, Montana removed an average of 14% of its wolf population in lethal control actions with total annual mortality from all causes averaging 47%; from 2009 – 2017, Wyoming removed an average of 15% of its wolf population in lethal control actions with total annual mortality from all causes averaging 30% (Table 4, USFWS 2020a). Recent year-end estimates indicate approximately 1,000 wolves occur in Idaho and 819 wolves occur in Montana; the most recent year-end minimum count shows at least 311 wolves in Wyoming (USFWS 2020b).

In the Great Lakes region of the United States (Michigan, Minnesota, and Wisconsin), 2,773 wolves were killed in response to depredations over a 33-year period during which this population was federally

protected (Ruid et al. 2009). Despite lethal control actions during this recovery phase, wolves in the Great Lakes region have since increased to roughly 4,200 animals and now occupy most suitable habitat in the region (Ruid et al. 2009, USFWS 2020b). The annual percentage of each of the three states' wolf populations removed for depredation management ranged from 1-7% while their wolf populations were increasing and is currently about 5% annually with no evidence of jeopardizing population viability (Ruid et al. 2009).

Lethal removal of wolves in response to livestock depredations has not had significant effects on recovery or continued viability of wolves in the western United States or Great Lakes wolf metapopulations, likely due to normal or high productivity levels and genetic connectivity of these wolf populations with those in Canada (USFWS 2020b).

Although use of lethal control as a strategy to promote wildlife conservation is difficult considering the history of wolf eradication in the United States, lethal control may contribute to wolf conservation. Treves and Naughton-Treves (2005) found that "short, selective removal of problem animals by government agents may be necessary to protect wildlife from extinction via widespread, illicit retaliation" (Treves and Naughton-Treves 2005, pg. 105) and "when highly endangered species kill livestock or take human lives, the best form of lethal control is highly accurate, selective removal of 'problem' animals by formally appointed and trained agents" (Treves and Naughton-Treves 2005, pg. 103).

Table 4. Percentage and number of individuals of the minimum population lethally removed, percentage and number of individuals included in total mortality, and minimum population counts of wolves in Idaho, Montana, and Wyoming, 2009 – 2017 (USFWS 2020a).

Year	Idaho			Montana			Wyoming		
	% min. pop. Lethally removed (# individuals)[1]	% total mortality (# individuals)[1]	Min. pop. Count	% min. pop. Lethally removed (# individuals)[1]	% total mortality (# individuals)[1]	Min. pop. Count	% min. pop. Lethally removed (# individuals)[1]	% total mortality (# individuals)[1]	Min. pop. Count
2009	11 (93)	31 (272)	870	28 (145)	49 (258)	524	10 (32)	18 (57)	320
2010	10 (78)	19 (144)	777	25 (141)	32 (179)	566	12 (40)	20 (69)	343
2011	8 (63)	39 (296)	768	10 (64)	33 (216)	653	11 (37)	20 (64)	328
2012	10 (73)	59 (425)	722	17 (108)	28 (324)	625	16 (43)	49 (136)	277
2013	14 (94)	72 (473)	659	12 (75)	53 (335)	627	11 (33)	36 (109)	306
2014	9 (67)	47 (360)	770	10 (57)	55 (306)	554	11 (37)	23 (78)	333
2015	10 (75)	45 (357)	786	7 (39)	51 (276)	536	14 (54)	22 (84)	382
2016	NA	NA	NA	11 (52)	70 (334)	477	30 (113)	35 (132)	377
2017	NA	NA	NA	9 (57)	48 (305)	633	18 (62)	48 (168)	347

[1] Derived by dividing the number of individuals by the minimum population count.

Poaching. Wolf poaching (i.e., illegal killing, unauthorized take) is a major source of mortality for wolf populations around the world (Liberg et al. 2011, Suutarinen and Kojola 2017, Treves et al. 2017). Poaching is challenging to document and measure and may be underestimated as a result. Wolf poaching in Washington represents 11% of documented mortality, 2008 – 2022, but was higher in 2022 than in previous years (Table 1, Figure 6) due to a poisoning incident that killed six wolves. In addition to documented wolf poaching in the state, undoubtedly there is poaching that goes undetected as well. It is uncertain whether collared wolves are a representative sample of the population with respect to their risk of being illegally killed, or whether collared wolves are instead at disproportionately high or low risk of poaching. Although the extent of undocumented poaching in Washington is not known, Washington's wolf population has continued to increase and poaching has not yet affected its continued existence in the state. A significant increase in poaching adding to overall wolf mortality in the state could be unsustainable in the future depending on the extent.

