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**U.S. DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**[Docket No. XXXXX]**

**[FXES11130900000C2-123-FF09E32000]**

**RIN 1018–AY00**

# Endangered and Threatened Wildlife and Plants; Proposed Rule To Remove the Gray Wolf (*Canis lupus*) from the List of Threatened and Endangered Wildlife and Maintain Protections for the Mexican Wolf (*Canis lupus baileyi*) by Listing it as Endangered

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTIONS:** Proposed rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service or USFWS) evaluated the classification status of gray wolves (*Canis lupus*) currently listed in the contiguous United States and Mexico under the Endangered Species Act of 1973, as amended (Act). Based on our evaluation we propose to remove the gray wolf from the List of Threatened and Endangered Wildlife but to maintain endangered status for the Mexican wolf by listing it as a subspecies (*Canis lupus baileyi*). We propose these actions because the best available scientific and commercial information indicates that the currently listed entity is not a valid species under the Act and that the Mexican wolf (*C. l. baileyi*) is an endangered subspecies.

In addition, we recognize recent taxonomic information indicating that the formally listed gray wolf subspecies, *Canis lupus lycaon*, which occurs in southeastern Canada and historically occurred in the northeastern United States and portions of the upper Midwest (eastern and western Great Lakes regions) United States should be elevated to the full species *Canis lycaon*. This proposed rule also constitutes the completion of a status review for gray wolves in the Pacific Northwest initiated on May 5, 2011.

Finally, this proposed rule replaces our May 5, 2011 proposed action to remove protections for *C. lupus* in all or portions of 29 eastern states (76 FR 26086).

**DATES:** *Comment submission:* We will accept comments received or postmarked on or before [**INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

*Public hearings:* We must receive requests for public hearings, in writing, at the address shown in the FOR FURTHER INFORMATION CONTACT section by [**INSERT 45 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION**].

**ADDRESSES:** You may submit comments by one of the following methods:

(1) Electronically*:* Go to the Federal eRulemaking Portal: *http://www.regulations.gov*. In the Enter Keyword or ID box, enter [Docket ID], which is the docket number for this rulemaking. On the search results page, under the Comment Period heading in the menu on the left side of your screen, check the box nest to "Open" to locate this document. Please ensure you have found the correct document before submitting your comments. If your comments will fit in the provided comment box, please use this feature of http://regulations.gov, as it is most compatible with our comment review procedures. If you attach your comments as a separate document, our preferred file format is Microsoft Word. If you attach multiple comments (such as form letters), our preferred format is a spreadsheet in Microsoft Excel.

(2) By hard copy: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: [Docket ID]; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042–PDM; Arlington, Virginia 22203. We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see the **Public Comments** section below for more information).

**FOR FURTHER INFORMATION CONTACT:** [Insert name], [insert number]. Direct all questions or requests for additional information to: GRAY WOLF QUESTIONS, U.S. Fish and Wildlife Service, Headquarters Office, Endangered Species Program, 4401 North Fairfax Drive, Room 420, Arlington, Virginia 22203. Individuals who are hearing-impaired or speech-impaired may call the Federal Relay Service at 1-800-877-8337 for TTY assistance.

**SUPPLEMENTARY INFORMATION:**

**Executive Summary**

This document contains a proposed rule to remove the current listing for gray wolf, *Canis lupus*, from the List of Threatened and Endangered Wildlife (List) and add an endangered listing for the Mexican wolf, *Canis lupus baileyi*. The evaluations that are included in this proposed rule are summarized in Table 1.

Table 1. Summary of proposed rule analyses and results

| Unit of Assessment | Description | Valid Listable Entity? | Determination |
|---|---|---|---|
| *C. lupus* | current listed entity - all or portions of 42 States and Mexico | no | Delist |
| *C. lupus* | species - rangewide | yes | Listing not warranted |
| *C. l. nubilus* | subspecies - rangewide | yes | Listing not warranted |
| *C. l. occidentalis* | subspecies - rangewide | yes | Listing not warranted |
| *C. l. baileyi* | subspecies - rangewide | yes | List as endangered |

| | | | |
|---|---|---|---|
| *C. lupus* in Pacific Northwest | Western Washington, Western Oregon, and Northern California | no | Not a listable entity |

*Purpose of the Regulatory Action*

This proposed rulemaking is intended to ensure the List of Endangered and Threatened Wildlife reflects the most current scientific and commercial information with respect to the status of *C. lupus* and any subspecies and potential distinct population segments of *C. lupus* in the contiguous United States. After a thorough evaluation of the best available science we have determined that, with the exception of Mexican wolves (from here on referred to by the scientific name, *Canis lupus baileyi*), *C. lupus* and *C. lupus* subspecies in the contiguous United States do not warrant listing under the Act. This evaluation was based on new data that has become available since the original listing, including new information on *C. lupus* taxonomy (Chambers *et al.* 2012 and Rutledge *et al.* 2012). *Canis lupus baileyi* continues to warrant endangered status under the Act.

*Major Provision of the Regulatory Action*

This proposed action is authorized by the Act. We are proposing to amend § 17.11(h), subchapter B of chapter I, title 50 of the Code of Federal Regulations by removing the entry for "Wolf, gray" under MAMMALS in the List of Endangered and Threatened Wildlife and adding an entry for "Wolf, Mexican" in alphabetic order.

*Costs and Benefits*

We have not analyzed the costs or benefits of this rulemaking action because the Act precludes consideration of such impacts on listing and delisting determinations. Instead, listing and delisting decisions are based solely on the best scientific and commercial information available regarding the status of the subject species.

**Public Comments**

We intend that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments, new information, or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are hereby solicited. In particular, we are seeking targeted information and comments on our proposed removal of *C. lupus* from the List of Threatened and Endangered Wildlife and addition of *C. l. baileyi* as an endangered subspecies.

(1) Biological, commercial trade, or other relevant information concerning our analysis of the current *C. lupus* listed entity and the adequacy of the approach taken in this analysis, with particular respect to our interpretation of the term population as it relates to the 1996 Policy Regarding the Recognition of Distinct Vertebrate Population Segments (DPS policy) (61 FR 4722, February 7, 1996) and specifically to gray wolves.

(2) Information concerning the genetics and taxonomy of the eastern wolf, *Canis lycaon*.

(3) Information concerning the status of the gray wolf in the Pacific Northwest United States and the following gray wolf subspecies: *Canis lupus nubilus*, *Canis lupus occidentalis*, and *C. l. baileyi*, including:

(a) Habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range including distribution patterns;

(d) Historical and current population levels, and current and projected trends;

(e) Historical, current, and projected levels of suitable habitat;

(f) Past, ongoing, and emerging threats to these populations, their habitat, or both; and

(g) Past and ongoing conservation measures for these populations, their habitat, or both.

As this proposal is intended to replace our May 5, 2011, proposal to remove protections for *C. lupus* in all or portions of 29 eastern contiguous States (76 FR 26086), we ask that any comments previously submitted that may be relevant to the proposal presented in this rule be resubmitted at this time. You may submit your comments and materials by one of the methods listed in **ADDRESSES**. We will not accept comments sent by e-mail or fax or to an address not listed in **ADDRESSES**. Comments must be submitted to ***http://www.regulations.gov*** before midnight (Eastern Daylight Time) on the date specified in **DATES**. Finally, we will not consider hand-delivered comments that we do not receive, or mailed comments that are not postmarked, by the date specified in **DATES**.

