IN THE COURT OF APPEALS OF THE STATE OF OREGON

CASCADIA WILDLANDS, an Oregon non-profit corporation; CENTER FOR BIOLOGICAL DIVERSITY, a California non-profit corporation; and OREGON WILD, an Oregon non-profit corporation,

Petitioners,

v.

DEPARTMENT OF FISH AND WILDLIFE, an agency of the State of Oregon; and FISH AND WILDLIFE COMMISSION, an agency of the State of Oregon,

Respondents,

and

OREGON CATTLEMEN'S ASSOCIATION, and OREGON FARM BUREAU FEDERATION,

Intervenor-Respondents,

and

WALLOWA COUNTY, a political subdivision of the State of Oregon,

Intervenor-Respondent.

Court of Appeals No. A161077

INTERVENOR-RESPONDENTS OREGON CATTLEMEN'S ASSOCIATION'S AND OREGON FARM BUREAU FEDERATION'S ANSWERING BRIEF

(Judicial Review of Administrative Rule – Department of Fish and Wildlife and Fish and Wildlife Commission)

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STATEMENT OF THE CASE

Intervenor-Respondents Oregon Cattlemen's Association and Oregon Farm Bureau Federation (Cattlemen and the Farm Bureau) accept the Statement of the Case in Petitioners' opening brief, with the following exceptions and modifications.

A. Summary of Argument

Petitioners challenge an administrative rule that amended OAR 635-100-0125 and removed the gray wolf from the Oregon endangered species list. Petitioners assert that the removal of the gray wolf violates the Oregon Endangered Species Act (Oregon ESA), exceeds Respondents' statutory authority, and was adopted without compliance with applicable rulemaking procedures. Pet Open Br at 1. Petitioners are wrong.

Respondents were legally compelled to remove the gray wolf from the Oregon endangered species list. Because the Oregon ESA only protects species and subspecies that are "native" to Oregon, ORS 496.004(6), and because only one subspecies of wolf is native to Oregon (the Great Plains wolf), Respondents should not have originally listed the entire gray wolf species, and the Canadian timber wolves currently present in Oregon are non-native wolves ineligible for protection under the Oregon ESA.

Further, Respondents gave a detailed explanation as to why 23% of the wolf's historical range in Oregon was excluded from consideration as a "significant portion of its range." As a result, Respondents properly excluded that portion of historical range, and were correct to analyze only the wolf's current range in Oregon to determine whether the wolf is in danger of extinction in Oregon. Therefore, this Court should reject Petitioners' challenge to the rule, and affirm the removal of the gray wolf from the Oregon endangered species list.

B. Supplemental Summary of Facts

(1) The method employed by the Oregon Department of Fish and Wildlife for measuring the wolf population in the state is a "minimum-observed count" method. ER 13. This method underestimates the actual wolf population for two reasons. First, it "does not account for all individual or non-territorial wolves . . . in all wolf populations" in Oregon. ER 13. Second, this method is necessary because it is unrealistic to expect a complete count of all wolves in Oregon. ER 13. As a result, the estimated population of 85 wolves in Oregon is an intentionally low estimate of the actual population.

(2) The Oregon Cattlemen's Association is a nonprofit organization that advocates for the economic, political, and social interests of about 13,000 cattle producers in Oregon, as well as the Oregon cattle industry generally.

Respondent-Intervenors' Mot to Intervene at 3. The Oregon Farm Bureau is a nonprofit organization that advocates for the interests of over 60,000 farming and ranching families in Oregon. *Id*. Members of the Cattlemen and the Farm Bureau have suffered financial and emotional harm from wolf depredations of their livestock and family pets. *Id*. at 4; ER 23, 25-27.

For years, both the Cattlemen and the Farm Bureau have worked to manage wolves in Oregon. Mot to Intervene at 4. Management efforts have included commenting before the legislature and administrative agencies, participating in the creation of Oregon's Wolf Conservation and Management Plan (Wolf Plan), and litigation. *Id*. at 4-5. A key aspect of the Wolf Plan was a bargain to provide protection for wolves for a period of time until sufficient numbers exist to ensure the continued, manageable success of the wolf in Oregon. ER 21-26. In spite of the economic and emotional losses suffered, the Cattlemen and the Farm Bureau, and their members, have honored their commitment to work under the Wolf Plan. Mot to Intervene at 5; ER 22-23, 26-27.

ANSWER TO ASSIGNMENT OF ERROR ONE

A. Concise Answer

Respondents did not exceed their statutory authority when they removed the gray wolf species from the Oregon endangered species list.

B. Preservation of Error

The Cattlemen and the Farm Bureau agree that preservation is not required under ORS 183.400(1).

C. Standard of Review

Under ORS 183.400(4), the Court may only declare a rule invalid if the rule violates constitutional provisions, exceeds the agency's statutory authority, or was adopted without compliance with applicable rulemaking procedures. *See Indus. Customers of Northwest Utilities v. Oregon Dep't of Energy*, 238 Or App 127, 129, 241 P3d 352 (2010). The Court's review of a rule "shall be limited" to examining the rule under review, the statutes authorizing the rule, and copies of documents necessary to show compliance with rulemaking procedures. ORS 183.400(3); *see also Wolf v. Oregon Lottery Comm'n*, 344 Or 345, 355, 182 P3d 180 (2008).

"The question in determining if a rule exceeds statutory authority is whether the rule corresponds to the statutory policy as we understand it." *Managed Healthcare Northwest, Inc. v. Dep't of Consumer & Bus. Serv.*, 338 Or 92, 96, 106 P3d 624 (2005) (quoting *Planned Parenthood Ass'n v. Dep't of Human Res.*, 297 Or 562, 573, 687 P2d 785 (1984)). In order to determine legislative intent, the Court must first look to the text and context of the statute, but may also look to legislative history to confirm or "illuminate" the statute's meaning. *State of Oregon v. Artissa Dehonda Gaines*, 346 Or 160, 171-173, 206 P3d 1042 (2009).

D. Argument

1. Respondents were legally compelled to delist the wolf because the wolves present in the state are a non-native subspecies of gray wolf which is not granted protection under Oregon's Endangered Species Act.

On November 9, 2015, Respondents removed the gray wolf (*canis lupus*) species from the Oregon endangered species list. Removal was proper because neither the gray wolf at the species level, nor the subspecies of wolves currently in Oregon, qualifies as an endangered species under the Oregon ESA.

The Oregon ESA defines endangered species as: (1) "[a]ny *native* wildlife species determined by the [Oregon Fish and Wildlife] commission to be in danger of extinction throughout any significant portion of its range within this state;" or (2) "[a]ny *native* wildlife species listed as an endangered species pursuant to the federal Endangered Species Act . . ."[1] ORS 496.004(6)

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[1] The "grandfather" clause of part two should not be read to require Respondents to list the gray wolf species solely because it is listed under the federal Endangered Species Act. As discussed below, the addition of the "native" qualifier in the Oregon ESA means only species on the Federal endangered species list that are native to Oregon may be listed under the Oregon ESA. Because only one subspecies of gray wolf is native to Oregon, only that subspecies may potentially be listed. The Canadian timber wolf subspecies currently in the state is not native to Oregon, and thus, cannot be listed as endangered under the Oregon ESA.

(emphasis added). The Oregon ESA defines "[n]ative" as "indigenous to Oregon, not introduced." ORS 496.171(2). "Species" is defined as "any species or subspecies of wildlife," and "any group or population of wildlife that interbreeds and is substantially reproductively isolated." ORS 496.004(15); 496.171(3).

The Oregon ESA's limited application to "native" species is fatal to Petitioners' claims. The definitions for endangered species in the Oregon ESA and the federal Endangered Species Act (Federal ESA) are substantially the same, except for the Oregon ESA's inclusion of the "native" limitation. *See* ORS 496.004(6); 16 USC 1532(6). The Federal ESA more broadly defines "endangered species" to mean "*any* species which is in danger of extinction throughout all or a significant portion of its range . . ." 16 USC 1532(6) (emphasis added). Because the Oregon ESA was enacted after the Federal ESA, and includes the limiting "native" qualifier not found in the Federal ESA, the Oregon Legislature intended to limit state protections under the Act to species native to Oregon, rather than all species wherever they occur. *See e.g.*, *J.R. Norton Co. v. General Teamsters, Warehousemen & Helpers Union*, 208 Cal App 3d 430, 442, 256 Cal Rptr 246 (Cal Ct App 1989) (establishing the analogous proposition that the "omission of a provision contained in a [federal] statute providing the model for action by the [state] Legislature is a strong indication that the Legislature did not intend to import such provision into the state statute.”).

Restricting the Oregon ESA’s application to native species is also consistent with the State’s wildlife policy in comparison to the purpose of the Federal ESA. Oregon’s express “wildlife policy” is limited to protecting species that are indigenous to Oregon. *See* ORS 496.012. In contrast, the Federal ESA was enacted to protect native, as well as non-native, species in accordance with international treaties and agreements to which the United States is party. *Foreign Listings under the ESA*, United States Fish and Wildlife Service: International Affairs.[2]

Here, listing the gray wolf as endangered at the species level conflicts with the Oregon ESA’s native limitation. While it may be consistent with the global application and purpose of the Federal ESA to list the entire gray wolf species as endangered,[3] such a listing is inconsistent with the Oregon ESA because, as discussed further below, only one subspecies of gray wolf is native to Oregon. Thus, only wolf subspecies that are native to Oregon may be

[2] https://www.fws.gov/International/laws-treaties-agreements/us-conservation-laws/endangered-species-act.html

[3] In any event, not all members of the gray wolf species are protected under the Federal ESA. For example, wolves are currently delisted under the Federal ESA in areas in Oregon east of Highways 395-78-95. ER 12.

considered for protections under the Oregon ESA—a threshold the Canadian timber wolves currently in Oregon cannot satisfy.

The differences between wolf subspecies are not merely paper distinctions. A brief history of wolves in North America is helpful to understanding those differences. The presence of wolves in North America is the result of at least three separate wolf "invasions" from Eurasia across Beringia. ER 11. The first invasion was by the ancestors of the *canis lupus baileyi* (Mexican wolf) subspecies, the second invasion was by the ancestors of the larger *canis lupus nubilus* (Great Plains wolf) subspecies, and the final invasion was by the ancestors of the still larger *canis lupus occidentalis* (Canadian timber wolf). ER 11. The latter invasions of successively larger wolves had the effect of displacing the already-present, smaller subspecies and pushing their ranges farther south. ER 11. As a result, the historical range for the Mexican wolf is primarily located in Mexico and the southwestern United States; the historical range for the Great Plains wolf covers the eastern regions of Canada, and the majority of the western, central, and Great Lakes regions of the United States (including Oregon); and the Canadian timber wolf's range covers Alaska and the mountainous regions of western, inland Canada. ER 2.

Not surprisingly, studies have established various genetic and physiological differences among the wolf subspecies. ER 3-11. After all, there would be no need for recognizing subspecies unless there were significant morphological differences between members of a broader species. Susan M. Haig, *et al*., *Taxonomic Considerations in Listing Subspecies Under the U.S. Endangered Species Act*, 20 Conservation Biology 1584, 1586 (2006).[4] One of the most obvious differences is that the Canadian timber wolf is larger than the subspecies native to Oregon—the Great Plains wolf. ER 11. Previously, Respondents properly accounted for distinctions between other wildlife species and subspecies when considering which ones to place on the Oregon endangered species list. For example, the Northern Spotted owl (*strix occidentalis caurina*) subspecies is listed as threatened, but not the Spotted owl (*strix occidentalis*) species, OAC 635-100-125, and the California least tern (*sterna antillarum browni*) subspecies is listed as endangered, but not the least tern (*sterna antillarum*) species, *id*., even though the least tern species is listed as endangered under the Federal ESA. *See* 50 Fed Reg 21784 (May 28, 1985). In this case, Respondents failed to distinguish between the native Great Plains wolf subspecies, and the broader gray wolf species which includes subspecies that are not native to Oregon.

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[4] http://watchdogwire.wpengine.netdna-cdn.com/northwest/files/2014/08/2006-Report-on-ESA-Subspecies-Controversy.pdf

Further, even the federal Fish and Wildlife Service distinguishes among the different wolf subspecies. In 2015, despite a proposed rule to delist the gray wolf species from Federal ESA protections, the federal Fish and Wildlife Service concurrently published a final rule to list the Mexican wolf subspecies as endangered. 80 Fed Reg 2488 (Jan. 16, 2015). Recognizing genetic and taxonomical distinctions between the Mexican wolf and the other gray wolf subspecies—including the Mexican wolf's status as the smallest wolf among the gray wolf species—the federal Service determined the listing was necessary to protect the subspecies. *See id*.

The only subspecies of gray wolf currently present in Oregon is the non-native Canadian timber wolf. ER 19-20. The Canadian timber wolves in Oregon are descendants of wolves introduced from western, inland Canada into Idaho in the mid-1990s as part of a federal program to reintroduce wolves to the western United States. ER 1, 18. As the experimental population of Canadian timber wolves in Idaho thrived, they expanded—and continue to expand—into Oregon. ER 19-20. Because the Canadian timber wolf is introduced, rather than indigenous to Oregon, it cannot be listed under the Oregon ESA. ORS 496.171(2); 496.004(6).

To allow non-native species or subspecies to be protected under the Oregon ESA would frustrate Oregon's enacted wildlife policy and run counter to the text of the Oregon ESA. Because the original listing of the gray wolf species failed to account for the non-native subspecies of gray wolf, and because the only wolf present in Oregon is a non-native subspecies, Respondents were legally compelled to remove the species from Oregon's endangered species list.

2. The relevant range to consider under the Oregon ESA is current range, not historical range.

Regardless of whether Respondents were legally compelled to remove the non-native Canadian timber wolf from the Oregon endangered species list, Respondents properly considered the wolves' current range in Oregon to determine whether they are in danger of extinction.[5] Petitioners are wrong to declare that the Oregon ESA and federal case law require Respondents also to include the wolves' historical range. Pet Open Br at 14-16. The natural reading of the Oregon ESA's text refers to current range, and the federal wildlife services' interpretation of the Federal ESA also supports such a reading. Further, cases relied upon by Petitioners are distinguishable due to Respondents' sufficient explanation as to why portions of historical range

[5] For the purposes of this section, ignoring the fact that the non-native Canadian timber wolf has no historical range in Oregon, the current range of the non-native wolves in Oregon is compared to the historical range of the native Great Plains wolves that were extirpated from Oregon.

were excluded from the calculus of current range, and instructive to determining the potential future range for the wolf.

a. "Range" only means "current range."