Other human-caused mortality. All other sources of human-caused mortality represent a much lower level (16%, Table 1, Figure 6) of all documented wolf mortality in the state. As wolves populate the Southern Cascades and Northwest Coast recovery region and western Washington, it is possible that vehicle collisions may increase along the I-5 corridor. Legal caught-in-the-act incidents likely would not increase given the wolf's federally protected status in the western two-thirds of Washington but could increase if wolves are federally delisted statewide in the future.

Management in other states. Wolves in Washington are part of the population in the Northern Rocky Mountains (Idaho, Montana, Wyoming, and parts of Oregon and Washington, with connectivity to British Columbia, Canada). The wolf populations within this region are not discrete; they are extensions of the large populations in Canada and effective dispersal has been documented across state and international boundaries (USFWS 2020b). Some of Washington's neighboring states have management goals of significantly decreasing the wolf populations within their states (Idaho aims to decrease their wolf population by approximately 63% [IDFG 2023]; Montana passed legislation in 2021 requiring Montana Fish, Wildlife, and Parks to make efforts to reduce Montana's wolf population [Montana SB 314, 2021]). It is unknown how efforts to reduce wolf populations in neighboring states may affect immigration and dispersal of wolves from other states into Washington. Petracca et al. (2023b) modeled scenarios including reducing immigration of wolves into Washington by 50%, and by 100%. Under the 50% immigration scenario, there was a 69% probability that the population would still meet recovery criteria projected over the next 50 years. Under the scenario of no immigration, the probability was 27% (total cessation of all wolf immigration into Washington is highly unlikely given the connectivity of Washington's wolves to a much larger population in Canada and the NRM). However, both scenarios showed a geometric mean of population growth ≥1, indicating long-term population stability or growth (Petracca et al. 2023b).

Disease (text adapted and updated from 2011 Wolf Conservation and Management Plan, Wiles et al. 2011). Wolves are susceptible to a number of viral and bacterial diseases, including rabies, canine parvovirus, canine distemper, canine adenovirus (canine hepatitis), canine herpesvirus, and leptospirosis (Kreeger 2003, Mech et al. 2008, Almberg et al. 2009, ODFW 2019). None of these appear to threaten

the long-term population viability of wolves in the northern Rocky Mountain states, although periodic outbreaks of canine distemper have been linked to poor pup survival and population decline in some years (Almberg et al. 2009, Brandell et al. 2020). Wolves at Yellowstone National Park have shown high and relatively constant levels of exposure to canine parvovirus and canine adenovirus since their reintroduction in 1995, but each disease has produced little or no wolf mortality (Almberg et al. 2009). Canine parvovirus is suspected to have caused a decline in the wolf population at Isle Royale National Park, Michigan (Kreeger 2003), and in Wisconsin during the early 1980s when its wolf population was <30 animals (Wydeven et al. 1995). In Minnesota, canine parvovirus limited population growth and expansion of the wolf population through reductions in pup survival (Mech et al. 2008). Rabies may limit population growth in some situations (Kreeger 2003).

Wolves host various parasites, but most produce little pathology and do not regulate populations (ODFW 2019). Sarcoptic mange has been documented in wolves in Montana and Wyoming, but not Idaho (Jimenez et al. 2010). Occurrence of this disease increased noticeably among wolves at Yellowstone National Park in 2008 and 2009 (Brandell et al. 2020). Mange outbreaks can be locally severe and persistent in wolves, and commonly can result in mortalities, but are not considered a serious threat to population persistence (Jimenez et al. 2010, Brandell et al. 2020) and mange is now considered enzootic in Yellowstone National Park (Brandell et al. 2020). Minor cases of parasite infestation have been documented in Washington wolves, but no known significant or population-regulating effects of disease or parasites have been observed in Washington's wolf population.