We will post your entire comment—including your personal identifying information—on *http://www.regulations.gov*. If you provide personal identifying information, such as your street address, phone number, or e-mail address, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *http://www.regulations.gov* at Docket No. [Insert docket ID], or by appointment, during normal business hours at U.S. Fish and Wildlife Service, Headquarters Office, Endangered Species Program, 4401 North Fairfax Drive, Room 420, Arlington, VA 22203.

**Public Hearings**

In accordance with Section 4(b)(5) of the Act, we intend to hold public hearings on the proposal prior to the close of the public comment period. The dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, will be presented subsequently in the **Federal Register** and local newspapers at least 15 days before the hearing.

**Peer Review**

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), we will seek the expert opinions of at least three appropriate and independent specialists regarding scientific data and interpretations contained in this proposed rule. The purpose of such review is to ensure that our decisions are based on scientifically sound data, assumptions, and analyses. We have invited these peer reviewers to comment during this public comment period on our proposed actions.

We will consider all comments and information we receive during this comment period on this proposed rule during our preparation of the final determination. Accordingly, the final decision may differ from this proposal.

**Previous Federal Actions**

Gray wolves were originally listed as subspecies or as regional populations of subspecies in the contiguous United States and Mexico. In 1967, we listed *C. l. lycaon* in the Great Lakes region (32 FR 4001, March 11, 1967), and in 1973 we listed *C. l. irremotus* in the northern Rocky Mountains (38 FR 14678, June 4, 1973). Both listings were promulgated under the Endangered Species Conservation Act of 1969; subsequently, on January 4, 1974, these subspecies were listed under the Endangered Species Act of 1973 (39 FR 1171). We listed a third gray wolf subspecies, *C. l. baileyi,* as endangered on April 28, 1976 (41 FR 17736), in the southwestern United States and Mexico. On June 14, 1976 (41 FR 24064), we listed a fourth gray wolf subspecies, *C. l. monstrabilis,* as endangered in Texas and Mexico.

In 1978, we published a rule (43 FR 9607, March 9, 1978) reclassifying the gray wolf as an endangered population at the species level (*C. lupus*) throughout the contiguous United States and Mexico, except for the Minnesota gray wolf population, which was classified as threatened. At that time, we considered the gray wolf group in Minnesota to be a listable entity under the Act, and we considered the gray wolf group in Mexico and the 48 contiguous States other than Minnesota to be another listable entity (43 FR 9607 and 9610, respectively, March 9, 1978). The separate subspecies listings thus were subsumed into the listings for the gray wolf in Minnesota and the gray wolf in the rest of the contiguous United States and Mexico. In that 1978 rule, we also identified critical habitat in Michigan and Minnesota and promulgated special regulations under section 4(d) of the Act for operating a wolf management program in Minnesota. The special regulation was later modified (50 FR 50793, December 12, 1985).

The 1978 reclassification was undertaken to "most conveniently" handle a listing that needed to be revised because of changes in our understanding of gray wolf taxonomy, and in recognition of the fact that individual wolves sometimes cross subspecific boundaries. In addition, we sought to clarify that the gray wolf was only listed south of the Canadian border. However, the 1978 rule also stipulated that "biological subspecies would continue to be maintained and dealt with as separate entities" (43 FR 9609), and offered "the firmest assurance that [the Service] will continue to recognize valid biological subspecies for purposes of its research and conservation programs" (43 FR 9610, March 9, 1978). Accordingly, we implemented three gray wolf recovery programs in the following regions of the country: the Western Great Lakes (Minnesota, Michigan, and Wisconsin, administered by the Service's Great Lakes, Big

Rivers Region), the Northern Rocky Mountains (Idaho, Montana, and Wyoming, administered by the Service's Mountain-Prairie Region and Pacific Region), and the Southwest (Arizona, New Mexico, Texas, Oklahoma, Mexico, administered by the Service's Southwest Region). Recovery plans were developed in each of these areas (the northern Rocky Mountains in 1980, revised in 1987; the Great Lakes in 1978, revised in 1992; and the Southwest in 1982, the revision of which is now underway) to establish and prioritize recovery criteria and actions appropriate to the unique local circumstances of the gray wolf. A separate recovery effort for gray wolves formerly listed as *C. l. monstrabilis* was not undertaken because this subspecies was subsumed with *C. l. baileyi* and thus addressed as part of the recovery plan for the Southwest.

Between 2003 and 2009 we published several rules revising the 1978 contiguous United States and Mexico listing for *C. lupus* in an attempt to recognize the biological recovery of gray wolves in the northern Rocky Mountain and western Great Lakes populations but leave the gray wolf in the southwestern United States and Mexico listed as endangered (except for the nonessential experimental population in Arizona and New Mexico) (68 FR 15804, April 1, 2003; 72 FR 6052, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15070 and 74 FR 15123, April 2, 2009). However, each of these revisions was challenged in court. As a result of court orders (*Defenders of Wildlife, et al. v. Norton, et al.*, 354 F.Supp.2d 1156 (D. Or. 2005); *National Wildlife Federation, et al. v. Norton, et al.*, 386 F.Supp.2d 553 (D. Vt. 2005); *Defenders of Wildlife, et al. v. Hall, et al.*, 565 F.Supp.2d 1160 (D. Mont. 2008); *Defenders of Wildlife, et al. v. Salazar, et al.*, 729 F.Supp.2d 1207 (D. Mont. 2010); *Humane Society of the United States v. Kempthorne*, 579 F. Supp. 2d 7 (D.D.C. 2008)) and, in one case, a

settlement agreement (*Humane Society of the United States v. Salazar*, 1:09-CV-1092-PLF (D.D.C.)), by the spring of 2010 the listing for *C. lupus* in 50 CFR 17.11 remained unchanged from the reclassification that occurred in 1978 except for the addition of the three experimental populations (Yellowstone Experimental Population Area (59 FR 60252, November 22, 1994), Central Idaho Experimental Population Area (59 FR 60266, November 22, 1994), and the Mexican Wolf Experimental Population Area (63 FR 1752, January 12, 1998)). For additional information on these Federal Actions and their associated litigation history refer to the relevant associated rules (68 FR 15804, April 1, 2003; 72 FR 6052, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15070; and 74 FR 15123, April 2, 2009) or the Previous Federal Actions sections of our recent gray wolf actions (76 FR 61782, October 5, 2011; 76 FR 81666, December 28, 2011; 77 FR 55530, September 10, 2012).

In the northern Rocky Mountains, on May 5, 2011, we published a final rule that implemented Section 1713 of Public Law 112–10, reinstating our April 2, 2009, delisting rule which identified the Northern Rocky Mountain (NRM) population of gray wolf as a distinct population segment (DPS) and, with the exception of Wyoming, removed gray wolves in the DPS from the List (76 FR 25590). Although gray wolves in Wyoming were not included in the May 5, 2011, final delisting, we have since finalized the removal of gray wolves in Wyoming from the List (77 FR 55530, September 10, 2012).