Oregon law contains multiple provisions referencing an endangered species' "range." The Oregon ESA defines "[e]ndangered species" as "any native wildlife species . . . in danger of extinction throughout *any significant portion of its range* within this state." ORS 496.004(6)(a) (emphasis added). The implementing regulations of the Oregon Department of Fish and Wildlife use the same language when discussing species' range. *See* OAC 635-100-0105; 635-100-0112.

The Oregon ESA does not define "range," but Petitioners and Respondents equate "range" with "suitable habitat." *See* Pet Open Br at 10; ER 14-18. Assuming that is correct, the proper interpretation of "range" is that it only means *current* range. A species' historical range is the range in which it once existed, but no longer does. By definition, a species cannot be "in danger of extinction" within range in which it is already extinct. Interpreting the language of ORS 496.004(6)(a) to include historical range, then, is illogical and violates the principle of non-contradiction.

The principle of non-contradiction is best understood for the proposition that two contradictory statements cannot both be true at the same time. Patrick

Wiseman, *Ethical Jurisprudence*, 40 Loy L Rev 281, 297-98 (1994). For example, "A is B" and "A is not B" are contradictory statements, and cannot both be true in the same context. Here, wolves cannot be extinct and in danger of extinction in the same range. It must be one or the other, or neither. Because historical range necessarily refers to range in which a species is no longer present, the only way Respondents can analyze whether wolves are in danger of extinction is by looking at their status within the range where they exist—their current range in Oregon. Thus, Respondents properly excluded historical wolf range.

b. The Federal Government interprets "range" to mean "current range."

The United States Fish and Wildlife Service and the National Marine Fisheries Service (Federal Services) considered the same interpretive question and reached the same conclusion: range means current, not historical, range. *Final Policy on Interpretation of the Phrase "Significant Portion of its Range,"* (July 31, 2014).[6] The Federal ESA defines "endangered species" to mean "any species which is in danger of extinction throughout all or a significant portion of its range . . ." 16 USC 1532(6). The Federal Services determined that the "in danger of extinction" language "denotes a present-tense condition." *Final*

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[6] Docket # FWS-R9-ES-2011-0031, http://regulations.gov.

Policy. Thus, "to say a species 'is in danger' in an area where it no longer exists—*i.e.*, in its historical range where it has been extirpated—is inconsistent with common usage." *Id*. As a result, "range" must mean current range, not historical range.

Because the Federal Services are the primary federal agencies responsible for enforcing and interpreting the Federal ESA, the *Final Policy* provides their considered judgment of what is workable and proper under the Federal ESA. Further, the *Final Policy* clarifies the Federal Services' previously misunderstood interpretation of "range," and addresses the problems highlighted by the various courts that considered the Federal Services' interpretation before the *Final Policy* was published. *See Final Policy*.

c. Cases cited by Petitioners are distinguishable, and in any event, Respondents acted in accord with their holdings.

Interpreting range to mean only current range does not ignore a species' historical range. Undoubtedly, an evaluation of lost historical range is relevant to a full understanding of the current status of a species and its continued viability within its current range. Respondents' recognition of the relevance of historical range, and explanation of why it is proper to exclude historical range in this case, distinguishes cases cited by Petitioners in support of an atextual and illogical reading of the text of the Oregon ESA.

In *Defenders of Wildlife v. Norton*, 258 F3d 1136, 1146-47 (9th Cir 2001) (*Defenders* (Lizard)), the Ninth Circuit reversed the decision of the Secretary of the Interior to withdraw a proposed rule recommending protection for the flat-tailed horned lizard under the Federal ESA. The Ninth Circuit so held because the Secretary failed to consider or discuss whether the lizard's lost historical range was relevant to whether it was endangered in a significant portion of its range.[7] *Id*. at 1145-46. It is true that the court stated that a species "*can* be extinct 'throughout . . . a significant portion of its range' if there are major geographical areas in which it is no longer viable but once was." *Id*. at 1145 (emphasis added). But the court immediately qualified that statement with the recognition that the Secretary may exclude historical range from consideration as a significant portion of a species' range if the Secretary provides an adequate explanation. *See Id*.

Likewise, in *Defenders of Wildlife v. Norton*, 239 F Supp 2d 9, 20-21 (D DC 2002) (*Defenders* (Lynx)), the district court for the District of Columbia adopted the Ninth Circuit's reasoning in *Defenders* (Lizard), and rejected the

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[7] In a subsequent rulemaking, the Federal Services noted their disagreement with the Ninth Circuit's holding as a "misunderstanding" of their position. *See Final Policy on Interpretation of the Phrase "Significant Portion of its Range."* According to the Federal Services, historical range is considered when analyzing the conservation status of a species in its current range. *Id*. In any event, *Defenders* (Lizard) stands for the uncontroversial proposition that historical range must be considered at some point in the analysis of a species' status.

U.S. Fish and Wildlife Service's decision to list the Lynx as "threatened" rather than "endangered." Because the Service failed to explain why the Lynx's lost historical range should not be included in the calculation for the significant portion of the Lynx's range, the court remanded the rulemaking to the Service to provide an explanation. *Id*.

In *Defenders of Wildlife v. Secretary, U.S. Dep't. of the Interior*, 354 F Supp 2d 1156, 1168 (D Or 2005) (*Defenders* (Wolf)), the court rejected the Secretary's explanation for only considering two core populations of the wolf's range in a rulemaking to downlist the wolf. Because the Secretary considered historical range and all current range not within the two core populations to be insignificant portions of the wolf's range, the court held the Secretary's interpretation to be unreasonable and inconsistent with the Federal ESA. *Id*. at 1168-69.

Similarly, in *Humane Soc'y of the United States v. Jewell*, 76 F Supp 3d 69, 75-76 (D DC 2014), the court rejected the Secretary of the Interior's Final Rule that removed protections under the Federal ESA for wolves in the Great Lakes region. Agreeing with the decisions of the other courts discussed above, the court held that the Secretary must give a sufficient explanation when excluding historical range from consideration as a "significant portion of [the species'] range." *Id*. at 129-30. Because the Secretary's explanation was conclusory and lacked sufficient detail as to why historical range is not a significant portion of the wolves' range, the decision was arbitrary and capricious. *Id*. at 130-32.

Finally, in *Tucson Herpetological Soc'y v. Salazar*, 566 F 3d 870, 878 (9th Cir 2009), the Ninth Circuit *affirmed* (under *Defenders* (Lizard)) the Secretary of the Interior's interpretation that "significant portion of its range" only includes current range. The court held that deference to the Secretary's interpretation was appropriate because the Secretary sufficiently explained why the lizard's current range—rather than its historical range—is the appropriate range to consider when analyzing the lizard's likelihood of survival. *Id*. at 877-78. The Secretary (1) determined that the lizard persisted in its current range; (2) analyzed lost historical range in a site-specific manner to show the lost range was not needed for the success of the species; (3) noted a study showing lost historical range did not result in the loss of a "critical pathway for maintenance of genetic diversity;" and (4) noted that the lizard's lost historical range was lost decades ago to agricultural and commercial use, and is not generally recoverable, thus not significant to the species' long-term survival. *Id*.

If Respondents provide a detailed explanation like that in *Tucson*, then even a loss of nearly 87% of a species' historical range is not "significant" when the species has available current range sufficient to maintain the species.

See WildEarth Guardians v. Salazar, 741 F Supp 89, 100-01 (D DC 2010) ("It may very well be that these reductions do not amount to a significant portion of the species range."). Thus, the relevant cases show that historical range may be removed from consideration (regardless of amount), but a thorough explanation must be provided.

Here, Respondents sufficiently explained why the wolves' historical range in Oregon should be excluded from the "significant portion" calculus. First, Respondents determined that wolves are persisting in their current range, and due to their continued increases in number and expansion of their range, they are not likely to go extinct. ER 17-18. Second, a complete assessment of the wolves' historical range in Oregon is difficult due to inconsistent and anecdotal reports, and the lack of accurate surveys of the species prior to the wolves' extirpation. ER 14. Nonetheless, based on the available information, an analysis of lost historical range shows that it is not needed for the success of the wolves because it is a relatively small amount—76.9% of historical range remains as current or potential range—and some of the lost historical range was likely unsuitable to support year-round habitat in the first place. ER 18. Third, observations of the wolves' movement and dispersal patterns, in combination with their increasing numbers, indicate that individual wolf populations are connected, thus allowing for continued genetic diversity. ER 18. Fourth, Respondents determined that in the nearly seventy years since wolves were extirpated from Oregon, the amount of historical range that remains suitable for wolves has decreased. Because of increases in human density, road density, and cultivated agricultural areas in the decades following extirpation, 23.1% of the wolves' historical range (mostly in the Willamette Valley) is no longer suitable for wolves, and not generally recoverable. ER 15. Therefore, excluding 23.1% of the wolves' historical range in Oregon from consideration as a "significant portion of its range" was proper, because (1) Respondents thoroughly analyzed the wolves' historical range and gave a detailed explanation for its exclusion; and (2) the purpose of the Oregon ESA is not to return native Oregon wildlife species to their pre-human existence, but to ensure that native species continue to exist in their current range. *See* ORS 496.176, 496.182(2)(a); OAC 635-100-0080.

In sum, the federal cases cited by Petitioners as guidance for this Court hold that when analyzing a species' range under the Federal ESA, the government cannot turn a blind eye to the species' historical range. *See* Pet Open Br at 11. In this case, Respondents acted in accordance with those federal decisions, and thoroughly considered the wolves' historical range in Oregon. But instead of citing the cases for that reasonable proposition, Petitioners urge this Court to focus on how much historical range has been lost, rather than the sufficiency of current range—a position as extreme as the ones reversed by prior courts. *See id*. at 14-16. Because such a focus runs counter to the sensible guidance of the *Tucson* and *WildEarth* courts, and erroneously prioritizes history over the wolves' current status and likelihood of survival, this Court should reject Petitioners' invitation.

CONCLUSION

For the foregoing reasons, the rule removing the gray wolf species from the Oregon endangered species list was proper, and Respondents correctly interpreted and applied the Oregon ESA to exclude historical range from consideration.

Respectfully submitted by the Cattlemen and the Farm Bureau this 9th day of January, 2017.

By:___________________________

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CERTIFICATE OF COMPLIANCE

I certify that Intervenor-Respondents' Answering Brief complies with the word-count limitations in ORAP 5.05(2)(b), in that it contains 4,342 words, proportionately spaced, and not smaller than 14-point font.

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Caleb R. Trotter, (Cal. Bar #305195)
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CERTIFICATE OF FILING
AND PROOF OF SERVICE

I certify that on January 9, 2017, I filed the original of this answering brief with the Appellate Court Administrator by using the Court's electronic filing system.

I further certify that on January 9, 2017, I served a true copy of this answering brief on Carson Whitehead and Benjamin Gutman, attorneys for Respondents, Daniel R. Kruse, attorney for Petitioners, and Dominic Carollo, attorney for Intervenor Wallowa County, using the Court's electronic filing system and caused two true copies to be served on each via regular U.S. Mail.

I further certify that on or before January 9, 2017, I caused to be served a true copy of this petition on the Attorney General of the State of Oregon, pursuant to ORAP 5.12, at the Office of the Solicitor General, 400 Justice Building, 1162 Court Street, NE, Salem, Oregon 97301-4096, by certified mail, return receipt requested.

By: ______________________________

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EXCERPT OF RECORD INDEX

wolves of the Lake Superior region survived a bit longer: the last wolves in Wisconsin were slain between 1950 and 1970, although bounties in Wisconsin and Michigan were repealed in 1956 and 1960 respectively (Thile 1993). A few wolves may have remained in Michigan after 1970 (Henderson et al. 1975). Several hundred wolves did survive in northern Minnesota.

Wolves were granted protection from the long-held Euro-American pursuit to exterminate them by passage of the federal ESA in 1973. As a result of this legislation, the wolf was re-introduced into the contiguous 48 states by the reintroduction of Canadian wolves into central Idaho and Yellowstone National Park. These actions indicate that the cultural beliefs of Euro-Americans may be softening in regard to the historical position of extermination.

B. Biology and Ecology

A discussion on the biology and ecology of wolves includes physical characteristics, pack size, reproduction, food habits, movements and territories, dispersal, mortality, genetics, and population growth. Significant numbers of books and papers have been written on these subjects. Efforts to condense these for the western United States have been undertaken during development of other state management plans. Appendix B, Wolf Biology and Ecology, includes a description of this topic that was adapted from the Montana Gray Wolf Conservation and Management Plan (2002). Appendix B also includes citations of books and papers on recent research. Much of the research specific to the western United States has been conducted in the Greater Yellowstone Ecosystem. Because portions of this ecosystem contain some non-hunted ungulate populations and have no livestock grazing, the results may not be directly transferable to Oregon in all aspects. Appendix B also provides a summary of wolf diseases.

C. Legal Status

Overview

In Oregon, wolves are subject to both the federal ESA and the Oregon Endangered Species Act (Oregon ESA). These laws are independent but somewhat parallel. As the federal government eases protections for the wolf under the federal ESA, the regulatory spotlight may shift to the Oregon ESA as well as to underlying state wildlife statutes and regulations. But so long as the wolf remains federally listed, it is crucial to consult both federal and state law to understand the protections that pertain to wolves in Oregon.

In January 2004 the USFWS developed an "Interim Response Strategy for Reporting Gray Wolf Activity in Oregon". In 2007, this document was replaced by the "Federal/State Coordination Strategy for Implementation of Oregon's Wolf Plan" (see Appendix C). The purpose of the document was to guide agency response to specific events that trigger a need for wolf management. Within the document, a common understanding of roles and responsibilities is discussed to ensure close coordination of agencies' actions to conserve wolves. The strategy was not intended to direct recovery of wolves in Oregon, but to ensure actions by agencies were consistent with the applicable state and federal laws. Now, the Oregon Wolf Conservation and Management Plan is the primary document governing the department's wolf conservation and management actions.