Climatic impacts. Because wolves are adaptive generalists, climate change likely will not affect them directly. However, climate change may have significant effects on their prey which could indirectly impact the survival, density, and distribution of wolves. Unprecedented climate change is altering habitat conditions. Investigations of ungulate range conditions across the west suggest most populations are experiencing some level of nutritional limitation and additional stress due to climate change that may have negative effects on population performance (Cook et al. 2013, Johnson et al. 2019). Climate-induced changes with increased temperature and altered precipitation patterns may create difficulties for ungulates. For example, resource availability during critical times such as parturition and while females are lactating could become mismatched with peak spring green-up (Post and Forchhammer 2007). Snow accumulation, snow melt, green-up magnitude and duration are changing but not consistently across all western herds. In some cases, elk can match their need with the available resources by interpreting environmental cues (Rickbeil et al. 2019), and by altering their site fidelity based on experience with resource tracking the previous spring (Morrison et al 2020). However, examples of additional stress from climate change resulting in poor population performance have been documented. Investigations of a migratory elk herd in the Greater Yellowstone Ecosystem revealed a shift of green-up duration by 27 days over the last two decades (Middleton et al. 2013). The shift was linked to increases in April-August temperature concurring with April-May precipitation declines. These climatic changes facilitate a rapid but short green-up period and reduced forage availability for migrating elk, which was a contributing factor to poor annual reproductive success. Snow accumulations and available forage influenced by climate change can also have a strong influence on the age class and gender of elk that are killed by wolves (Wilmers et al. 2020).

MANAGEMENT ACTIVITIES

In 2007, anticipating dispersal of wolves into Washington from surrounding states and provinces, and the likely formation of resident packs, WDFW initiated development of a state Wolf Conservation and Management Plan for Washington (Wolf Plan). Assisted by an 18-member working group comprised of stakeholders, the Wolf Plan was adopted in December 2011 by the state Fish and Wildlife Commission. The purpose of the plan is to ensure the reestablishment of a self-sustaining population of gray wolves in Washington and to encourage social tolerance for the species by addressing and reducing conflicts.

Goals of the plan are to:

- Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>50-100 years).
- Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population.
- Maintain healthy and robust ungulate populations in the state that provide abundant prey for wolves and other predators as well as ample harvest opportunities for hunters.
- Develop public understanding of the conservation and management needs of wolves in Washington, thereby promoting the public's coexistence with the species.

Management and research activities related to each of these plan goals are described in depth in Washington Gray Wolf Conservation and Management Annual Reports, provided annually from 2011 to 2022 (all reports available here). These reports describe annual population monitoring efforts (including techniques, status and distribution, captures and monitoring, dispersal information, harvest information, and documented mortality), management efforts (including wolf-livestock conflict management, conflict deterrence, cost-sharing for conflict deterrence, compensation for livestock losses, and wolf interactions with ungulates), ongoing research, and outreach initiatives.

CONCLUSIONS AND RECOMMENDATIONS

Washington's wolf population is robust. Since WDFW's first wolf population survey in 2008, the wolf population has increased for 14 consecutive years by an average of 23% per year. Although growth of the minimum population has slowed in recent years, which is expected following initial recolonization of habitat formerly completely unoccupied by wolves, the number of documented packs and successful breeding pairs continues to increase. Northeast and southeast Washington wolf population growth has slowed due to wolf reoccupation of most of the available suitable habitat. The 2022 annual population revealed a continued increase in wolf packs and successful breeding pairs in the North and Central Cascades as well as novel presence in the South Cascades.

Model projections from Petracca et al. (2023a, 2023b) show mean population growth of 1.29 (95% CRI 1.26-1.33) during initial recolonization from 2009-2020 decreasing to 1.03 (IQR 1.00-1.05) in the projection period (2021-2070). Their projections suggest that wolves have a >99% probability of colonizing the Southern Cascades and Northwest Coast recovery region by 2030, regardless of alternative assumptions about how dispersing wolves select new territories. In the model, only scenarios that included harvest mortality (removal of 5% of the population every six months), increased lethal removals (removal of 30% of the population every four years), and cessation of immigration from out of state resulted in low probabilities (i.e., probabilities <0.30) of meeting recovery goals in the next 50 years. However, although recovery goals were not predicted to be met in those scenarios, all management scenarios analyzed exhibited a geometric mean of population growth that was at or above 1, indicating long-term population stability or growth of Washington's wolf population, depending on the scenario.