In the western Great Lakes, on May 5, 2011, we also published a proposed rule to revise the List for *C. lupus* in the eastern United States (76 FR 26086). This proposal included (1) revising the 1978 listing of the Minnesota population of gray wolves, identifying it as the Western Great Lakes (WGL) DPS (the DPS includes all of

Minnesota, Wisconsin, and Michigan and portions of the adjacent states), and removing that WGL DPS from the List, and (2) revising the range of the gray wolf (the species *C. lupus*) by removing all or parts of 29 eastern states that we recognized were not part of the historical range of the gray wolf.

On December 28, 2011, we published a final rule that revised the listing of the Minnesota population of gray wolves, identified it as part of the WGL DPS, and removed the DPS from the List (76 FR 81666). We also notified the public that we had separated our determination on the delisting of the WGL DPS from the determination on our proposal regarding all or portions of the 29 eastern States we considered to be outside the historical range of the gray wolf and stated that a subsequent decision would be made for the rest of the eastern United States.

In the southwest, On August 11, 2009, we received a petition from the Center for Biological Diversity requesting that we list the Mexican wolf as an endangered subspecies or DPS and designate critical habitat under the Act. On August 12, 2009, we received a petition dated August 10, 2009, from WildEarth Guardians and The Rewilding Institute requesting that we list the Mexican wolf as an endangered subspecies and designate critical habitat under the Act. On October 9, 2012, we published a 12-month finding in the Federal Register stating that because all individuals that constitute the petitioned entity already receive the protections of the Act, the petitioned action was not warranted at that time (77 FR 61375).

As a result of the actions described above, the current *C. lupus* listed entity now includes all or portions of 42 States (Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Kansas, Kentucky, Louisiana, Massachusetts,

Maryland, Maine, Missouri, Mississippi, North Carolina, Nebraska, New Hampshire, New Jersey, Nevada, New York, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Vermont and West Virginia; those portions of Arizona, New Mexico, and Texas not included in the experimental population, and portions of Iowa, Indiana, Illinois, North Dakota, Ohio, Oregon, South Dakota, Utah, and Washington), and Mexico (Figure 1).

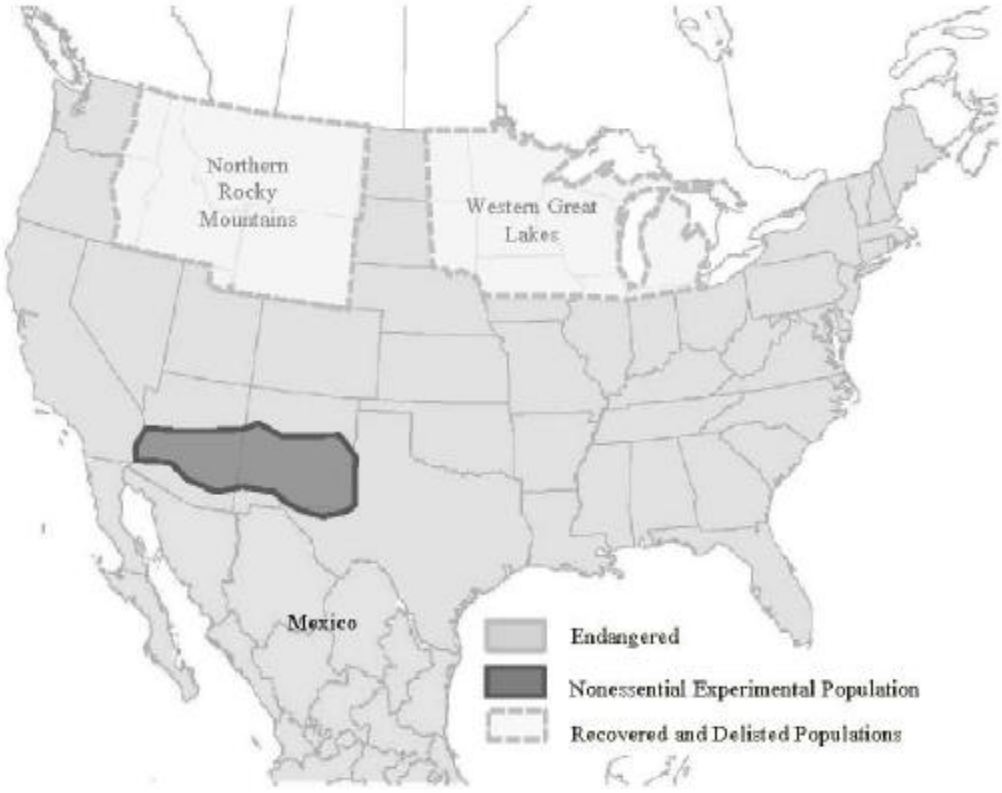


Figure 1: Current legal status of *Canis lupus* under the Act. All map lines are approximations see 50 CFR 17.11 and 17.84(k) for exact boundaries.

On February 29, 2012, we concluded a 5-year review of the *C. lupus* listed entity, recommending that the entity currently described on the List should be revised to reflect the distribution and status of *C. lupus* populations in the contiguous United States and Mexico by removing all areas currently included in the Code of Federal Regulations (CFR) range except where there is a valid species, subspecies, or DPS that is threatened or endangered.

**National Wolf Strategy**

We first described our national wolf strategy in our May 5, 2011, proposed rule to revise the List for the gray wolf in the eastern United States (76 FR 26086). This strategy was intended to: (1) Lay out a cohesive and coherent approach to addressing wolf conservation needs, including protection and management, in accordance with the Act's statutory framework; (2) ensure that actions taken for one wolf population do not cause unintended consequences for other populations; and (3) be explicit about the role of historical range in the conservation of extant wolf populations.

The strategy is based on three precepts. First, to qualify for listing, wolf entities must conform to the Act's definition of "species," whether as taxonomic species or subspecies or as DPSs. Second, the strategy promotes the continued representation of all substantially unique genetic lineages of gray wolves found historically in the contiguous United States. Third, wolf conservation under the Act is concerned with reducing extinction risk to imperiled species, subspecies, or valid DPSs. The May 5, 2011, proposed rule further stated that our strategy focused on conservation of four extant gray

wolf populations: (1) The western Great Lakes (WGL) population, (2) the northern Rocky Mountains (NRM) population, (3) the southwestern population of Mexican wolves, and (3) a potential population of gray wolves in the Pacific Northwest.

All of our actions to date are consistent with this focus. As stated above (see **Previous Federal Actions**), we published final rules delisting the NRM DPS, except for Wyoming, on May 5, 2011 (76 FR 25590), and the WGL DPS on December 28, 2011 (76 FR 81666). On September 10, 2012, we published a final rule delisting the Wyoming portion of the NRM DPS (77 FR 55530).

We have completed our evaluation of the status of gray wolves currently occupying portions of the Pacific Northwest and our assessment to determine if they qualify for Listing under the Act is presented in this proposed rule. The status of the southwestern population (*i.e., C. l. baileyi*) was reviewed pursuant to our 90-day finding on two listing petitions (75 FR 46894, August 4, 2010). We published a not warranted 12-month finding on October 9, 2012 (77 FR 61375). However, in that finding we stated that we could not, consistent with the requirements of the Act, take any action that would remove the protections accruing to the southwestern population under the existing *C. lupus* listing without first determining whether the southwestern population warranted listing separately as a subspecies or a DPS, and, if so, putting a separate listing in place (77 FR 61377, October 9, 2012). Therefore, because we are now proposing to remove protections for the current *C. lupus* listed entity it is necessary for us to reconsider listing the southwestern population as a subspecies or DPS, and we present our analysis and determination in this proposed rule.