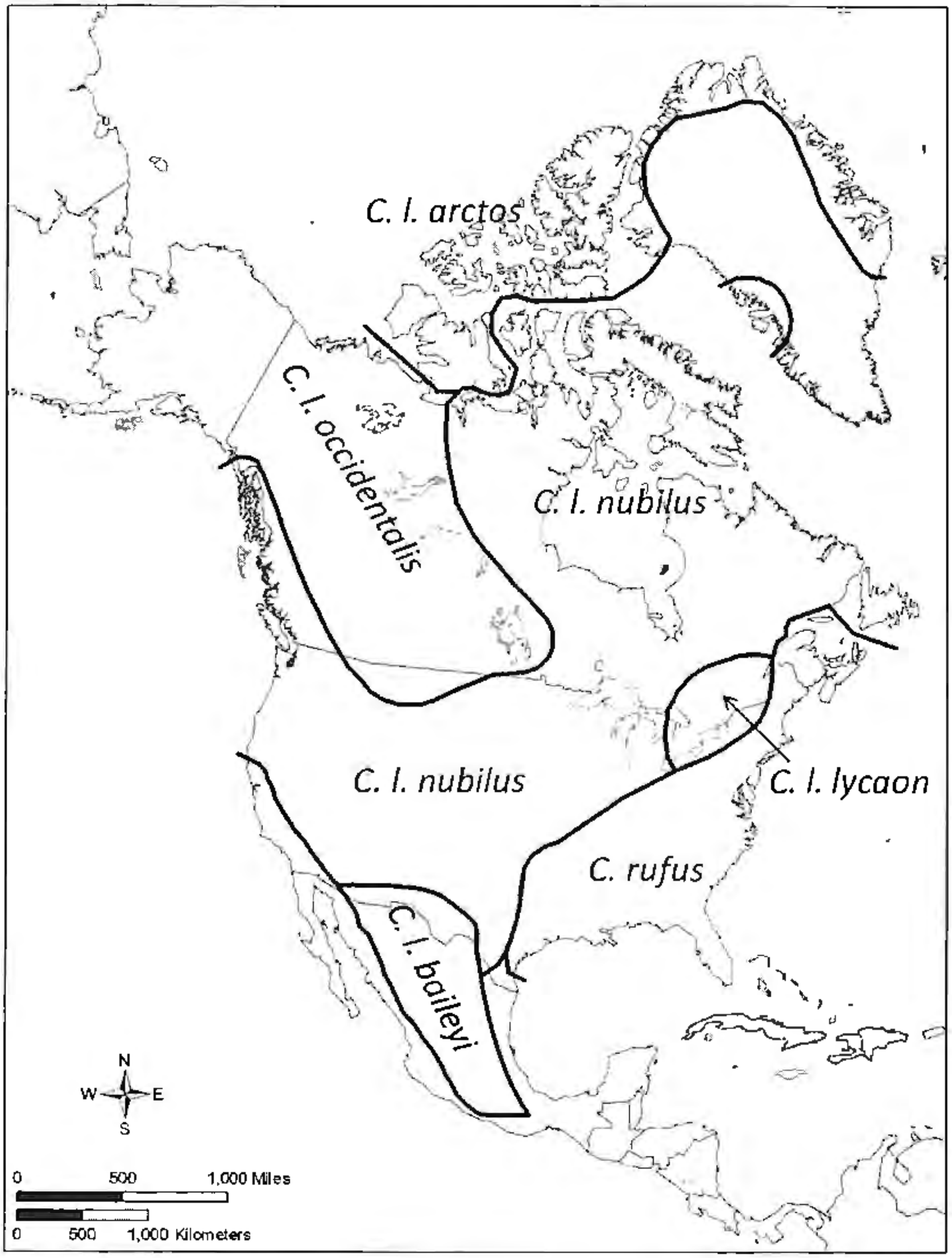

Figure 3. Ranges of North American *Canis lupus* subspecies recognize by Nowak (1995, 2002) and of *C. rufus* (after Nowak 2002).

classification. Despite the reservations, expressed above, that discriminant function analysis can result in oversplit classifications, Nowak actually reduced the number of subspecies and greatly consolidated the subspecific classification of *C. lupus*. The scientific support for the validity of these five subspecies is evaluated using the relevant information from the study summaries available in the Appendix. A lineages. Morphometric, autosomal microsatellite, and canine SNP array data also indicate divergence between red wolf and eastern wolf; although these conclusions must be qualified by acknowledging the gaps in sampling. Independent evolution of these two taxa from different lineages of coyote-clade ancestors is more consistent with the available genetic data and argues against combining them as a single species but argues for retaining them as *C. lycaon* and *C. rufus*.

Nomenclatural issues. Regardless of present lack of genetic support for combining the taxa, some nomenclatural problems would need to be addressed before uniting *C. lycaon* and *C. rufus*. A compromise approach would be to recognize *C. lycaon* and *C. rufus* as subspecies within the same species. This would require the formal publication of new name combinations for at least one subspecies. In addition, there is significant geographic variation in genetic composition within a more broadly defined taxon that includes both *C. lycaon* and *C. rufus*. Moreover, Texas wolves occupied a very different environment than did wolves in eastern Canada.

The appropriate name for a single species that would encompass both *C. lycaon* and *C. rufus* remains an issue. Wilson et al. (2000) suggested that the name be *C. lycaon*. The rule of chronological priority normally applies in such cases, and the name *C. lycaon* was published earlier than *Canis lupus* var. *rufus* (Table 1). The availability of the older name in this case is uncertain because the type specimen of *C. lycaon* may have been a hybrid (Pocock 1935). As explained by Goldman (1944), the type is the individual portrayed in Schreber's illustration, which was in turn based on a figure published by Buffon in 1761. Article 73.1.4 of the International Code for Zoological Nomenclature (International Commission on Zoological Nomenclature 1999) provides for such instances: "Designation of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation." Because the disposition of the remains of the illustrated specimen is unknown, and the holotype must be of the same group to which the species name is applied, the identity of the specimen portrayed is important.

The type locality was restricted by Goldman (1937) to the vicinity of Quebec, Quebec. Wolves in this region may have already been interbreeding with coyotes or dogs at the time the holotype was collected. Support for earlier hybridization is provided by the presence of either coyote or dog mtDNA in wolf (based on morphology) remains of four individuals from a 400–500-y-old archaeological site in southern Ontario (Rutledge et al. 2010a). Article 23.8 of the International Code specifies that, "a species-group name established for an animal later found to be a hybrid must not be used as the valid name of either of the parental species, even if it is older than all other available names for them." Pocock's (1935) argument that the type may have been a hybrid was rejected by Goldman (1937), who also believed that a hybrid could still serve as the type, which is in conflict with today's Code.

The next oldest name in Goldman's (1944) synonymy for *C. lycaon* is *Canis lupus canadensis* (Table 1). Allen and Barbour (1937) note that the type specimen for *C. l. canadensis* is a skull illustrated by Blainville and that the locality was given only as Canada, so questions may also be raised about its identity and relation to modern wolf populations in eastern Canada. In this case, the holotype of *C. rufus* (type locality: Austin, Texas) might be more appropriate because hybridization with coyotes would have been unlikely at the time it was described. Nowak (2009) believes that the holotype of *C. lycaon* is actually a specimen of *C. rufus* based on its description as black, which he describes as a well-known coat color in *C. rufus*, but unusual for *C. lycaon*. Black coat color could also indicate that the individual had dog ancestry. Current wolves nearest the *C. lycaon* type locality (vicinity of Quebec), however, have the mtDNA haplotypes of *C. lycaon*. Even if additional evidence should provide support for formally combining these taxa, this issue would need to be resolved before formal changes in taxonomy are made.

The subspecies of *Canis lupus*

The following evaluation and discussion is organized by the remaining (less *C. l. lycaon*) subspecies of *C. lupus* recognized by Nowak (1995). This does not mean that Nowak's classification is accepted without consideration of alternative classifications. The analysis therefore includes consideration of formerly recognized subspecies (e.g., Goldman 1944; Hall 1981) that were reduced to synonymy by Nowak (1995) when patterns of variation within these four subspecies suggest that some finer scale taxonomic subdivision might be recognizable.

Canis lupus baileyi *(Mexican wolf).* Both morphometric and genetic evidence support the distinctiveness of *C. l. baileyi* and its recognition as a subspecies. Genetic analysis of living specimens is limited to the descendants of the founders of the captive-breeding population, thought to be seven individuals (Hedrick et al. 1997). Although the effects of genetic drift and a small founder population have likely increased the observed divergence of living *C. l. baileyi* from other wolves at autosomal microsatellite DNA (García-Moreno et al. 1996), they cannot account for the unique mtDNA haplotype (Roy et al. 1996; Vilà et al. 1999; Table 5 of this paper) and several private microsatellite DNA alleles (García-Moreno et al.

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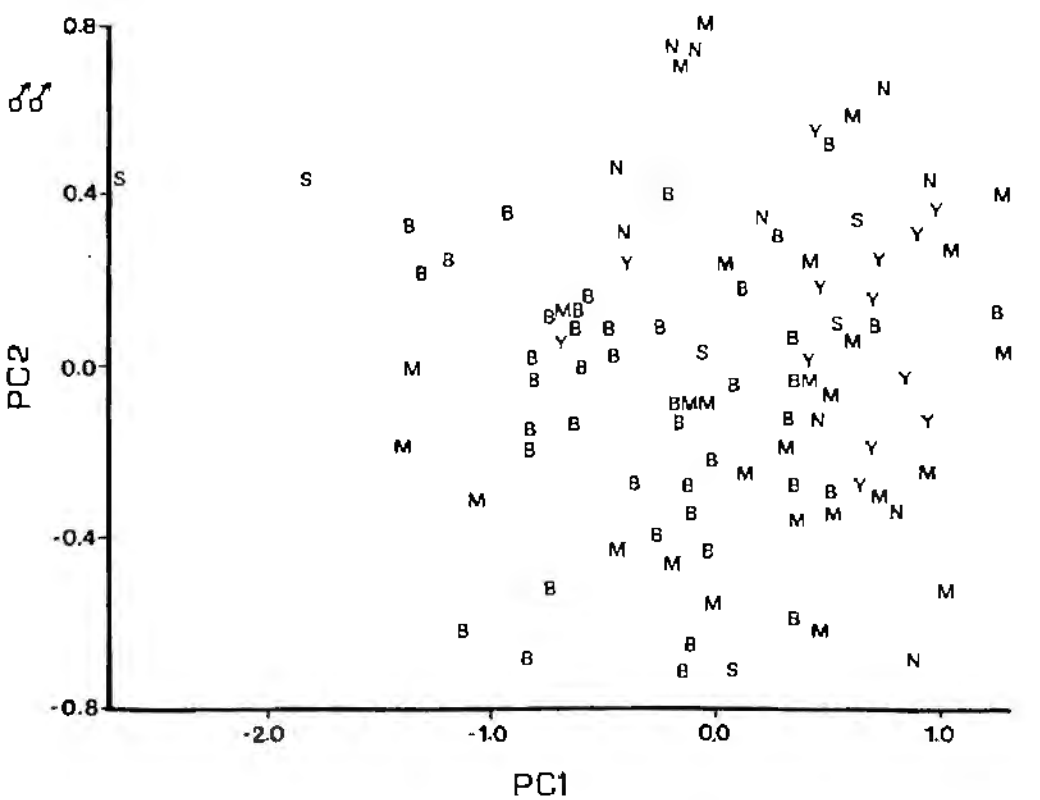


Figure 8. Principal components plot of skulls from male *Canis lupus* from the southwestern United States (figure 2 of Bogan and Mehlhop 1983). This illustrates the overlap in morphology among three subspecies recognized by Goldman (1944) in Arizona and New Mexico. B = *C. l. baileyi*; M = *C. l. mogollonensis*; S = *C. l. monstrabilis*. Credit: Museum of Southwestern Biology, University of New Mexico.

1996) found in *C. l. baileyi*. Additional genetic data from historical, museum specimens (Leonard et al. 2005) have corroborated the results obtained from living individuals, and further indicate that the "southern mtDNA clade" of the Mexican wolf is divergent from other North American wolves. Comparisons of mtDNA sequence divergences among *C. lupus* haplotypes support recognition of *C. l. baileyi* as a subspecies rather than as a species distinct from other *C. lupus*. The predominant *C. l. baileyi* haplotype has a sequence divergence of 2.2% from the closest other North American *C. lupus* haplotype (Wayne and Vilà 2003, p. 228), compared with sequence divergences averaging 2.9% within *C. lupus* (Vilà et al. 1999, p. 2093), 8% between *C. lupus* and either *C. lycaon* or *C. rufus*, and 10% between gray wolf and coyote (Wilson et al. 2000, p. 2159).

Analyses of a canine SNP array data set (vonHoldt et al. 2011) from 10 *C. l. baileyi* from the captive-breeding program also indicate the distinctness of the Mexican wolf. Principal components analysis of the North American gray wolves in the sample (vonHoldt et al. 2011, figure S2) separates Mexican wolf from other gray wolves on the first principal components axis, which accounts for 6.6% of the variance. Mexican wolf is basal to other North American gray wolves in both a neighbor-joining tree and a phylogram (vonHoldt et al. 2011, figure S5). Values of F_{ST} between Mexican wolf and other western gray wolves is 0.1, which is greater than F_{ST} values (which range from 0.01 to 0.08) among western gray wolves from different regions. In the STRUCTURE analysis, Mexican wolf is the first group to appear (at $K = 6$) as a cluster distinguished from other North American gray wolves. While these results are consistent with other genetic data, a founder effect in establishing the captive Mexican wolf population may also have contributed to the high measures of divergence observed in this analysis.

At the MHC class II locus *DRB1*, individuals from the *C. l. baileyi* captive-breeding program shared three of their five alleles with gray wolves from Alaska and northern and western Canada (Hedrick et al. 2000; Kennedy et al. 2007). As previously discussed, owing to balancing selection, sharing of MHC alleles occurs even among species and is therefore not informative in assessing intraspecific relationships (Hedrick et al. 2000).