Washington's wolf population has far exceeded the Wolf Plan objectives for delisting in terms of the number and persistence of successful breeding pairs. However, the Wolf Plan objectives also consider wolf presence in each of the state's three recovery regions (Figure 8); furthermore, all listed classifications (e.g., endangered, threatened, sensitive) consider a significant portion of the species' range within the state. WAC 220-610-110 (section 2.9) defines a "significant portion of its range" as "that portion of a species' range likely to be essential to the long term survival of the population in Washington." Model projections from Petracca et al. (2023a, 2023b) indicate Washington's wolf population currently occupies an area essential to their long-term survival and is not in danger of extinction or becoming endangered with their current distribution and population trend. However, the geographic distribution standards of the Wolf Plan have not yet been met for the Southern Cascades and Northwest Coast recovery region.

As discussed in the "Population and Habitat Status" section in this document above, no successful breeding pairs have been documented yet in the Southern Cascades and Northwest Coast recovery region, although the first known pack was documented in this region as of 2022. Although individual wolves have been detected in western Washington (i.e., west of the Cascades [where models indicate most unoccupied, suitable wolf habitat in the state remains; Figure 6]), no known packs or reproductive individuals have been documented as of 2022. The Wolf Plan specifically indicates the importance of the recovery region that has not yet met plan recovery objectives: "In particular, the southern Cascade Mountains contain a large amount of high quality habitat. This area contains abundant natural prey for wolves, including nearly half of Washington's elk population, and large contiguous blocks of forested public and private lands, where low levels of conflict with livestock are expected. As a result, the southern Cascades have the potential to support a source population of wolves, a factor of importance with regard to the long-term survival of the wolf population in Washington" (pg. 60). WDFW recommends observing the Wolf Plan recovery targets for delisting of at least four successful breeding pairs in each recovery region. We believe that these targets are attainable through natural recolonization and ensure adequate distribution of reproducing wolves throughout the state. WDFW does not recommend delisting wolves at this time.

Based on 14 consecutive years of population growth, population modeling predictions that indicate Washington's wolf population is robust and will continue to grow and expand its range (including in the Southern Cascades and Northwest Coast recovery region), and ongoing state and federal protections, we conclude that the wolf does not meet the definition of State Endangered, which requires that the species is "seriously threatened with extinction" (WAC 220-610-110).

Similarly, WDFW believes that the wolf does not best fit the definition of State Threatened, which requires that a species is "...likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats" (WAC 220-610-110). Current information does not indicate that wolves are threatened with extinction or likely to be threatened with extinction in the foreseeable future in Washington state.

WDFW's draft recommendation is to reclassify the wolf to State Sensitive, "vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats" (WAC 220-610-110). This status reflects the significant progress toward recovery that Washington's wolf population has made since the original state listing in 1980 but recognizes that wolves remain vulnerable in western Washington and should continue to be managed for recovery within the state as a protected species. Continued population growth and range expansion will depend on the robustness of source populations in eastern Washington (as well as neighboring states and provinces) and cooperative management to ensure sources of human-caused mortality do not impede recovery.

Downlisting wolves to state sensitive status would continue to protect them under RCW 77.15.130 and protections precluding hunting would remain in place. The definitions of State Threatened and State Sensitive under WAC 220-610-110 are very similar and both fall under the designation of protected wildlife under RCW 77.15.130. **Appendix A** shows differences in conservation/management provisions for wolves under endangered and protected state species classifications and can assist policy makers in weighing the implications of future management actions. WDFW anticipates receiving additional information through the Draft Periodic Status Review public process that will help explore how to consider these complex issues.

WDFW remains committed to the recovery and long-term sustainability of Washington's wolf population. WDFW will continue to work closely with partners, stakeholders, and communities, just as we have over the past decade, on the recovery, conservation, and management of wolves in Washington, with a focus on reducing conflict between wolves and livestock and achieving statewide recovery objectives.