Our national wolf strategy also addresses the two other wolf taxa that fall within the range described for *C. lupus* in the 1978 listing, the eastern wolf (*C. lycaon*) and the red wolf (*Canis rufus*). Consistent with our current understanding of *C. lycaon* taxonomy and the historical range of *C. lupus,* our proposal to remove the current *C. lupus* entity from the List addresses the error of continuing to include all or parts of 29 eastern states in the current *C. lupus* listing. For a complete discussion of this issue see **Taxonomy** section below. With respect to the status of *C. lycaon*, our analysis is ongoing (see *C. lycaon* section below). With regard to *C. rufus,* red wolves currently are listed as endangered where found (32 FR 4001, March 11, 1967); the red wolf listing is not affected by this proposal and recovery efforts for red wolves will continue as warranted (Red Wolf Recovery and Species Survival Plan; Service 1990).

**Approach for this Proposed Rule**

In this proposed rule we consider whether and to what extent gray wolves should be listed in the contiguous United States and Mexico. Our analysis begins with an evaluation of the current *C. lupus* listed entity (Figure 1), with a focus on current taxonomic information and statutory and policy requirements under the Act. Consistent with our 5-year review, we conclude that the current *C. lupus* listed entity is not a valid species under the Act and now propose to remove this entity from the List (see Evaluation of the Current *C. lupus* Listed Entity). However, our 5-year review further recommends that we consider whether there are any valid species, subspecies, or DPSs of gray wolf that are threatened or endangered in the contiguous United States and Mexico.

Thus, in this rule we consider whether the current *C. lupus* listed entity is part of a valid species, or includes, any valid species, subspecies, or DPSs of gray wolf that warrant protections under the Act. Because we are considering whether protections need to remain in place for any of the gray wolves that are included in the current *C. lupus* listed entity, we are focusing our evaluation on valid listable entities (*i.e.*, *C. lupus* and subspecies and potential DPSs of *C. lupus*) with ranges that are at least partially within the contiguous United States or Mexico. In this rule we also consider recent scientific information with respect to eastern wolf taxonomy. See **Taxonomy** section for detailed discussions of the subspecies we evaluate and the Service's position on eastern wolf taxonomy.

## Species Information

### *Biology and Ecology*

The biology and ecology of the gray wolf has been widely described in the scientific literature (*e.g.*, Mech 1970, Mech and Boitani 2003), in Service recovery plans (*e.g.*, Northern Rocky Mountain Recovery Plan (Service 1987) and Recovery Plan for the Eastern Timber Wolf (Service 1992)), and in previous proposed and final rules (*e.g.*, 68 FR 15804, April 1, 2003; 71 FR 15266, March 27, 2006; 74 FR 15123, April 2, 2009; 75 FR 46894, August 4, 2010; and 76 FR 81666, December 28, 2011). Gray wolves are the largest wild members of the Canidae, or dog family, with adults ranging from 18 to 80 kilograms (kg) (40 to 175 pounds (lbs)), depending on sex and geographic locale (Mech

1974, p. 1). Gray wolves have a circumpolar range including North America, Europe, and Asia. A recent genetic study found that gray wolves also occur in portions of North Africa (Rueness *et al.* 2011, pp. 1-5; Gaubert *et al.* 2012, pp. 3-7). In North America, wolves are primarily predators of medium and large mammals, such as moose (*Alces alces*), elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), caribou (*Rangifer tarandus*), muskox (*Ovibos moschatus*), bison (*Bison bison*), and beaver (*Castor canadensis*). Gray wolves have long legs that are well adapted to running, allowing them to move fast and travel far in search of food (Mech 1970, p. 13), and large skulls and jaws, well suited to catching and feeding on large mammals (Mech 1970, p. 14). Wolves also have keen senses of smell, hearing, and vision, which they use to detect prey and one another (Mech 1970, p. 15). Pelt color varies in wolves more than in almost any other species, from white, to grizzled gray, brown, to coal black (Mech 1970, p. 16).

Wolves share an evolutionary history with other mammalian carnivores (Order Carnivora), or meat eaters, which are distinguished by their long, pointed canine teeth, sharp sheering fourth upper premolars and first lower molars, simple digestive system, sharp claws, and highly developed brains (Mech 1970, pp. 20-21). Divergence among the ancestral mammalian carnivores began 40 to 50 million years ago (Mech 1970, p. 21) and at some point during the late Miocene Epoch (between 4.5 to 9 million years ago) the first species of the genus Canis arose, the forerunner of all modern wolves, coyotes (*Canis latrans*), and domestic dogs (*Canis familiaris*) (Nowak 2003, p. 241). The lineage of wolves and coyotes diverged between 1.8 to 2.5 million years ago (Nowak 2003, p. 241). Domestication of wolves led to all modern domestic dog breeds and probably

started somewhere between 135,000 to 13,000 years ago (reviewed by Honeycutt 2010, p. 3).

Gray wolves are highly territorial, social animals and group hunters, normally living in packs of 7 or less, but sometimes attaining pack sizes of 20 or more wolves (Mech 1970, pp. 38-40; Mech and Boitani 2003, pp. 8, 19). Packs are family groups consisting of a breeding pair, their pups from the current year, offspring from the previous year, and occasionally an unrelated wolf (Mech 1970, p. 45; Mech and Boitani 2003, p. 2). Normally, only the top-ranking male and female in each pack breed and produce pups, although sometimes maturing wolves within a pack will also breed with members of the pack or through liaisons with members of other packs (Mech and Boitani 2003, p. 3). Females and males typically begin breeding as 2-year-olds and may produce young annually until they are over 10 years old. Litters are born from early April into May and can range from 1 to 11 pups, but generally include 5 to 6 pups (Mech 1970, p. 119; Fuller *et al.* 2003, p. 176). Normally a pack has a single litter annually, but 2 litters from different females in a single pack have been reported, and in one instance 3 litters in a single pack were documented (reviewed by Fuller *et al.* 2003, p. 175). Offspring usually remain with their parents for 10-54 months before dispersing, meaning that packs may include the offspring from up to 4 breeding seasons (reviewed by Mech and Boitani 2003, p. 2).

Packs typically occupy and defend a territory of 33 to more than 2,600 square kilometers (sq km) (13 to more than 1,016 square miles (sq mi)), with territories tending to be smaller at lower latitudes (Mech and Boitani 2003, pp. 21-22; Fuller *et al.* 2003, pp. 172-175). The large variability in territory size is likely due to differences in pack size;

prey size, distribution, and availability; population lags in response to changes in prey abundance; and variation in prey vulnerability (*e.g.*, seasonal age structure in ungulates) (Mech and Boitani 2003, pp. 21-22).