There is consensus on the valid taxonomic standing of *C. l. baileyi*, but there is some controversy

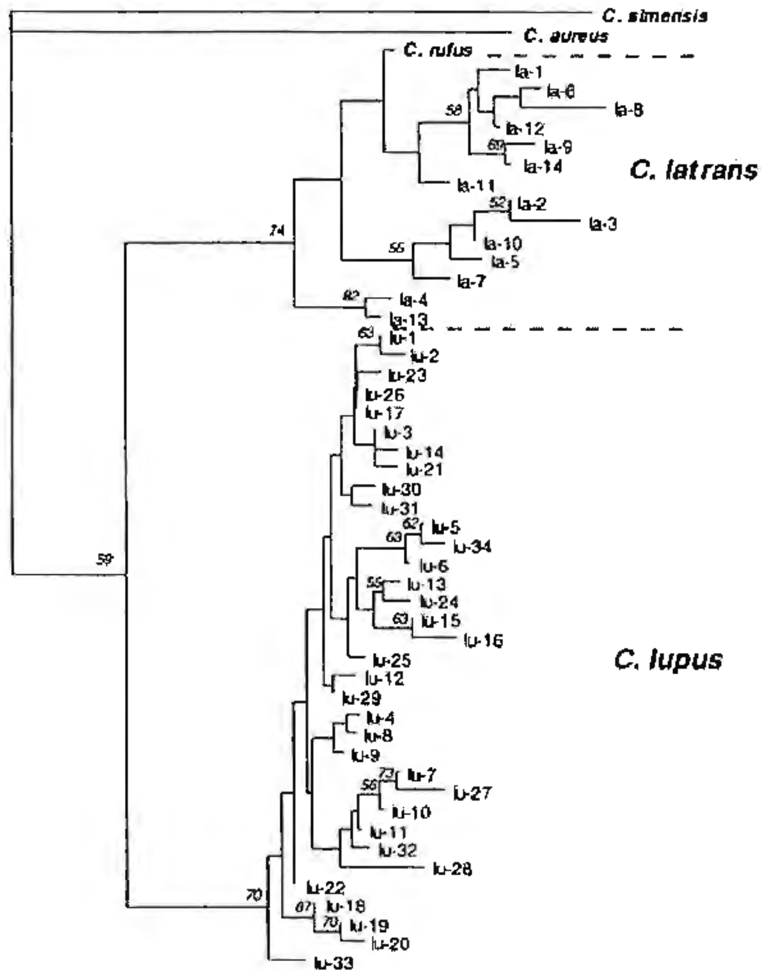


Figure 9. Neighbor-joining tree based on mtDNA control-region sequences of *Canis lupus* from Vilà et al. (1999, figure 1). North American haplotypes are *lu-28, lu-29, lu-30, lu-31, lu-32, lu-33*. Others are from Eurasia. The haplotype unique to *C. l. baileyi* is *lu-33*. ©John Wiley and Sons. Used with permission.

based on interpretation of morphometric data on the historical boundaries of the subspecies. Nowak (1995) recognized *C. l. baileyi* as a subspecies, but did not adopt Bogan and Mehlhop's (1983) inclusion of *C. l. mogollonensis* and *C. l. monstrabilis* as its synonyms. These different interpretations may be related to larger sample sizes used by Bogan and Mehlhop (1983), who studied 253 skulls of the three subspecies in question, compared with 88 skulls studied by Nowak (1995). It may also be related to Bogan and Mehlhop's (1983, p. 15; Figure 8 of this paper) preference for PCA as a more objective method for assessing overlap in characters than discriminant function analysis, which was used by Nowak (1979, p. 4). Bogan and Mehlhop (1983) also carried out discriminant function analyses on their data and found intermediacy of skulls assigned to *C. l. mogollonensis* between *C. l. baileyi* and more northern wolves. The two different discriminant function analyses have generally comparable outcomes, so the difference is in interpreting to which subspecies a collection of individuals that is intermediate between recognized taxa should be assigned. Bogan and Mehlhop (1983) and Nowak (1995) agree that the range of *C. l. mogollonensis* in Arizona was a transition zone where *C. l. baileyi* intergraded with more northern *C. lupus*, which is consistent with the limited available genetic data from historical specimens (Leonard et al. 2005). Wolves were long ago extirpated—perhaps by the 1940s (Parsons 1996)—within the ranges of *C. l. monstrabilis* and *C. l. mogollonensis*, so the controversy is now primarily of historical interest.

The phylogenetically closer relationship of *C. l. baileyi* to certain Eurasian wolf populations than to other North American *C. lupus* (Vilà et al. 1999; Wayne and Vilà 2003; Figure 9 of this paper) indicates that contact was secondary between *C. l.*

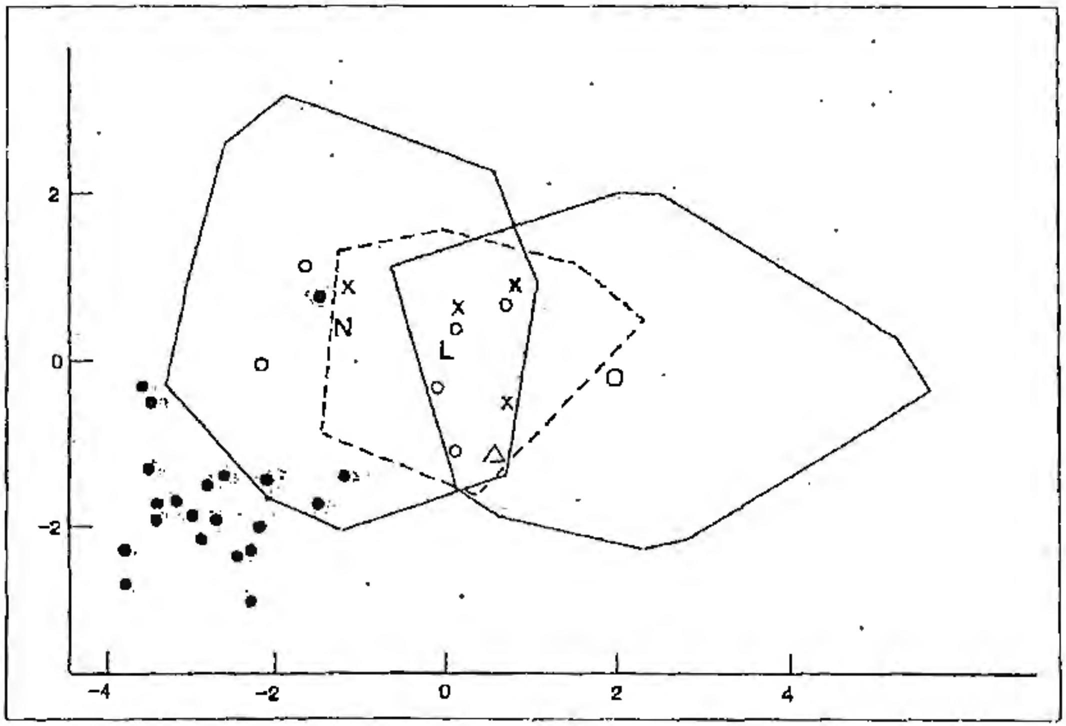


Figure 10. Discriminant function analysis of skulls of some North American *Canis lupus* (figure 7 of Nowak 1995). Axes represent first (horizontal) and second (vertical) canonical variables. Solid lines are limits of the Nowak's southern group (corresponding to *C. l. nubilus*), which is the polygon on the left with center N; and northern group (corresponding to *C. l. occidentalis*), which is the polygon on the right with center O. This illustrates the morphological divergence between the two subspecies. Dots represent individuals of *C. l. baileyi*. Credit: ©Ronald M. Nowak and Canadian Circumpolar Institute Press. Used with permission.

baileyi, as delineated by Bogan and Mehlhop (1983) and the later arriving, more northerly *C. l. nubilus*. Both morphometric (Nowak 1995, p. 385) and genetic data (Leonard et al. 2005) are consistent in indicating that, once *C. l. baileyi* came into contact with more recent *C. lupus* invaders from Eurasia, there was a broad area of reproductive interaction between them. This interaction could have been in the form of a relatively stable and broad zone of intergradation between them, or *C. l. nubilus* could have incorporated genetic elements of *C. l. baileyi* as it rapidly displaced the latter subspecies to the south. General models on plants and animals have demonstrated the process by which local genes are incorporated into an invading population (Currat et al. 2008). The interaction has been described more locally in Arizona by the morphometric data (Bogan and Mehlhop 1983; Nowak 1995), and more expansively by the mtDNA data from historical specimens, where a northern haplotype associated with *C. l. nubilus* was found in Arizona and southern haplotypes associated with *C. l. baileyi* were found as far north as Nebraska. While concordant morphometric and genetic evidence supports the evolutionary and taxonomic distinctness of *C. l. baileyi*, its predominant prey is elk (Reed et al. 2006; Merkle et al. 2009), which is consistent with the predominance of large wild ungulates in the diet of other gray wolves of western North America.

C. l. baileyi and *C. rufus* do not overlap in morphometric variation of skull features (Nowak 1979). The genetic data, particularly that of Hailer and Leonard (2008), indicate that if hybridization has occurred between these species it has apparently not affected the genetic composition of *C. l. baileyi*, with one exception. The Y-chromosome haplotype *H29* that Hailer and Leonard (2008, figure 3B) found in some *C. l. baileyi* and identified as a wolf haplotype is common in dogs (Table 6). The *C. l. baileyi* with *H29* are all descended from an individual in the "Aragon lineage," which has a nuclear DNA composition (based on microsatellites) that clusters with other *C. l. baileyi* (Hedrick et al. 1997).

Canis lupus arctos *(Arctic wolf)*. The three high Arctic Islands sampled for *C. l. arctos* were grouped together in a neighbor-joining distance analysis based on autosomal microsatellite data (Carmichael et al. 2008, figure 3B), but the authors observed that the island populations exhibited only one private allele, and that their unpublished mtDNA data did not identify any unique Arctic Islands haplotypes. Based on the assumption that a long isolation in an Arctic refugium (as proposed by Nowak [1983]) should have at least resulted in a higher proportion of unique alleles, Carmichael et al. (2008) concluded that the populations on these Arctic Islands are the result of recent colonization from the mainland. Their interpretation was further supported by low levels of genetic diversity in island wolves. Low levels of microsatellite diversity also affect the reliability of calculated distance measures (Paetkau et al. 1997). The genetic differences observed between Arctic Island and mainland wolves are not likely to be of taxonomic significance.

The morphometric data in support of recognition of *C. l. arctos* also have limitations. The overlap with mainland subspecies (*C. l. nubilus* and *C. l. occidentalis*) is not minimal (Nowak 1995, figure 9), and the large polygons representing the mainland subspecies are likely affected by the very large scale of geographic sampling of the mainland subspecies. A more relevant comparison for evaluating taxonomically significant discontinuity between island and mainland populations would be between island and adjacent, coastal-mainland populations. Coastal-mainland populations do not appear to be well-represented in either morphometric study (Nowak 1995; Mulders 1997).

The genetic data, together with difficulties in interpreting the morphometric data, do not provide clear support for subspecies recognition of *C. l. arctos*. This conclusion is tentative because it is based on lack of supportive data rather than definitive information that these populations are not taxonomically recognizable. The genetic data consist only of autosomal microsatellite DNA and some preliminary mtDNA data that did not detect unique haplotypes in the island populations (Carmichael et al. 2008, p. 885). Y-chromosome and additional mtDNA data could better resolve the relationship between island and mainland populations, and therefore the taxonomic standing of *C. l. arctos*.

Canis lupus occidentalis *(northern timber wolf)*. Nowak (1995) defined the range of this subspecies and identified its synonyms by grouping skulls of the subspecies recognized by Goldman (1944) and Hall and Kelson (1959), and then deriving a measure of statistical distance (D^2 of Mahalanobis) between the groups. In comparing these distances, he discerned two major groups across most of western North America corresponding to *C. l. occidentalis* and *C. l. nubilus* (Figures 3 and 10), and reduced other component names within them to synonyms. This consolidation into two major groups is also apparent in the PCA of Skeel and Carbyn (1977), when the subspecies in their study are grouped following Nowak's synonymies (1995).

The major genetic support for *C. l. occidentalis*, as delineated by Nowak (1995) is the phylogenetic relationship and geographic distribution of mtDNA haplotypes. Phylogenetic analyses (Vilà et al. 1999, figure 1, reproduced in this paper as Figure 9; Leonard et al. 2005, figure 2) identify three major groupings, or clades, which correspond to *C. l. occidentalis*, *C. l. nubilus*, and *C. l. baileyi* in North America. Each of the three major clades also includes Old World wolves, so that the members of the same clade in North America are more closely related to certain Old World wolves than they are other North American wolves from the different clades. This pattern of three separate clades is interpreted as the result of independent invasions of North America by wolves from phylogenetically distinct Old World sources (Vilà et al. 1999). The range of *C. l. occidentalis* from Alaska southward represents the last gray wolf invasion of North America. The overall shape of the range suggests an invasion front that has moved southward to what is now the conterminous United States from an entry point in Beringia. Nine unique mtDNA haplotypes (*lu67* through *N* in Table 5) occur only within the range of *C. l. occidentalis* and are distributed from Alaska to Manitoba. Three haplotypes that are shared with *C. l. nubilus* are discussed in the following section on that subspecies. Overall, the geographic distributions of haplotypes support the general interpretation of "episodes of isolation followed by admixture" (Vilà et al. 1999, p. 2100), but the degree of admixture has not been sufficient to distribute the unique haplotypes of *C. l. occidentalis* beyond its current range.

The autosomal microsatellite study of Carmichael et al. (2008) from widespread localities in Canada also lends support for distinguishing *C. l. occidentalis* from *C. l. nubilus*, with most sampling areas largely attributable to *C. l. occidentalis* (Qamanirjuaq, Saskatchewan, Bluenose West, Cape Bathurst, Manitoba, Alberta, Porcupine, Alaska, Yukon, British Columbia, and Mackenzie) occurring together on the neighbor-joining tree (Carmichael et al. 2008, figure 3B). These sampling areas were not designed to assess subspecies classification, so some straddle Nowak's (1995) boundaries between the two subspecies. The Bathurst and Qamanirjuaq sampling areas appear to also include individuals from Nowak's (1995) range for *C. l. nubilus*, and this may explain the reason these localities do not group closely with other *C. l. occidentalis*. Genetic discontinuity between wolves in the western range of *C. l. occidentalis* and coastal wolves of British Columbia and southeast Alaska is evident in data from autosomal microsatellite loci, canine SNP array analysis, and mtDNA haplotypes (Weckworth et al. 2005, 2010; Muñoz-Fuentes et al. 2009; vonHoldt et al. 2011). These coastal wolves were considered to be *C. l. nubilus* by Nowak (1995, 2002) and are discussed in more detail in the following section.