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Table 5. Key to 34.05.271 RCW categories.

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

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Appendix A. Differences in conservation/management provisions for gray wolves under endangered and protected state species classifications

Note: Most items in this table do not differ among the endangered and protected state species classifications. Those items that do differ are highlighted in yellow. Wolves are federally listed in the western two-thirds of Washington (as of May 2023) and most of these actions (including lethal take) do not apply where wolves are federally protected. All proposed state conservation/management actions in areas of Washington where the species is federally listed are contingent on consistency with federal law and consultation and approval by the U.S. Fish and Wildlife Service.

Conservation/management action (source)	**Endangered and protected state species classification**		
	Endangered	**Protected wildlife**	
	Any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state (WAC 220-610-110). (See WAC 220-610-010 for example species.)	**Threatened** Any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats (WAC 220-610-110). (See WAC 220-200-100 for example species.)	**Sensitive** Any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats (WAC 220-610-110). (See WAC 220-200-100 for example species.)
Criminal enforcement penalty for illegal take (RCW 77.15.120, RCW 77.15.130)	RCW 77.15.120 protects endangered species from hunting, possession, malicious harassment, and killing; penalties for illegally killing a state endangered species range up to $5,000 and/or one year in jail.	RCW 77.15.130(1)(c) prohibits the hunting, possession or malicious harassment of threatened or sensitive wildlife unless authorized by rule of the commission, a WDFW permit, or a federal permit; the maximum penalty for violations is 90 days in jail and/or a $1,000 fine.	

"Caught-in-the-act" lethal take (WAC 220-440-080)	An owner of domestic animals, the owner's immediate family member, the agent of an owner, or the owner's documented employee may kill one wolf without a permit issued by the director, regardless of its state classification, if the wolf is attacking their domestic animals.	
Wolf location information to livestock owners (2011 Wolf Plan)	Provided under each status	
Non-injurious harassment (2011 Wolf Plan)	Allowed under each status	
WDFW authorization for livestock owners and grazing allotment holders (and their agents) to use non-lethal injurious harassment (2011 Wolf Plan)	May grant authorization to strike wolves with non-lethal projectiles if WDFW required training is completed. Under the endangered classification, an authorization would be reconsidered if used inappropriately or a mortality occurs.	Allowed with a permit and training from WDFW.
Move individual wolves to resolve conflicts (2011 Wolf Plan)	May be used by state/federal agents to resolve conflicts on a case-by-case basis under each status.	
Lethal control by state/federal agents of wolves involved in repeated livestock depredations (2011 Wolf Plan)	Allowed during all listed statuses and after delisting, consistent with federal law.	
WDFW permits for lethal control by livestock owners (including family members and authorized employees) of wolves to resolve	Typically not issued, except WDFW may consider issuing a permit to a livestock owner (including family members and authorized employees) to conduct lethal control if WDFW does not have the resources to address control.	May be issued to livestock owners (including family members and authorized employees) with an issued permit on private lands and public grazing allotments they own or lease.

repeated wolf-livestock conflicts (2011 Wolf Plan)		
WDFW permits for lethal take of wolves in the act of attacking (biting, wounding, or killing) livestock, including guarding/herding animals (2011 Wolf Plan)	May be issued to livestock owners (including family members and authorized employees) on private land they own or lease and public grazing allotments after documented depredation (injury or killing) in the area. Would trigger a review by WDFW if used inappropriately or if 2 wolf mortalities occur under this provision in a year. WDFW would evaluate the circumstances of the mortalities and determine if it would continue issuing permits.	
Compensation for livestock loss (2011 Wolf Plan)	Yes under each status	
Assistance to livestock owners with the use of proactive non-lethal management tools (2011 Wolf Plan)	Yes under each status	
Title 222 WAC (Forest Practices Board): Critical habitats (state) of threatened and endangered species (WAC 222-16-080)	Harvesting, road construction, or site preparation within 1 mile of a known active den site, documented by the department of fish and wildlife, between the dates of March 15 and July 30 or 0.25 mile from the den site at other times of the year.	Does not apply