Pack social structure is very adaptable and resilient. Breeding members can be quickly replaced either from within or outside the pack, and pups can be reared by another pack member should their parents die (Packard 2003, p. 38; Brainerd *et al.* 2008; Mech 2006, p. 1482). Consequently, wolf populations can rapidly recover from severe disruptions, such as very high levels of human-caused mortality or disease, if the source of mortality is reduced. After severe declines, wolf populations can more than double in just 2 years if mortality is reduced; increases of nearly 100 percent per year have been documented in areas of high quality habitat where wolves were at low densities or absent (Fuller *et al.* 2003, pp. 181-183; Service *et al.* 2011, Table 4).

A wolf pack will generally maintain its territory as long as the breeding pair is not killed, and even if one member of the breeding pair is killed, the pack may hold its territory until a new mate arrives (Mech and Boitani 2003, pp. 28-29). If both members of the breeding pair are killed, the remaining members of the pack may disperse, starve, or remain in the territory until an unrelated dispersing wolf arrives and mates with one of the remaining pack members (Brainerd *et al.* 2006, pp. 93-94, Mech and Boitani 2003, pp. 28-29).

Yearling wolves frequently disperse, although some remain with their natal pack (Mech and Boitani 2003, pp. 11-17). Dispersers may become nomadic and cover large areas as lone animals, or they may locate suitable unoccupied habitats and members of the opposite sex to establish their own territorial pack (Mech and Boitani 2003, pp. 11-

17). Dispersal distances in North America typically range from 65 to 154 km (40 to 96 miles) (Boyd and Pletscher 1999, p. 1102), although dispersal distances of several hundred kilometers are occasionally reported (Boyd and Pletscher 1999, pp. 1094, 1100; Mech and Boitani 2003, pp. 14-15, Oregon Department of Fish and Wildlife (ODFW) 2011, p. 55). These dispersal movements allow a wolf population to quickly expand and colonize areas of suitable habitat that are nearby or even those that are separated by a broad area of unsuitable habitat.

Wolf populations are remarkably resilient as long as food supply (a function of both prey density and prey vulnerability), habitat, and regulation of human-caused mortality (Fuller *et al.* 2003, pp. 187-189; Creel and Rotella 2010, pp. 4-6) are adequate. In naturally occurring populations (in the absence of hunting), wolves are likely limited by a density-dependent, intrinsic regulatory mechanism (*e.g.*, social strife, territoriality, disease) when ungulate densities are high, and are limited by prey availability when ungulate densities are low (Carriappa *et al.* 2011, p. 729). Where harvest occurs, high levels of reproduction and immigration can compensate for mortality rates of 17 to 48 percent ([Fuller *et al.* 2003 +/- 8 percent], pp. 184-185; Adams *et al.* 2008 [29 percent], p. 22; Creel and Rotella 2010 [22 percent], p. 5; Sparkman *et al.* 2011 [25 percent], p. 5; Gude *et al.* 2011 [48 percent], pp. 113-116; Vucetich and Carroll In Review [17 percent]). Recent studies suggest the sustainable mortality rate may be lower, and that harvest may have a partially additive or even super additive effect (i.e., harvest increases total mortality beyond the effect of direct killing itself, through social disruption or the loss of dependent offspring) on wolf mortality (Murray *et al.* 2010, p.2514; Creel and Rotella 2010, p.6), but there is substantial debate on this issue (Gude *et al.* 2012, p.p.

113-116). When populations are maintained below carrying capacity and natural mortality rates and self-regulation of the population remain low, human-caused mortality can replace up to 70 percent of natural mortality (Fuller *et al.* 2003, p. 186).

*Taxonomy*

The taxonomy of the genus *Canis* has a complex and contentious history (for an overview of the taxonomic history of the genus *Canis* in North America, see Chambers *et al.* 2012, pp. 16-22). The literature contains at least 31 published names for species or subspecies in the genus (Hall and Kelson 1959, p. 849; Chambers *et al.* 2012, Table 1). Hall (1981) and Nowak (1995), who conducted the most recent comprehensive reviews based on morphology, both recognize two species of wolves, *C. lupus* and *C. rufus*. Hall (1981), however, recognized 27 subspecies (24 in North America) of *C. lupus* while Nowak (1995) recognized 8 subspecies (5 in North America) of *C. lupus*.

More recently, the advance in molecular genetic capabilities has led to even greater controversy regarding interpretations of wolf taxonomy (Chambers *et al.* 2012, pp. 4-5). Chambers *et al.* (2012) reviewed the available scientific literature to assess the taxonomic classification of wolves in North America. They believe the current literature supports recognition of three subspecies of gray wolf in North America (*Canis lupus nubilus*, *Canis lupus occidentalis*, and *Canis lupus baileyi*) and is not definitive with regards to a potential fourth subspecies (*Canis lupus arctos*) of gray wolf in North America. Researchers continue to debate such questions as to the identity of the wolves in the Great Lakes (Wilson *et al.* 2000, Leonard and Wayne 2008, Koblmüller *et al.*

2009), the northern extent of *C. l. baileyi* historical (pre-1900s) range (Leonard *et al.* 2005), whether wolves in the western United States are truly differentiated (for example, VonHoldt *et al.* 2011 show little genetic separation between the purported *C. l. occidentalis* and *C. l. nubilus*), and the taxonomy of wolves in the Pacific coastal region (Munoz-Fuentes *et al.* 2009, Weckworth *et al.* 2011, pp. 5-6). The lack of consensus among researchers on these issues prompted Chambers *et al.* (2012, entire) to conduct an evaluation and synthesis of the available scientific literature related to the taxonomy of North American wolves to date. This is the only peer-reviewed synthesis of its kind conducted for North American wolves and represents the best available scientific information on the issue. Chambers *et al.* (2012, entire) employed the general concordance approach of Avise (2004, entire) to recognize subspecies. The nature of available data does not permit the application of many traditional subspecies criteria (*i.e.*, 75-percent rule, Mayr 1963, p. 348; 1969, p. 190; 90 percent separation rule, Patten and Unitt, 2002, p. 27; reciprocal monophyly, Zink 2004, entire). The Avise (2004, entire) method is the most applicable to the disparate data sets available on wolves, and evaluates concordance in patterns from measures of divergence from morphology and various genetic marker systems. While many experts reject the utility of subspecies for species like wolves given their wide-ranging nature, adjoining and likely overlapping range, and unparalleled dispersal capability, the Act requires we consider subspecies when a preponderance of evidence indicates they are warranted. Given the available data, we accept conclusions of Chambers *et al.* (2012) regarding taxonomic subdivisions, including species and subspecies, of North American wolves and geographic boundaries, and use them to inform this rule. This is consistent with Service regulations that require

us to rely on standard taxonomic distinctions and the biological expertise of the Department and the scientific community concerning the relevant taxonomic group (50 CFR 424.11). Even recognizing continued uncertainty on a number of specific issues (*e.g.*, the issues of continued debated noted above), we believe Chambers *et al.* (2011) is reflective of this standard. However, it should be noted that while we accept the conclusions of Chambers *et al.* (2012) for use in this analysis, *Canis* taxonomy has long been complicated and continuously evolves with new data. Therefore, we do not view this issue as "resolved" and we fully expect that *Canis* taxonomy will likely continue to be debated for years if not decades to come and scientific opinion on what represents the current best available science could well shift over time.