Some features of the genetic data suggest that the taxonomic standing of *Canis lupus mackenzii*, which

Nowak (1995) and Mulders (1997) treated as a synonym of *C. l. occidentalis* based on morphometric analyses, deserves further consideration. Its distribution is mapped by Goldman (1944) and Hall (1981) as the northern Northwest Territories extending to the Arctic Ocean. The southern boundary in these sources generally coincides with the boundary between tundra taiga and boreal coniferous forest habitats (Musiani et al. 2007). This boundary also generally coincides with differences in prey specialization, with tundra wolves following migratory caribou and boreal coniferous forest wolves using resident prey (Carmichael et al. 2001; Musiani et al. 2007). The frequencies of wolf coat colors also varied across this boundary, with white coat color predominating to the north, and increasing frequency of black color and its associated K^B allele at the *CBD103* locus increasing to the south (Musiani et al. 2007; Anderson et al. 2009).

There is some genetic discontinuity at the Mackenzie River, which is indicated by autosomal microsatellite variation near the southwest boundary of the mapped range of *C. l. mackenzii* (Carmichael et al. 2001). As measured by Nei's genetic distance, D_S, divergence ranges from 0.12 to 0.24 across the river, compared with 0.08 to 0.11 for samples on the same side of the river. These across-river values are smaller than most measurements (Carmichael et al. 2008) across the presumptive eastern boundary of *C. l. occidentalis* with *C. l. nubilus*. Additional autosomal microsatellite data covering the eastern portion of the range of *C. l. mackenzii* (Carmichael et al. 2008), which includes the type locality (Bathhurst Inlet), does not support subspecies standing because the sampling areas (Cape Bathurst, Bluenose West, and Bathurst) that represent the range of *C. l. mackenzii* do not group together in a neighbor-joining analysis (Carmichael et al. 2008, figure 3B). Although there are indications of genetic discontinuity across some portions of the putative boundary of *C. l. mackenzii*, they are not of the magnitude observed between boundaries between *C. l. occidentalis* and *C. l. nubilus*. Comprehensive genetic sampling in a taxonomic context is needed for a clearer understanding of the taxonomic status of *C. l. mackenzii*.

The autosomal microsatellite (Carmichael et al. 2007, 2008) and mtDNA data (summarized in Table 5) indicate limited genetic continuity between *C. l. nubilus* and *C. l. occidentalis*. Although there are the exceptions noted above related to sampling areas not being confined to single subspecies, these data are in general agreement with the morphometric support (Skeel and Carbyn 1977; Nowak 1995) for recognizing *C. l. occidentalis*.

Canis lupus nubilus *("plains" wolf)*. The vernacular name "plains wolf" was applied to this taxon by Nowak (2003) and is a legacy of Say's (1823) type locality in Nebraska, and of Goldman's use of "Great Plains wolf" for his concept of the range of the taxon, which was indeed the Great Plains (Figure 2). It is inadequate to describe a taxon that occupies habitats ranging from coastal rain forests of British Columbia to the Arctic of eastern Canada, but rather than coin a new vernacular name, Nowak's terminology is continued here. This is the most difficult and complex subspecies to evaluate because it is, or was historically, in contact with each of the other three *C. lupus* subspecies, *C. lycaon,* and probably *C. rufus*. Some areas included within *C. l. nubilus* range may represent intergrade or contact zones between subspecies. More localized genetic structure generated by habitat and prey preferences (Carmichael et al. 2001, 2007, 2008; Pilot et al. 2006; Musiani et al. 2007) may alternatively obscure or coincide with older patterns of structure that may be of more taxonomic significance. Moreover, this subspecies suffered extirpation over a great part of its range, including all of the conterminous United States except for northeastern Minnesota and Isle Royale, where genetic data have been limited by the relatively few individuals from museum collections that have been characterized.

All *C. l. nubilus* mtDNA haplotypes occur within a major clade separate from the two clades that include the unique haplotypes of *C. l. baileyi* and *C. l. occidentalis* (Vilà et al. 1999; Leonard et al. 2005). Within this clade, six haplotypes (*lu48, lu49, lu52, lu53, lu54, lu68*) are unique to *C. l. nubilus*, and three (*lu28, lu32, lu38*) are shared with *C. l. occidentalis* (Table 5). Haplotypes in the *C. l. nubilus* clade extend within the range of that subspecies, as mapped by Nowak (2002), from the Pacific Coast (Muñoz-Fuentes et al. 2009; Weckworth et al. 2010), through areas of the western United States where wolves were extirpated (Leonard et al. 2005), eastward to eastern Ontario (Wilson et al. 2000; Grewal et al. 2004; Rutledge et al. 2010b) and Labrador (Leonard et al. 2005). This supports the phylogenetic relationship of wolves within the wide geographic range attributed by Nowak (1995) to *C. l. nubilus*.

Although three of nine haplotypes of the *C. l. nubilus* clade also occur in *C. l. occidentalis,* this probably overestimates the proportion originally shared by the two subspecies because much of the haplotype diversity in this clade has been revealed by a relatively small number (26) of historical museum specimens (Leonard et al. 2005) that are not likely to be fully representative of the true haplotype diversity of *C. l. nubilus* in areas where they were extirpated. It is most likely that these three haplotypes entered *C. l. occidentalis* by a process similar to that described earlier for the incorporation of *C. l. baileyi* haplotypes by *C. l. nubilus:* incorporation of local genes into an invading population (Currat et al. 2008). Theoretically, as few as three matings involving *C. l. nubilus* females could account for these three haplotypes in *C. l. occidentalis.*

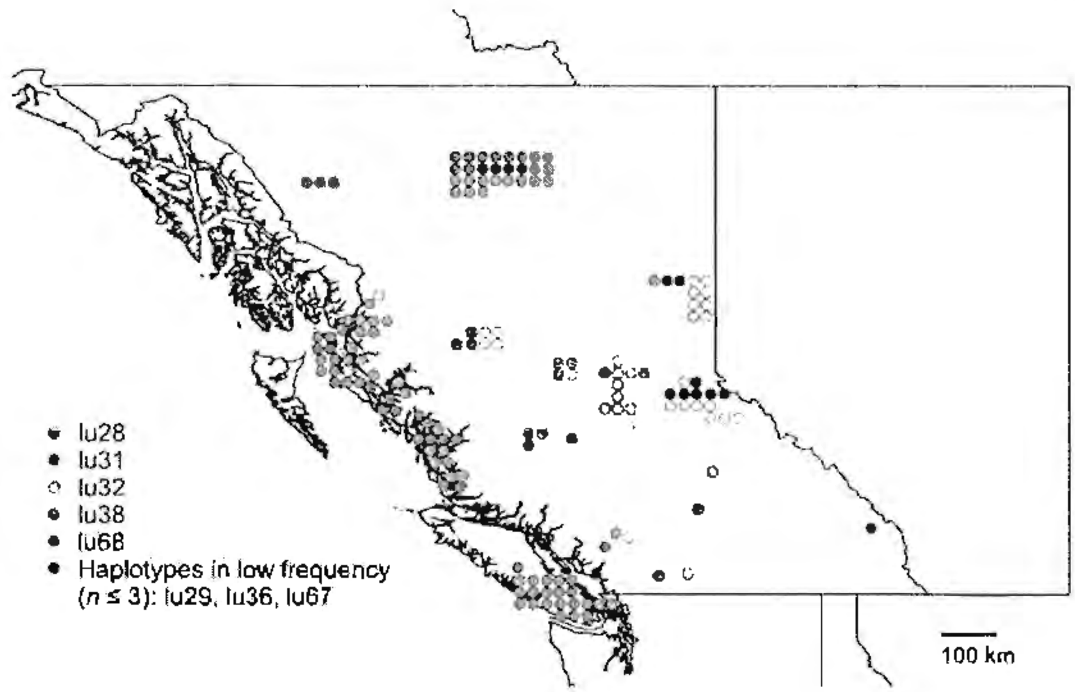


Figure 11. Distribution of control-region mtDNA haplotypes of *Canis lupus* in British Columbia, illustrating that phylogenetic divergence has been maintained between coastal and inland wolves that have been in geographically extensive and long-term contact (figure 3 of Muñoz-Fuentes et al. 2009). ©John Wiley and Sons. Used with permission.

While it was likely to have involved more than three matings, indiscriminant mating should have resulted in more sharing of haplotypes than was observed.

Autosomal microsatellite data provide information on specific areas of contact between *C. l. nubilus* and *C. l. occidentalis*. The neighbor-joining analysis of Carmichael et al. (2008, figure 3A) groups together some northern sampling areas for *C. l. nubilus*, including Baffin Island, the adjacent mainland, and Atlantic (Newfoundland). The Bathurst sampling area is also in this group, but as discussed under *C. l. occidentalis*, it straddles Nowak's (1995) boundary dividing the two subspecies. Unfortunately for taxonomic purposes, this study was designed to explore relationships of Arctic wolves and did not include samples from Ontario or Quebec in the southern Canada range of *C. l. nubilus*.

Another portion of the range in which subspecies assignment is uncertain is the area west of Hudson Bay in Northwest Territories. Skeel and Carbyn (1977) found morphometric affinity with *C. l. occidentalis* from Wood Buffalo National Park, which Nowak (1995) has questioned on the basis of their inclusion of females with samples of males. The Qamanirjuaq sampling area of the autosomal microsatellite study of Carmichael et al. (2008) encompasses an area from Hudson Bay west, which straddles the boundary between the two subspecies. As a possible consequence, its position on the neighbor-joining tree (Carmichael et al. 2008, figure 3B) is only weakly supported and therefore provides little reliable information on taxonomic standing.

Nowak (1995) considered wolves from the Pacific Northwest of the United States, coastal British Columbia, and southeastern Alaska to be *C. l. nubilus*, and several recent studies address various aspects of these coastal wolves. The following discussion will first address their relationship to inland, or continental, populations attributed to *C. l. occidentalis*; then the relationships among the coastal populations; and finally the relationship of the coastal populations to historical populations of *C. l. nubilus* of the western United States.

Differentiation between coastal and inland wolves in southeastern Alaska has been reported for both autosomal microsatellite (Weckworth et al. 2005) and mtDNA data (Weckworth et al. 2010, 2011). Differentiation between mtDNA haplotypes exhibited by coastal and inland wolves in British Columbia has also been documented (Muñoz-Fuentes et al. 2009; Weckworth et al. 2011; Figure 11 of this paper). An affinity between wolves in western coastal areas of Canada and those in southeastern Alaska was originally shown by morphometric data (Jolicoeur 1959). Coastal populations were closer in morphology to one another than to nearby inland populations (Jolicoeur 1959; Nowak 1983). Nowak (1995) observed that wolves in southeastern Alaska populations were intermediate between *C. l. nubilus* and *C. l. occidentalis.*

The canine SNP array study of vonHoldt et al. (2011) included a small sample ($n = 3$) of wolves from coastal British Columbia within the range of *C. l. nubilus* as mapped by Nowak (1995). It also included samples within the general range of *C. l. occidentalis*: "boreal forest" (Alaska), "tundra–taiga" (inland Canada), and "Rocky Mountain" (Yellowstone). The western coastal sample was differentiated from other inland gray wolves by PCA (vonHoldt et al. 2011, figure S3). Values of F_{ST} among samples representing *C. l. occidentalis* (Alaska, inland Canada, and Yellowstone) ranged from 0.01 to 0.03, while F_{ST} between these samples and the *C. l. nubilus* sample from coastal British Columbia was an order of magnitude greater (range 0.6 to 0.8).

Muñoz-Fuentes et al. (2009) and vonHoldt et al. (2011) attribute the difference between coastal and inland populations and other patterns of geographic variation within gray wolves to differences in habitat characteristics. Coastal wolves differ from inland populations in this region in their reliance on salmon *Oncorynchus* spp. and marine mammals, and a combination of habitat preference required to exploit these food resources and evolved resistance to diseases associated with marine food sources may restrict movement between coastal and inland habitats (Darimont et al. 2003, 2008). Differences in habitat can, however, coincide with subspecies boundaries and play a role in maintaining taxonomic distinctions when ranges are contiguous. In these instances, explanations based on habitat variation can also be taxonomically informative. These coastal–inland patterns of genetic and ecological divergence lend support to Nowak's (1995) boundary between *C. l. nubilus* and *C. l. occidentalis* in the Pacific Northwest.

Three subspecies names recognized by Hall and Kelson (1959) and Hall (1981) for Pacific coastal wolves were considered by Nowak (1995) to be synonyms of *C. l. nubilus*: *C. l. ligoni* (southeast Alaska), *C. l. crassodon* (Vancouver Island), and *C. l. fuscus* (British Columbia except for Vancouver Island, Washington, and Oregon). Coastal populations of southeast Alaska (Weckworth et al. 2010) and British Columbia (Muñoz-Fuentes et al. 2009) share common *lu38* and unique *lu68* haplotypes (Table 5) that comprise a distinct mtDNA phylogroup, inconsistent with their taxonomic distinction as different subspecies. The name *Canis lupus crassodon* has been used to distinguish the wolves of Vancouver Island from mainland wolves (Goldman 1944; Hall and Kelson 1959; Hall 1981). However, there is no genetic support for such taxonomic recognition because recent mtDNA analyses did not differentiate the wolves currently populating Vancouver Island and the coastal mainland of British Columbia (Muñoz-Fuentes et al. 2009). It is apparent from characterization of historical wolves (haplotype *lu68*) and the current population (haplotype *lu38*) that the extirpation was complete (Muñoz-Fuentes et al. 2009). It is, perhaps, encouraging that the mtDNA haplotype *lu68* found in historical Vancouver Island wolves is also common in coastal mainland wolves today (Muñoz-Fuentes et al. 2010).

The wolf population of coastal British Columbia was probably contiguous with the original populations of coastal Washington and Oregon, which were included by Goldman (1944) with *Canis lupus fuscus*, the type locality of which (near The Dalles, Oregon) was not coastal. Hall and Kelson (1959) included most of coastal British Columbia with the range of this subspecies. Bailey (1936) identified coastal wolves of Oregon as *Canis lycaon gigas* (type locality near Vancouver, Washington). Goldman (1944) included this name as a synonym of *C. lupus fuscus*. Understanding the phylogenetic relationship of coastal British Columbia and southeast Alaska wolves to other populations that Nowak (1995) included in *C. l. nubilus* is greatly impeded by the extirpation of that subspecies in inland portions of the western United States. Genetic study of historical remains from western Oregon and Washington would provide additional information for the taxonomic placements of Pacific Northwest wolves that have been based on traditional morphology and morphometrics.