*Wolf Species of the United States*

Our review of the best available taxonomic information indicates that *C. lupus* did not historically occupy large portions of the eastern United States: that is, the northeastern United States and portions of the upper Midwest (eastern and western Great Lakes regions) were occupied by the eastern wolf (*C. lycaon*), now considered a separate species of *Canis* rather than a subspecies of *C. lupus*, and the southeastern United States was occupied by the red wolf *(C. rufus)* rather than the gray wolf.

At the time the gray wolf was listed in 1978, and until the molecular genetics studies of the last few years, the range of the gray wolf prior to European settlement was generally believed to include most of North America. The only areas believed to have lacked gray wolf populations were the coastal and interior portions of California, the arid

deserts and mountaintops of the western United States, and parts of the eastern and southeastern United States (Young and Goldman 1944, Hall 1981, Mech 1974, and Nowak 1995). However, some authorities have questioned the reported historical absence of gray wolves in parts of California (Carbyn *in litt.* 2000, Mech *in litt.* 2000).

Furthermore, we note long-held differences of opinion regarding the extent of the gray wolf's historical range in the eastern and southeastern United States. Some researchers regarded Georgia's southeastern corner as the southern extent of gray wolf range (Young and Goldman 1944, Mech 1974); others believed gray wolves did not extend into the Southeast at all (Hall 1981) or did so to a limited extent, primarily at somewhat higher elevations (Nowak 1995). The southeastern and mid-Atlantic states were generally recognized as being within the historical range of the red wolf *(C. rufus)*, and it is not known how much range overlap historically occurred between these two *Canis* species. Morphological work by Nowak (2000, 2002, 2003) supported extending the historical range of the red wolf into southern New England or even farther northward, indicating either that the historical range of the gray wolf in the eastern United States was more limited than previously believed, or that the respective ranges of several wolf species expanded and contracted in the eastern and northeastern United States, intermingling in post-glacial times along contact zones.

The results of recent molecular genetic analyses (*e.g.*, Wilson *et al.* 2000, Wilson *et al.* 2003, Wheeldon and White 2009, Wilson *et al.* 2009, Fain *et al.* 2010, Wheeldon *et al.* 2010, Rutledge *et al.* 2012) and morphometric studies (*e.g.*, Nowak 1995, 2000, 2002, 2003) explain some of the past difficulties in describing the gray wolf's range in the eastern United States. These studies show that the mid-Atlantic and southeastern states

historically were occupied by the red wolf *(C. rufus)* and that the Northeast and portions of the upper Midwest (eastern and western Great Lakes regions) historically were occupied by *C. lycaon*; they also indicate that the gray wolf *(C. lupus)* did not occur in the eastern United States.

Based on these recent studies, we view the historical range of the gray wolf in the contiguous United States as the central and western United States, including portions of the western Great Lakes region, the Great Plains, portions of the Rocky Mountains, the Intermountain West, the Pacific States, and portions of the Southwest.

In sum, we now recognize three wolf species with ranges in the contiguous United States: *Canis lupus, Canis lycaon,* and *Canis rufus*.

*Gray wolf subspecies of North America*

Within *Canis lupus,* there is considerable variation in morphology and genetic lineage, as might be expected in a widespread species with geographic barriers that restrict or temporarily prohibit gene flow (Nowak 2003, p. 244). A number of taxonomists have attempted to describe and organize this variation by designating subspecies of gray wolf (reviewed by Nowak 2003, pp. 244-245). As stated above, gray wolf taxonomy at the subspecific level has long been debated with evolving views on the validity of various subspecies. Generally, the trend in gray wolf taxonomy has been towards subsuming subspecies, resulting in fewer recognized subspecies over time (Young and Goldman 1944, pp. 413-415; Hall 1981, p. 76; Mech 1974, p. 1-6; Nowak 1995, p. 375-397, Figure 20; VonHoldt *et al.* 2011, pp. 7-10; Chambers *et al.* 2012,

Figures 1-3). Because of questions about the validity of some of the originally listed subspecies, the 1978 final rule (43 FR 9607; March 9, 1978) reclassified all gray wolves in the contiguous United States and Mexico, except for those in Minnesota, into a single listed entity. However, the 1978 rule also stipulated that "biological subspecies would continue to be maintained and dealt with as separate entities" (43 FR 9609), and offered "the firmest assurance that [the Service] will continue to recognize valid biological subspecies for purposes of its research and conservation programs" (43 FR 9610, March 9, 1978).

Due to the complicated taxonomy of the genus *Canis* and the fact that some subspecies of gray wolves are more strongly supported in the scientific literature than others, it is important to be explicit about what taxonomic entities we are considering in this evaluation. As stated above, for the purposes of this rulemaking, we are considering the conservation status of the gray wolf, *C. lupus*, and those purported subspecies with described historical ranges at least partially within the contiguous United States. We are taking this approach in an effort to thoroughly consider what *C. lupus* listing(s) that include gray wolves in portions of the contiguous United States and Mexico, if any, would be appropriate if the existing listing were removed. In this rule we follow Chambers' *et al.* (2012) interpretation of available scientific literature, and are thus considering the following three subspecies in our analysis: (1) *C. lupus baileyi* which occupies the southwestern United States and Mexico; (2) *C. lupus occidentalis* which occurs throughout east-central Canada, Alaska (except Southeast Alaska), and the NRM region; and (3) *C. lupus nubilis* which occurs throughout central Canada and into northern Ontario and Quebec, in the Pacific Northwest (including coastal British

Columbia), and in the WGL region and historically occurred in the Great Plains states of the United States (Figure 2). Of these three purported subspecies, *C. lupus balieyi* is the most strongly differentiated genetically and morphometrically (as reviewed by Chambers *et al*. 2012) and is the only one of the three widely accepted as a valid subspecies. The other two subspecies reviewed in this analysis are considered as they have been recognized by several recent taxonomic evaluations (Nowak 1995, figure 20; Chambers *et al*. 2012, Figure 3). That said, the distinctiveness of these purported subspecies is less pronounced, albeit still considered enough by both Chambers *et al.* (2012) and Nowak (1995) to warrant recognition as discrete taxonomic subspecies. Therefore, we consider all three purported subspecies in this analysis.

The taxonomic synthesis by Chambers *et al.* (2012, p. 42) includes a general evolutionary interpretation of the conclusions of their review in the context of the evolutionary history of modern North American *Canis*. This evolutionary scenario describes at least three separate invasions of North American by *C. lupus* from Eurasia. The first of these North American invasions was by the ancestors of *C. l. baileyi*, followed by the ancestors of *C. l. nubilus*, which displaced *C. l. baileyi* in the northern part of its range. The final invasion was by *C. l. occidentalis*, which displaced *C. l. nubilus* in the northern part of its former range. These waves of invasion are apparent in Figure 2 below which illustrates the approximate historical ranges of the 3 North American *C. lupus* subspecies recognized by Chambers *et al.* (2012). Figure 2 is for illustrative purposes only, is intended to provide a course continental scale representation of the approximate historical ranges of the *C. lupus* subspecies analyzed in this review, and should not be interpreted as precise delineation of those ranges. Delineation of the extent of the historical range of these subspecies is difficult given the existence of zones

of reproductive interaction, or intergradation, between neighboring gray wolf populations. Zones of intergradation have long been a recognized characteristic of historical gray wolf distribution throughout their circumpolar distribution (Mech 1970, p. 223; Brewster and Fritts 1995, p. 372). As Chambers *et al.* (2012, p. 43) describe, "delineation of exact geographic boundaries presents challenges. Rather than sharp lines separating taxa, boundaries should generally be thought of as intergrade zones of variable width. These "fuzzy" boundaries are a consequence of lineages of wolves that evolved elsewhere coming into contact. Historical or modern boundaries should also not be viewed as static or frozen in any particular time. Our understanding of the historical interactions between subspecies or genetically different populations (e.g., Leonard *et al.* 2005) is that they are dynamic processes and boundaries can shift over time."

Details on the specific taxonomy of the three subspecies we include in our evaluations follow below.

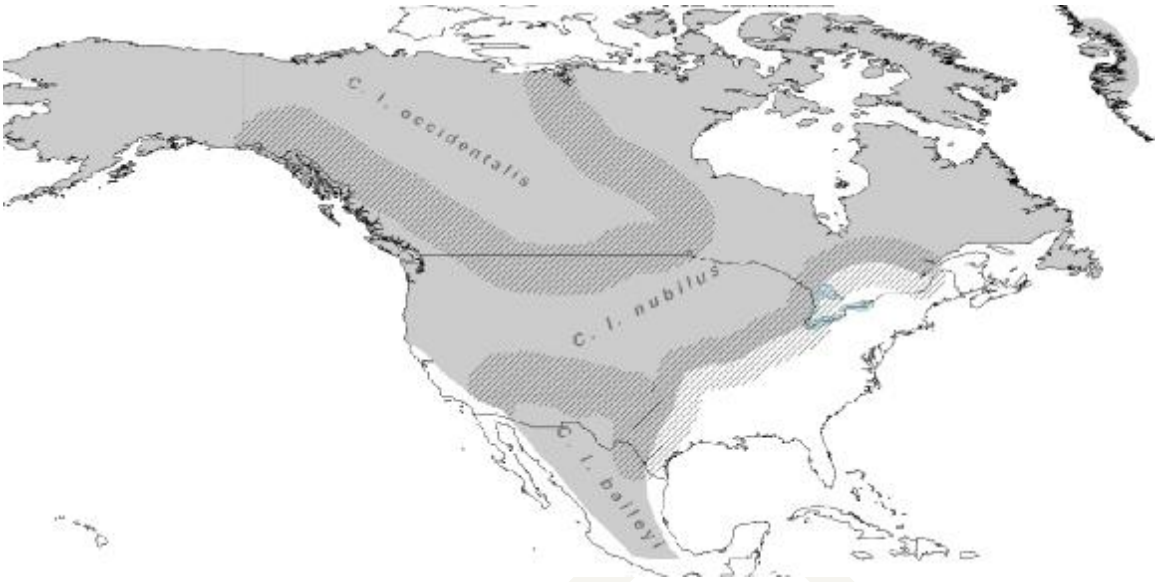


Figure 2: Coarse continental scale historical (prior to European settlement) ranges (gray) of gray wolf subspecies (*C. l. nubilus, C. l. occidentalis,* and *C. l. baileyi*) analyzed in this proposed rule. White areas in the contiguous United States are considered as outside of the historical range of the subspecies. Approximate subspecies boundaries are based on Bogan and Melhop (1983) and Nowak (1995). Broad hatched areas are intended to (1) represent the uncertainty in the precise location of the boundaries between the subspecies and (2) illustrate zones of reproductive interaction, or intergradation between the subspecies or species (*C. lupus,* and *C. lycaon,* or *C. rufus* in the eastern United States) where consistent dispersal between populations and consequently a blurring of subspecies or species identities was likely. Extent of intergradation zones are based on our current knowledge of the dispersal capability of gray wolves and do not imply existence of wolf occurrence records or limits to wolf movement. Map is for illustrative purposes only and does not address suitable habitat for gray wolves.

*Canis lupus nubilus*

Say (1823) first defined *C. l. nubilus* based on wolves he observed in eastern Nebraska. Goldman's (1944) classification included a range map of 24 subspecies in North America, and described the distribution *of C. l. nubilus* as: "Formerly Great Plains region from southern Saskatchewan and Manitoba south to northeastern New Mexico and southern Oklahoma and from near the eastern base of the Rocky Mountains east to western Minnesota, western Iowa, and Missouri. Intergraded on the north with *occidentalis*, on the west with *irremotus* and *youngi*, on the east with *lycaon*, and on the south with *monstrabilis*" (Goldman 1944, p.442).

Young and Goldman (1944, p. 414) described 23 subspecies of gray wolves in North America, with *C. l. fuscus*, or the Cascades Mountains wolf, occupying western Washington, western Oregon, and northern California. Their recognition of *C. l. fuscus* was based on the examination of 28 specimens (skulls and skins) from southern British Columbia to northern California (Young and Goldman 1944, p. 458). Nowak later revised the subspecific classification of North American wolves, based on examination of 580 wolf skulls (10 from the Pacific Northwest) and a multivariate statistical analysis of 10 skull measurements, to include only 5 subspecies, lumping the Pacific Northwest wolves with coastal British Columbia, most of the Rocky Mountains, the Great Plains within the United States, and northeastern Canada and describing them as the plains wolf (*C. l. nubilus*) (Nowak 1995, p. 396; Nowak 2003, Table 9.3).

The historical range of *C. l. nubilus* was described by Nowak (1995, p. 396) as "Southeastern Alaska, southern British Columbia, contiguous U.S. from Pacific to Great

Lakes region and Texas, Ontario except southeastern, northern and central Quebec, Newfoundland, northern Manitoba, Keewatin, eastern Mackenzie, Baffin Island, occasionally west-central Greenland (now evidently extirpated in the western contiguous U.S.)." Recent review of gray wolf taxonomy lends general support for Nowak's (1995) delineation (Chambers *et al.* 2012). The range of *C. l. nubilus*, however, borders each of the other *C. lupus* subspecies' ranges, with *C. lycaon*, and probably that of *C. rufus*, creating ambiguous zones of hybridization with *C. lycaon* from eastern Ontario to Minnesota and Manitoba with *C. l. baileyi* as far north as Nebraska, and with *C. l. occidentalis* in inland portions of the Pacific Northwest and Manitoba (Chambers *et al.* 2012, pp. 39-42).Recent molecular ecology studies of wolves in North America have reported differentiation between coastal and inland wolves in British Columbia based on microsatellite DNA (Weckworth *et al.* 2005, p. 921), mitochondrial DNA (Leonard *et al.* 2005, pp. 13-15; Muñoz-Fuentes *et al.* 2009, p.5; Weckworth *et al.* 2010, p. 921), and single-nucleotide polymorphisms (SNPs) (von Holdt *et al.* 2011, p. 4). These coastal-inland patterns of divergence support Nowak's (1995, Fig 20) boundary between *C. l. nubilus* and *C. l. occidentalis* in the Pacific Northwest. Although Leonard *et al.* (2005, pp. 13-15) asserted that coastal wolves were evolutionarily distinct from *C. l. nubilus*, the large proportion of unique, and apparently extinct, haplotypes in their historical sample likely exaggerated the measure of divergence between the coastal populations and historical inland *C. l. nubilus* (Chambers *et al.* 2012, pp. 41-42). Chambers *et al.* (2012, pp. 41-42) reevaluated the haplotypes in Leonard *et al.* (2005) and Weckworth *et al.* (2010) and found that the most common haplotype in coastal British Columbia also occurs in historical Kansas and Nebraska samples, and nearly all coastal haplotypes are in

the same phylogroup as the historical western *C. l. nubilus* haplotypes (Weckworth *et al.* 2010, p. 368). These relationships are consistent with coastal British Columbia and southeast Alaska wolves (and probably coastal wolves in Oregon, Washington, and northern California) being a northward extension of *C. l. nubilus*. Genetic study of wolf skins and bones collected from the historical wolf population in Oregon, Washington, and California has not yet been accomplished, but would be valuable in further evaluating the historical taxonomic placement of gray wolves from the Pacific Northwest.