The strongest indication of the relationship of the coastal populations of southeast Alaska and British Columbia to *C. l. nubilus* is from comparison of their haplotypes with those of the relatively small sample of historical individuals for which genetic data (mtDNA) are available (Leonard et al. 2005). The finding of Muñoz-Fuentes et al. (2009) that coastal British Columbia wolves are less differentiated from inland *C. l. occidentalis* ($\Phi_{ST} = 0.305$) than from the historical samples (Leonard et al. 2005) of *C. l. nubilus* from the conterminous western United States ($\Phi_{ST} = 0.550$) supported their view that coastal wolves were evolutionarily distinct from inland wolves, including *C. l. nubilus*. However, the large proportion of unique, and apparently extinct, haplotypes in the historical sample contributes to an exaggerated measure of divergence between the coastal populations and historical inland *C. l. nubilus*. A different picture emerges when examining the phylogenetic relationships of the haplotypes. The most common haplotype (*lu38*) in coastal British Columbia also occurs in historical Kansas and Nebraska samples (Leonard et al. 2005; Table 5 of this paper), and nearly all coastal haplotypes are in the same phylogroup as the historical western *C. l. nubilus* haplotypes (Weckworth et al. 2010, figure 2). These relationships are consistent with coastal British Columbia and southeast Alaska wolves being a northward extension of *C. l. nubilus*—the descendants of wolves from a southern Pleistocene refugium that migrated north along the west coast as glacial ice retreated inland approximately 12,000 y ago (Nowak 1983, 1995).

Nowak's (1983, 1995) classification and evolutionary explanation characterizes *C. l. nubilus* as a medium-size wolf that was widespread in North America at the time of arrival of the larger *C. l. occidentalis*. Morphometric analyses by Skeel and Carbyn (1977) provide general support for a comparable distribution of larger and smaller wolves in central Canada. Autosomal microsatellite data (Carmichael et al. 2007, 2008) distinguish *C. l. nubilus* from *C. l. occidentalis* in the northeastern portion of its range, and both microsatellite and mtDNA data (Weckworth et al. 2005, 2010; Muñoz-Fuentes et al. 2009, 2010) distinguish its Pacific Coast populations from inland *C. l. occidentalis*. Historical samples of *C. l. nubilus* from the western United States (Leonard et al. 2005; Table 5 of this paper) have several unique and phylogenetically related mtDNA haplotypes. The available genetic information bearing on the question of subspecies lends general support for *C. l. nubilus* as delineated by Nowak (1995, 2003), at least in the areas covered by those studies.

The range of *C. l. nubilus* included a range of habitats: Pacific coastal, the Great Plains, and the eastern Canadian Arctic. Populations over this range are associated phylogenetically and have a long history in North America, probably preceding *C. l. occidentalis*, but not *C. l. baileyi*. This history of occupation and adaptation is traced in the extensive geographic distribution of related mtDNA haplotypes *lu28*, *lu32*, *lu38*, and *lu68* (Table 5). Intergrade zones involving *C. l. nubilus* were discussed earlier in sections on relationships of *C. lycaon* to gray wolves and on *C. l. baileyi*. General conclusions on these intergrade zones are repeated here. *C. l. nubilus* forms a hybrid zone with *C. lycaon* from eastern Ontario to Minnesota and Manitoba. There was historical contact between *C. l. nubilus* and *C. l. baileyi*, with haplotypes attributable to the latter occurring as far north as Nebraska.

A General Evolutionary Interpretation

The following evolutionary scenario is presented as an overview of the conclusions of this review in the context of the evolutionary history of modern North American *Canis*. Coyotes, *C. rufus*, and *C. lycaon* are modern representatives of a major and diverse clade that evolved within North America, as proposed by Wilson et al. (2000). *C. lupus* arose in Eurasia and invaded North America at least three separate times, with each invasion being by one or more different clades of Eurasian *C. lupus*. These different source clades indicate a dynamic process of clade evolution and changes in the geographic distributions of clades in Asia during the Pleistocene. The first of these North American invasions was by the ancestors of *C. l. baileyi*, as suggested by Vilà et al. (1999), followed by the ancestors of *C. l. nubilus*, which displaced *C. l. bailey* in the northern part of its range. While expanding in North America and displacing *C. l. bailey*, the historical *C. l. nubilus* population gained some mtDNA haplotypes from the latter (Leonard et al. 2005) in a process whereby an invading population is genetically introgressed with local genes. The distribution of *C. l. occidentalis* has the general form of an invading population, and its southward expansion and displacement of *C. l. nubilus* may have continued into historic times. The final invasion, probably postglacial, was by *C. l. occidentalis*, which displaced *C. l. nubilus* in the northern part of its former range. This final phase was undoubtedly more complex, because the biogeography of Beringia is complex, and at least one Beringian lineage of *C. lupus* became extinct without leaving genetic traces in modern wolves (Leonard et al. 2007). *C. lupus* is not morphologically or genetically homogeneous or undifferentiated across North America. An interpretation that wolves of these different lineages have mixed in North America to an extent that the only geographic pattern is isolation by distance is not supported by the geographic distribution of lineage markers. There is geographic structure in genetic composition (Tables 5 and 6) that is consistent with multiple invasions of North America from Eurasia. This geographic structure on a continental scale coincides with the general distributions of the three *C. lupus* subspecies recognized in this review.

Final Comments and Recommendations

The taxonomic recommendations and conclusions stated here are intended to represent the most reasonable interpretations based on the available scientific information. Some conclusions, such as the taxonomic standing of *C. l. baileyi*, are more strongly supported than others. The taxonomic standing for *C. l. arctos* is not confirmed, but important limitations in the available data do not permit more definitive statements on its taxonomic status.

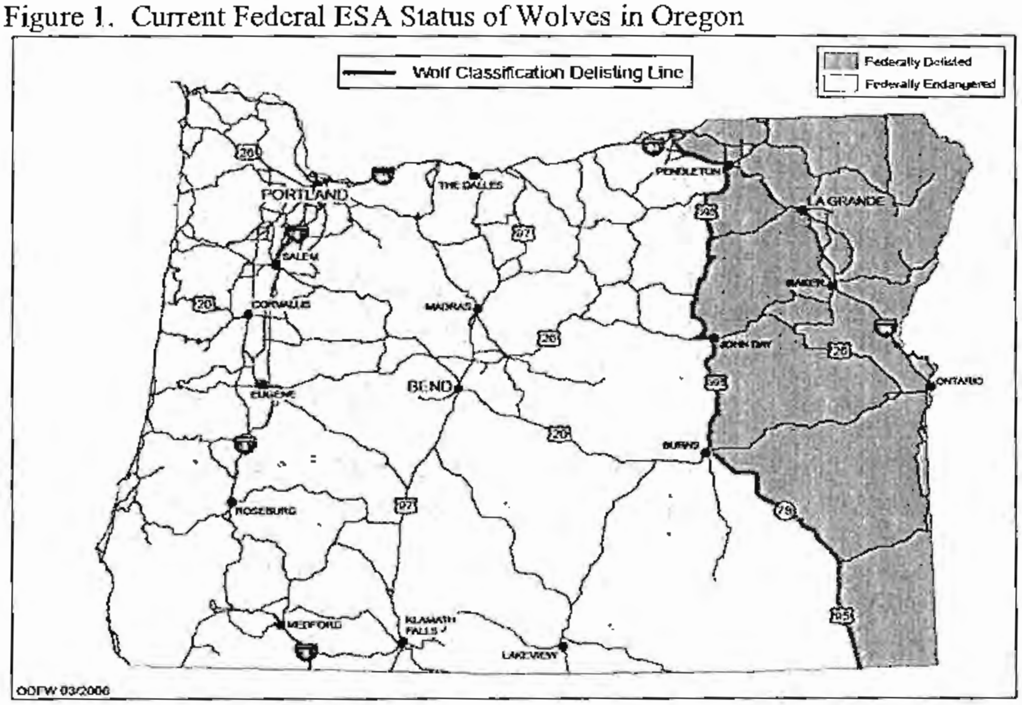
It is possible that further research will provide data that would change certain conclusions reached here. Longer sequences of mtDNA (most studies used approx. 200 to approx. 400 base pairs) could provide more robust resolution of both extant and historical populations. There are many more historical specimens in museum and government agency collections that have not yet had DNA characterized. Y-chromosome haplotypes from additional populations of wolves would provide an additional lineage marker to complement mtDNA data. Single nucleotide polymorphisms are now

In the early stages of implementation, the Wolf Plan focused on methods and procedures to conserve wolves so that the species was self-sustaining and could be delisted. The Wolf Plan defined a population objective of four breeding pairs of wolves for three consecutive years in eastern Oregon as the guideline for when wolves may be considered for statewide delisting from OESA. Accordingly, the Wolf Plan was drafted to meet the five delisting criteria identified in Oregon Revised Statute (ORS) 496.176 and Oregon Administrative Rule (OAR) 635-100-0112.

In 1987, the USFWS completed the NRM Wolf Recovery Plan. Four years later Congress initiated an administrative process to reintroduce wolves into Yellowstone National Park and central Idaho. Extensive public input showed general support for wolf recovery, and the U.S. Secretary of Interior approved reintroduction. In 1995 and 1996, 66 wolves were captured in Alberta and British Columbia, Canada. Of those, 35 were released in central Idaho and 31 were released into Yellowstone National Park.

At the time Oregon's Wolf Plan was first adopted in 2005, wolves were listed as endangered under the federal Endangered Species Act (ESA). To emphasize close coordination between the U.S. Fish and Wildlife Service (USFWS) and ODFW, the *2007 Federal/State Coordination Strategy for Implementation of Oregon's Wolf Plan* was developed which outlined procedures for managing wolves while federally listed. In 2007, the USFWS proposed to designate the NRM gray wolf population as a Distinct Population Segment and remove their status as endangered under federal ESA. The resulting decision to delist (and subsequent delisting decisions) was met with litigation and between 2008 and 2011 the status of NRM wolves varied between listed and delisted. In May 2011, NRM wolves, which included areas east of Highways 395-78-95 in Oregon, were delisted as a result of congressional action. Wolves in the remainder of Oregon remained listed as endangered under federal ESA (Figure 1).

Figure 1. Current Federal ESA Status of Wolves in Oregon

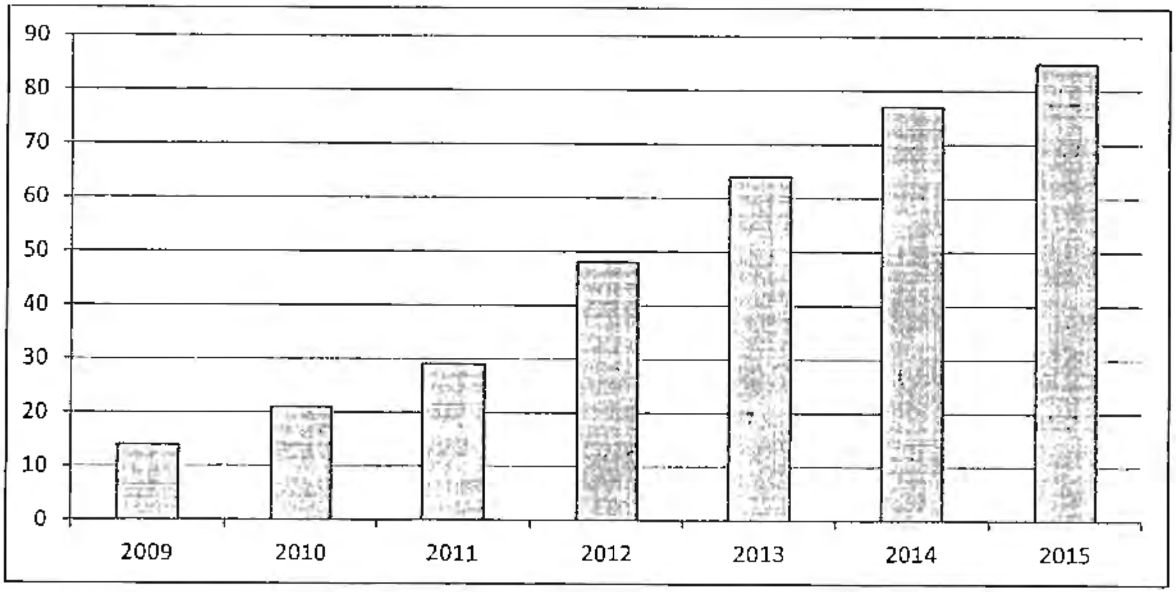


Biological Status of Wolves in Oregon

Population

Successful wolf reproduction was first documented in 2008 in the northeastern portion of the state. Annual winter counts of wolves were initiated by ODFW in 2009 and Oregon's wolf population increased in all years since (Figure 2) with a mean population growth rate of 1.43 (± 0.15 SD). Updated information in 2015 shows that there were a minimum of 81 wolves in Oregon in 2014 (Table 2). This included 10 packs, defined as four or more wolves travelling together in winter (Oregon Department of Fish and Wildlife 2010). As of July 2015, there were 16 known groups or packs of wolves containing a male-female pair (Table 2), and the mid-year minimum population (non-pup) was 85 wolves. Oregon uses a minimum-observed count method for surveying wolves which underestimates the actual population because, 1) it does not account for all individual or non-territorial wolves which are known to occur in all wolf populations, and 2) it is unrealistic to assume complete detection of all wolves.

Figure 2. Oregon minimum wolf population 2009 - 7/2015 (2015 population does not include pups of the year)



Reproduction and pup survival

The minimum number of breeding pairs in Oregon increased since 2009 but varies annually (Table 2). Breeding pairs are considered successful if at least 2 pups survive and are documented at the end of the calendar year. In 2014, 8 of 9 Oregon breeding pairs occurred within the eastern Wolf Management Zone (WMZ) and this marks the third consecutive year in which at least 4 breeding pairs occurred in eastern Oregon; prompting entry into Phase II of the Wolf Plan. As of July 2015, we were aware of reproduction occurring in 13 packs or groups of wolves in Oregon, (the other 3 groups had not been surveyed at that time). Although these will not be considered successful breeding pairs until December 31st, they do signify a likely increase in breeding pairs for the year and this increase is consistent with past and predicted trends.

4. Over-utilization of the species or its habitat for commercial, recreational, scientific, or educational purposes is not occurring or likely to occur; and
5. Existing state or federal programs or regulations are adequate to protect the species and its habitat.

For any determination of Criterion 1 above regarding the range of a species, OAR 635-100-0105 specifies three evaluation factors to be used by the Commission:

1. The total geographic area in this state used by the species for breeding, resting, or foraging and the portion thereof in which the species is or is likely within the foreseeable future to become in danger of extinction; and
2. The nature of the species' habitat, including any unique or distinctive characteristics of the habitat the species uses for breeding, resting, or foraging; and
3. The extent to which the species habitually uses the geographic area

Option 1

Evaluation of delisting criteria for wolves within the entire state of Oregon

Criterion 1: The species is not now (and is not likely in the foreseeable future to be) in danger of extinction throughout any significant portion of its range in Oregon or is not at risk of becoming endangered throughout any significant portion of its range in Oregon.

Within broadly defined habitat requirements described in this document, wolves are not generally known to require specific or niche habitat features within areas of use. We define and use 'potential range' as geographic areas of Oregon with sufficient habitat features to allow breeding, resting, and foraging requirements of wolves per OAR 635-100-0105. It does not include areas of contracted historical range (described below), nor does it provide a qualitative assessment of future wolf numbers or carrying capacity based on available habitat. A report describing methods used for evaluating contracted historical and potential range is available in Appendix A of this document.

Historical range

Assessment of the baseline historical range of wolves in Oregon is difficult because: 1) historical accounts are inconsistent and often anecdotal; and 2) human-caused effects which resulted in the wolf's extirpation pre-dated accurate surveys of the species. Historical accounts generally describe a wide distribution and variable abundance within the state (Oregon Department of Fish and Wildlife 2010), but no comprehensive surveys of wolf distribution and abundance were conducted during this period. Scientists described wolves as historically occurring in both eastern (Young 1946) and western Oregon (Bailey 1936). Bounty records up to 1946 corroborated presence of wolves from both sides of the Oregon Cascade Mountains (Olterman and Verts 1972). For this criterion, and to facilitate our analysis, we conclude that prior to European settlement most of the land area within Oregon was historical wolf range.

Historical range, however, does not mean that all geographic areas of Oregon supported sustainable sub-populations of wolves or that densities were uniformly distributed across the state. Based on preferred cover types and our current understanding of wolf ecology, some portions of Oregon historically contained areas of marginal or less suitable habitat. By example, arid and non-forested areas with low prey densities would have been expected to support few wolves (Young and Goldman 1944). In Oregon, these areas likely included much of the Columbia Basin and Great Basin rangeland habitats.

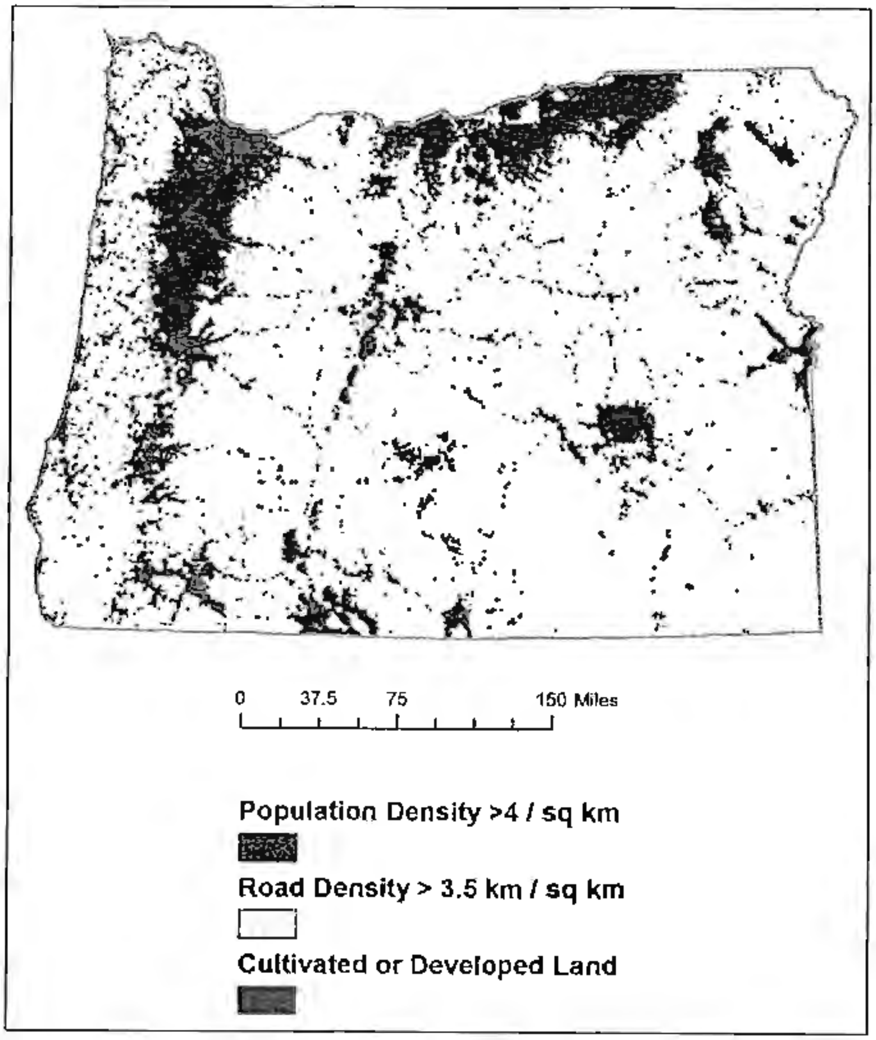
Contraction of historical range in Oregon

Human activities affect wolf distribution (Mladenoff et al. 1995) and the absence of wolves in human-dominated areas may reflect high anthropogenic mortality, avoidance, or both (Mech and Boitani 2003). We used human density, road density, and cultivated agriculture areas to identify geographic areas that are unsuitable for wolf establishment. We estimated permanent contraction of historical range of at least 57,889 km^2 (23.1%) of Oregon has occurred to date (Figure 6). A large proportion of which occurs in the Willamette Valley, where dense human population, cultivated landscape, lack of forest cover and high road density is expected to preclude significant reestablishment of resident wolves under any protection level or management policy.

Potential range

Several studies have assessed habitat features as related to occupancy and persistence of wolves, and though the resulting model outputs have varied, some generalizations among studies were observed. First, wolves will likely occupy areas with adequate prey populations and where conflict with humans is low (Keith 1983, Fuller 1989, Fritts et al. 2003, Carroll et al. 2006, Oakleaf et al. 2006). Second, habitat features associated with occupancy and persistence of wolves include: human density (Oakleaf et al. 2006, Belongie 2008), forest cover (Mladenoff et al. 1995, Larsen and Ripple 2004, Oakleaf et al. 2006), prey availability (Mech and Boitani 2003, Peterson and Ciucci 2003, Larsen and Ripple 2006, Oakleaf et al. 2006), public land ownership (Mladenoff et al. 1995, Carroll 2003, Mech and Boitani 2003, Larsen and Ripple 2006), and road density (Thiel 1985, Mech 1989, Carroll 2003, Carroll et al. 2006, Larsen and Ripple 2006). We are not aware of any published model which included data collected from wolves in Oregon because wolves did not occur in Oregon at the time the models were developed. We used the above factors, (sans public land ownership) and estimated the potential range for wolves in Oregon to be approximately 106,853km^2, or 42.6% of the total area of the state (Figure 7). See Appendix A for a description of methods used in this analysis.

Figure 6. Estimated areas of contracted wolf range in Oregon.



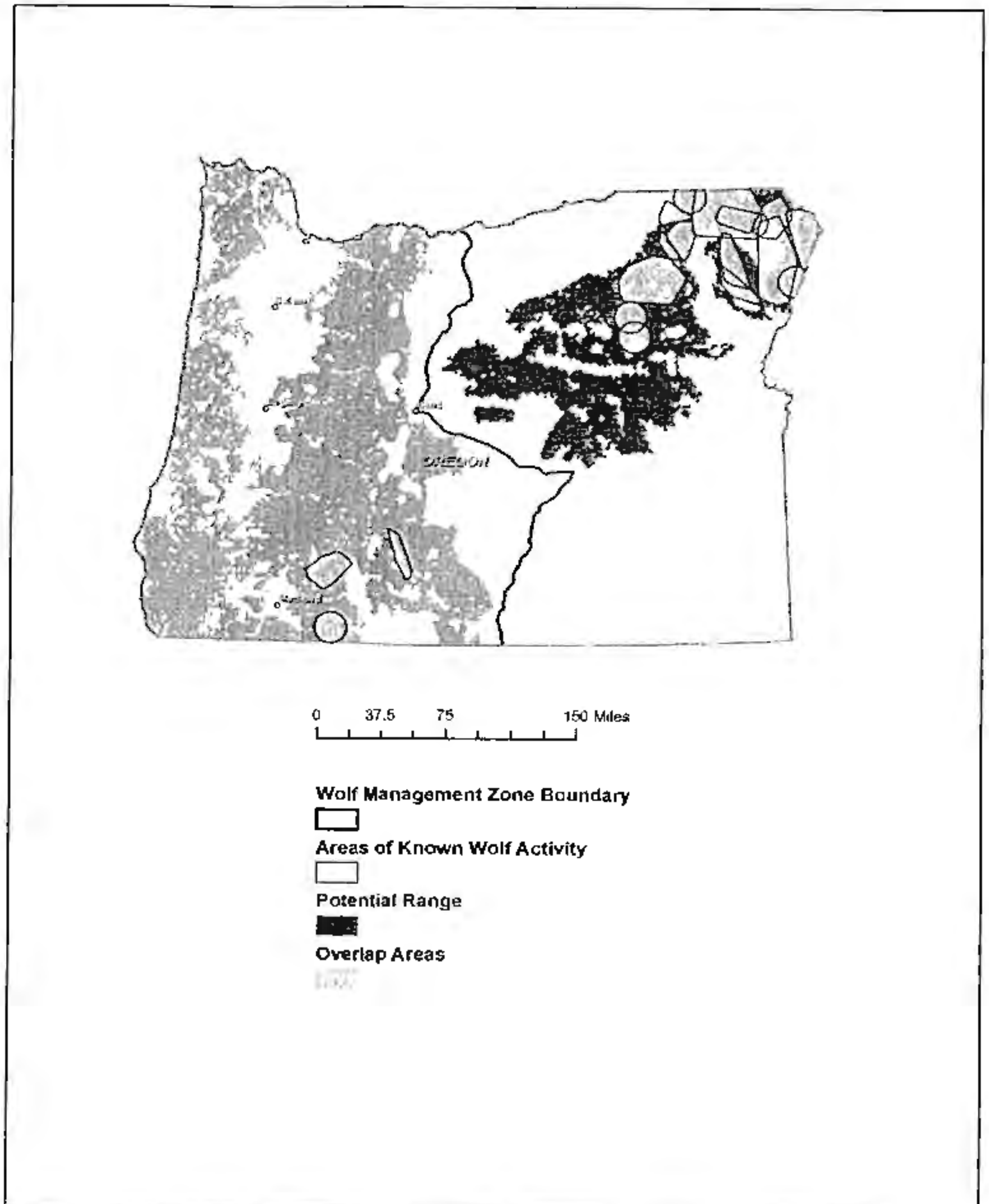
Current occupied range

Wolves currently occupy 13,222 km^2 (12.4%) of the estimated potential wolf range in Oregon (Figure 7). Within the eastern WMZ, occupied wolf range is 31.6% of the total available area (Table 3), and in the western WMZ, occupied wolf range is 2.7% of the total available.

Table 3. Potential and Occupied Wolf Range in Oregon.

Wolf Management Zone	Potential range (km^2)	Currently occupied range (km^2)
West	71,011	1,909
East	35,842	11,313
Total	106,853	13,222

Figure 7. Potential wolf range by wolf management zone and currently occupied potential range in Oregon.



Extinction risk

We assessed risk of population failure or extinction of Oregon's wolves using an individual-based population model. Specific methods and results of this analysis are presented in detail in Appendix B. The results are also summarized in Criterion 2 below.

Oregon's wolf population is currently increasing at an annual mean rate of 1.43 (± 0.15 SD) and is projected to continue this trend in the near term. Using vital rates observed in Oregon from 2009-2014 our model had no simulations in which either the biological-extinction or conservation-failure levels were reached in the next 50 years. However, Oregon's wolf population will transition from a rapidly increasing population to a population with lower growth rates. The timing of this transition is unknown and to account for this we modeled the wolf population using conservative inputs, and the resulting analysis indicated a low (5%) probability of wolves dropping below 4 breeding pairs or fewer within the next 50 years and the risk of the population becoming biologically extinct (i.e., < 5 wolves) was about 1% over the same time period. The modeled risk of extinction was reduced even further in our analysis when using an initial population (100 or more) larger than the current minimum wolf population (n = 85). However, as discussed elsewhere in this document, initial population size used in our model was based on observed minimum counts and the actual population is likely larger. Even using conservative biological inputs over the long term, our modeled wolf population is projected to continue to increase at a mean growth rate of 1.07 (± .17 SD).

Summary conclusions for Criterion 1

We evaluated a combination of historical, potential, and currently occupied wolf range in Oregon to evaluate Criterion 1. In addition, we identified portions of the state which have been altered by humans in a manner that preclude current and future use by wolves. These contracted range areas are not likely to affect the threat of extinction of the species in Oregon because 1) they represent a relatively small portion of Oregon's available wolf habitat, and 2) the biological requirements of wolves indicate that some of these now unsuitable areas were likely marginal or unsuitable year-round habitats anyway.

Wolves continue to increase in both distribution and abundance, and do not yet occupy all of their potential range in Oregon. They currently occupy 12.4% of the estimated potential wolf range in Oregon. In the western WMZ in which approximately 3% of the potential range is currently occupied by wolves. However, representation in two distinct and separate geographical portions of the state (Figure 7) is an indication that conditions exist (e.g., habitat capability, connectivity, and prey availability) to support wolves in both the east and west WMZ's. Successful range expansion of a species is often used as a measure of population fitness, and there are no known conditions which prevent wolves from occupying currently unoccupied areas of potential wolf range.

The eventuality that wolves would become established in the eastern WMZ before the western WMZ was accurately predicted by the Commission when the 2005 Oregon Wolf Plan was adopted. The decision to divide the state into two WMZ's was an intentional effort to provide the flexibility needed to manage increasing numbers of wolves in eastern Oregon while maintaining conservation measures for colonizing sub-populations in western Oregon. When evaluating the threat of extinction in Oregon's potential and current wolf range we considered that: 1) wolves were once extirpated as a result of historical efforts to eradicate them, and now in absence of those efforts and under current management frameworks, are increasing in abundance and distribution; 2) there are no known conditions which prevent wolves from inhabiting currently unoccupied portions of range in Oregon; 3) observed movement and dispersal patterns indicate connectivity from source populations; and 4) the probability of extinction in Oregon is low (see Criterion 2 below).

(OR7 and OR25), and further indicated by at least four uncollared adult wolves in the southern Oregon Cascade Mountains. Recently breeding wolves were documented in northern California (California Department of Fish and Game News Release August 20, 2015), and though the genetic source of these wolves is unknown at the time of this report, it is expected that these wolves are likely connected to Oregon or other NRM wolves.

Data from GPS-collared dispersers shows that dispersal in Oregon occurred largely through forested habitats. However, dispersers which travelled more than 85 km generally crossed a variety of land cover types and landscape features (i.e., open prairie or shrub habitats, roads, rivers, etc.). To evaluate effects of major highways as barriers to dispersal, we examined crossings of two interstate highways by dispersing wolves fitted with GPS collars; Interstate 84 in eastern Oregon and Interstate 5 in western Oregon. Seven collared wolves in Oregon are known to have crossed Interstate 84, and one wolf (OR7) crossed Interstate 5 on two occasions. We documented fourteen instances where GPS-collared wolves crossed interstate highways in Oregon, with four wolves (OR7, OR14, OR24, and OR30) crossing more than once. Data from two GPS-collared dispersers (OR15 and OR18) indicate attempted, but unsuccessful crossings of Interstate 84 in 2014 between La Grande and Pendleton. In both cases the wolves changed dispersal course and ultimately emigrated from Oregon. It is notable that both of these emigrating dispersers were from Oregon's most remote pack (Snake River) and prior to dispersal had few encounters with busy roadways and vehicles. Oregon's only documented highway-related mortality was in May 2000 when a wolf dispersing from Idaho was struck by a vehicle on Interstate 84 south of Baker City. Combined, these observations of dispersing wolves suggest interstate highways are at least partially permeable and do not prevent dispersal of wolves.

The ability for wolves to cross large rivers is also important for maintaining connectivity between Oregon wolves and the larger NRM meta-population which includes Idaho. To date, we have no data of wolves crossing the Columbia River. Wolves in Oregon are genetically related to wolves in Idaho, and GPS-collared dispersers in Oregon have successfully crossed the Snake River 14 times. This apparent ease of large river crossing is consistent with collar data from non-dispersing wolves of the Snake River pack (a shared Oregon/Idaho pack) which in 2013 showed regular crossings of the Snake River (ODFW, unpublished data). These crossings indicate the river itself does not impede connectivity between subpopulations in Idaho and Oregon.

Genetic viability is a critical concern for any threatened or endangered population (Frankham et al. 2002, Scribner et al. 2006). Small populations of wolves are unlikely to be threatened by low genetic diversity (Boitani 2003). Although inbreeding is a potential threat to the long-term viability for small and isolated populations (Liberg 2005, Fredrickson et al. 2007), there are examples of wolf populations which are small and isolated which have persisted for decades (Fritts and Carbyn 1995, Boitani 2003, Liberg 2005). Regarding a 'required' population size, Fritts and Carbyn (1995) stated the following:

> *"Most theoretical analyses of population viability have assumed a single, isolated population and lack of management intervention, neither of which is likely for wolves. Data on survival of actual wolf populations suggest greater resiliency than is indicated by theory. In our view, the previous theoretical treatments of population viability have not been appropriate to wolves, have contributed little to their conservation, and have created unnecessary dilemmas for wolf recovery programs by overstating the required population size"*

Genetic interchange between subpopulations is important to maintain genetic health of any wildlife population and as few as 1-2 immigrants per generation (~5 years with wolves) is generally considered sufficient to minimize effects of inbreeding (Vila et al. 2003, Liberg 2005). This requirement is easily attained because wolves have the demonstrated ability to rapidly disperse long distances and avoid inbreeding by selecting unrelated mates (Vonholdt et al. 2008). Montana and Idaho wolf population are connected to each other and to Canada through natural dispersal (U. S. Department of the Interior 2009), and Oregon wolves are genetically related to Idaho wolves. For example, Oregon's westernmost wolf pack (Rogue) in the southern Oregon Cascade Mountains is only 1 generation removed from central Idaho wolves – the breeding male of that pack (OR7) is an offspring of an Idaho-born female (B300). We contend that high levels of genetic diversity in Oregon wolves will be maintained through connectivity to the larger NRM wolf population. Natural dispersal will allow a sufficient number of immigrants to arrive in Oregon so long as sufficient connectivity is maintained between populations in adjacent states (Hebblewhite et al. 2010).

As a source population, the genetic health of the NRM reintroduced wolves is also important to understanding the genetic health of Oregon wolves. Wolves reintroduced into Idaho in 1995 and 1996 originated from two distinct wolf populations in Canada – 15 wolves from 7 packs came from Hinton, Alberta in 1995, and 20 wolves from 9 packs came from Fort St. John, British Columbia in 1996 (M. Jimenez, USFWS, personal communication). Subsequent genetic analysis concluded that the reintroduced wolves were as diverse as their general source population (Forbes and Boyd 1996;1997) and that genetic variation within the NRM is high (Forbes and Boyd 1996;1997, Vonholdt et al. 2008). While our analysis of wolf-population viability did not explicitly incorporate genetic effects, we recognize that genetic effects could become important if the Oregon wolf population becomes isolated from the remainder of the NRM wolf population.

The challenges of wolves in areas with livestock are well documented, and wolves prey on domestic animals in all parts of the world where the two coexist (Mech and Boitani 2003). From 2009 through June 2015, wolf depredation in Oregon resulted in confirmed losses of 79 sheep, 37 cattle, 2 goats, and 2 livestock protection dogs. Management of wolf-livestock conflict utilizes a three-phased approach based on population objectives and emphasizes non-lethal measures while increasing management flexibilities as the wolf population increases (Oregon Department of Fish and Wildlife 2010). In all phases of implementation the Wolf Plan requires that non-lethal techniques remain the first choice of managers when addressing wolf-livestock conflicts. Currently, we are implementing Phase II of the Wolf Plan in the eastern WMZ and OAR 635-110-0020 outlines conditions for legal harassment and take of wolves in response to wolf-livestock conflict in the federally delisted portion of the eastern WMZ. The total incidence of livestock depredation is expected to increase as Oregon's wolf population increases and expands their geographic range. However, we have no data indicating whether the proportional rate of depredation will increase or decrease.

In all areas where wolves occur with people, some wolves are killed (Fritts et al. 2003), and human-caused mortality was responsible for the initial extirpation of wolves from Oregon. There are many references which relate human tolerance to successful wolf management (Mech 1995, Bangs et al. 2004, Smith 2013), and for our analysis we consider that the primary human-related impacts to wolves are realized through direct human-caused mortality.

The Wolf Plan (and associated rules) outlines conditions for when human-caused mortality is authorized. In the federally delisted portion of the eastern WMZ, OAR 635-110-0020 is currently in effect regardless of OESA listing status, and this rule allows human take for wolf-livestock conflict under the following: 1) take of wolves caught in the act of attacking or chasing livestock; and 2) agency take of wolves in response to chronic livestock depredation. To date, no wolves

Commissioners?

Thank you, panel.

UNIDENTIFIED MALE SPEAKER: Jenny.

CHAIR FINLEY: Oh, I'm sorry.

JENNY DRESLER: Sorry.

UNIDENTIFIED MALE SPEAKER: Great testimony, Jenny.

JENNY DRESLER: Thank you. Thank you.

UNIDENTIFIED MALE SPEAKER: Looking forward to it.

JENNY DRESLER: Chair Finley, Director Melcher, and members of the Commission, my name is Jenny Dresler and I represent the Oregon Farm Bureau Federation. I am here today on behalf of our seven thousand members to ask you to delist the gray wolf throughout the state of Oregon.

Since I have limited time to testify today I thought I would briefly list the top ten reasons that the Oregon Farm Bureau believes delisting is appropriate. I refer you to our written testimony for further details.

Number one, wolf management in Oregon is not governed by -- or is governed by the Oregon Wolf Plan. Management of wolves will not change with a decision to delist the wolves. Number two, wolf management in Eastern Oregon is currently in Phase II of the Oregon Wolf Plan and that management will not change. The Wolf Plan also calls for delisting to occur in Phase II.

Number three, wolves in Western Oregon will remain under federal protection under Phase I of the Oregon Wolf Plan. These wolves will remain fully protected under the plan as the populations continue to grow. Number four, the decision to delist the wolves is biologically sound. We have gone from the first wolf sighted in 1999 to estimates of over one hundred wolves today. That growth has occurred due to wolf management under the Wolf Plan and we anticipate that growth to continue under the plan.

Number five, some groups here today claim that a species must be found throughout all of its range for it to be delisted. These statements are inaccurate. The listing criteria does not require statewide dispersal, it only requires the species is not likely to become in danger of extinction throughout a significant portion of its range. We trust that the current management framework will ensure continued growth in Oregon.

Number six, comparisons to other species populations or ranges are not suitable to wolves. Number seven, the State biologist found that the probability of population failure under the Wolf Plan is very low and that wolves are increasing in abundance and distribution throughout the state. Number eight, we believe in honoring commitments. Oregon producers have honored their commitments under the Wolf Plan at great loss and expense to their operations. We are now asking that the State honor its commitments under the Wolf Plan.

Number nine, we believe that some groups involved in the Wolf Plan have not honored their commitments. They have used the State Endangered Species Act as a tool to renegotiate compromises and promises made by them under the original plan and to volley side attacks on the Wolf Plan when they do not agree with management decisions. This erodes trust with all groups that were involved in the formation of the plan.

Number ten, if delisting does not occur we are worried that our producers on the ground will lose faith in the Wolf Plan and the agreements and commitments made by the State and by environmental groups at the table. Producer buy-in and involvement is critical to the Wolf Plan's success and the continued success of the species in Oregon.

For those reasons we urge you to move forward with the delisting decision today and I appreciate the opportunity to provide comments. Thank you.

CHAIR FINLEY: Thank you.

Okay. Commissioners.

All right. Thank you, panel.

Next up, Mr. Todd Nash, Mr. Ingles, and Ms. Beldin.

Todd, we'll start with you, please. And your name is written here very clearly, the name and address.

TODD NASH: Jenny Dresler wrote it down for me so that's why, so.

My name is Todd Nash. I'm the Wolf Committee chairman for the Oregon Cattlemen's Association. I live at 64541 Alder Slope Road, Enterprise, Oregon.

When wolves first came into Oregon the first established pack that we knew of was the Imnaha Pack and they resided right in the middle of where I ran cattle. And 2009 we were told that there was one or two wolves there. Ended up that there was ten there that year. The next year they got up to sixteen wolves at the top end of things. I was the stock grower's president at the county level at that time and became very involved and so my history with wolves in Oregon and the first pack's pretty well established. I went to a number of depredations of my own as well as others.

The five criteria clearly have been met. There was a time when B-300 was the only known wolf in Oregon, 2009, and now here we are six years later.

Chair Finley, in Florence you said this is an emotional issue but your decision would be based on science and I appreciate that and I agree with that. But part of the Oregon Wolf Plan was based on human tolerance and we're at a threshold now where there is a distrust with what's going on and we need to see and I need to be able to carry on a message that if it's written down that's the way it's going to be. And I've given presentations all over this state to cattlemen. The Oregon Cattlemen's Association was instrumental in spreading the word on non-lethal activity. The Wallowa County Stock Growers in conjunction with the county government there, we established the first compensation board. We've done a number of non-lethals. Our chairman there, our president for the county, he supervises the range rider program there every year.

But here we are at this next threshold and we're just dependent on you all to make a decision that shows that at some point the things that we need will be addressed. Compensation has fallen far short of where financially it ever was supposed to be. And it will never replace the peace of mind that we once had.

CHAIR FINLEY: Down to fifteen seconds, Todd.

TODD NASH: Delisting today is not going to address all of those things, but it's a step in the right direction. Appreciate your time.

CHAIR FINLEY: Thank you.

Mr. Ingles.

RUSTY INGLES: Chair Finley, Director Melcher, members of the Commission, my name is Rusty Ingles. I live members of the Commission. I've supplied copies of my testimony today so you should have that in your materials.

My name is Jerome Rosa and I'm the executive director of the Oregon Cattlemen's Association representing our nearly two thousand members in OCA. Today I'm asking you on behalf of our members based on evidence and recommendations by Oregon biologists to honor the Oregon Wolf Plan and delist wolves from the Endangered Species listing. It's key to recognize that the way Oregon wolves are managed will not change with the delisting action. The Oregon Wolf Plan was agreed upon by multiple parties and it's time to follow through to the next that it dictates.

Oregon ranchers honored their obligations to follow the plan. This is part of the reason why the wolves have multiplied in our state. Following the Oregon Wolf Plan does not come without sacrifice. Our members and their families have suffered many animal losses and endured wolf attacks on animals ranging from calves to family dogs. Still, they have worked through these losses to follow and honor the plan. It would be unfair and unwarranted to these people to not follow through with the State's recommended delisting which is provided for under the plan.

Oregon's wolf populations have gone from zero to nearly a hundred in six years. An example of this expansion can be seen by looking at last week's first confirmed attack in Klamath County which is the first confirmed kill by wolves west of Highway 395. Oregon wolf's population is predicted to continue expanding under Phase II, not decline.

Earlier this afternoon there was comments from the back when a previous speaker raised concerns about the possibility of a wolf attacking a child. For ranchers in areas with high wolf populations that concern is very real. Indeed the ranchers whose dogs were attacked regularly allow their children to play outside and a future attack on their children is at the top of their mind.

Abraham Lincoln once said, "A commitment is what transforms a promise into a reality." Oregon ranchers have held up their commitment to the Oregon Wolf Plan. We want to encourage the State to honor their obligation to delist with State biologists have found that the delisting criteria are met. That time is now. Thank you.

CHAIR FINLEY: Thank you.

Who did I miss? Got them all.

Commissioners, any questions, comments?

Thank you, panel.

Jonathan Jelen and Jim Litts and Alison Litts.

Okay, Mr. Jelen, we'll start with you, please. Name and address for the record.

JONATHAN JELEN: Chair Finley, Director Melcher, members of the Commission, my name is Jonathan Jelen. I'm