*Canis lupus occidentalis*

Richardson (1829) described *C. l. occidentalis* based on type material from the Northwest Territories. Goldman (1944) described the distribution of *C. l. occidentalis* as: "Upper Mackenzie River Valley, north to Great Bear Lake, south over the vast lowlands interior of Mackenzie to central Alberta (Edmonton), Sakatchewan, and central Manitoba (Norway House); west in the Peace River Valley to eastern British Columbia. Intergrades on the west with *pambasileus*, and *columbianus*; on the north with *mackezii*; on the east with *hudsonicus*; and on the south with *nubilus*." (Goldman 1944, p. 424).

Since publication of Goldman (1944) revisions of wolf taxonomy have tended toward recognition of fewer subspecies. Nowak's (1995) delineation of subspecies and depiction of historical ranges indicate that, under his taxonomy, *C. l. occidentalis* ranged across all of Alaska except for the coastal Southeast, and from the Beaufort Sea in the north to northern Montana in the south and including all of the Yukon most of the Northwest Territories, eastern British Columbia, all of Alberta, most of Saskatchewan

and southwestern Manitoba (Nowak 1995, Fig. 20). Under Nowak's classification, *C. l. occidentalis* subsumes the following formerly recognized subspecies entirely or in part: *pambasileus*, *tundrarum*, *alces*, *mackenzii*, *columbianus*, *irremotus*, and *griseoalbus*.

*Canis lupus baileyi*

It is hypothesized that North America was colonized by gray wolves from Eurasia during the Pleistocene through at least three waves of colonization, each by wolves from different lineages; *C. l. baileyi* may represent the last surviving remnant of the initial wave of gray wolf migration into North America (Nowak 1995, p. 396; Nowak 2003, p. 242; Wayne and Vilá 2003, pp. 226-228; Chambers *et al.* 2012, p. 10). The distinctiveness of *C. l. baileyi* and its recognition as a subspecies is supported by both morphometric and genetic evidence. We are unaware of any published study that does not support the recognition of *C. l. baileyi* as a valid subspecies.

This subspecies was originally described by Nelson and Goldman in 1929 as *Canis nubilis baileyi*, with a distribution of "Southern and western Arizona, southern New Mexico, and the Sierra Madre and adjoining tableland of Mexico as far south, at least, as southern Durango (Nelson and Goldman 1929, pp. 165-166)." Goldman (1944, pp. 389-636) provided the first comprehensive treatment of North American wolves, in which he renamed *Canis nubilis baileyi* as a subspecies of *lupus* (*i.e., Canis lupus baileyi*) and shifted the subspecies range farther south in Arizona. His gray wolf classification scheme was subsequently followed by Hall and Kelson (1959, pp. 847-851; Hall 1981, p. 932). Since that time, gray wolf taxonomy has undergone substantial

revision, including a major taxonomic revision in which the number of recognized gray wolf subspecies in North America was reduced from 24 to 5, with *C. l. baileyi* being recognized as a subspecies ranging throughout most of Mexico to just north of the Gila River in southern Arizona and New Mexico (Nowak 1995, pp. 375-397).

Three published studies of morphometric variation conclude that *C. l. baileyi* is a morphologically distinct and valid subspecies. Bogan and Mehlhop (1983) analyzed 253 gray wolf skulls from southwestern North America using principal component analysis and discriminant function analysis. They found that *C. l. baileyi* was one of the most distinct subspecies of southwestern gray wolf (Bogan and Mehlhop 1983, p.17). Hoffmeister (1986) conducted principal component analysis of 28 skulls, also recognizing *C. l. baileyi* as a distinct southwestern subspecies (pp. 466-468). Nowak (1995) analyzed 580 skulls using discriminant function analysis. He concluded that *C. l. baileyi* was one of only five distinct North American gray wolf subspecies that should continue to be recognized (Nowak 1995, pp. 395-396).

Genetic research provides additional validation of the recognition of *C. l. baileyi* as a subspecies. Three studies demonstrate that *C. l. baileyi* has unique genetic markers that distinguish the subspecies from other North American gray wolves. Garcia-Moreno *et al.* (1996, p.384) utilized microsatellite analysis to determine whether two captive populations of *C. l. baileyi* were pure *C. l. baileyi* and should be interbred with the captive certified lineage population that had founded the captive breeding program. They confirmed that the two captive populations were pure *C. l. baileyi* and that they and the certified lineage were closely related. Further, they found that as a group, the three populations were the most distinct grouping of North American wolves, substantiating

the distinction of *C. l. baileyi* as a subspecies. Hedrick *et al.* (1997, pp. 64-65) examined data for 20 microsatellite loci from samples of *C. l. baileyi*, northern gray wolves, coyotes, and dogs. They concluded that *C. l. baileyi* was divergent and distinct from other sampled northern gray wolves, coyotes, and dogs (and see Wayne 1995). Leonard *et al.* (2005, p. 10) examined mitochondrial DNA sequence data from 34 pre-extermination wolves collected from 1856 to 1916 from the historical ranges of *C. l. baileyi* and *C.l. nubilus.* They compared these data with sequence data collected from 96 wolves in North America and 303 wolves from Eurasia. They found that the historical wolves had twice the diversity of modern wolves, and that two-thirds of the haplotypes were unique. They also found that haplotypes associated with *C. l. baileyi* formed a unique southern clade distinct from that of other North American wolves. A clade is a taxonomic group that includes all individuals that have descended from a common ancestor. In another study, VonHoldt *et al.* (2011, p. 7) analyzed SNP genotyping arrays and found *C. l. baileyi* to be the most genetically distinct group of New World gray wolves. Most recently, Chambers *et al.* (2012, pp. 34-37) reviewed the scientific literature related to classification of *C. l. baileyi* as a subspecies and concluded that this subspecies' recognition remains well-supported. Maps of *C. l. baileyi* historical range are available in the scientific literature (Young and Goldman 1944, p. 414; Hall and Kelson, 1959, p. 849; Hall 1981, p. 932; Bogan and Mehlhop 1983, p. 17; Nowak 1995, p. 395; Parsons 1996, p. 106). The southernmost extent of *C. l. baileyi's* range in Mexico is consistently portrayed as ending near Oaxaca (Hall 1981, p. 932; Nowak 1995, p. 395). Depiction of the northern extent of the *C. l. baileyi's* pre-settlement range among the available descriptions varies depending on the authors' taxonomic treatment of several

subspecies that occurred in the Southwest and their related treatment of intergradation zones.

Hall's (1981, p.932, based on Hall and Kelson 1959) map depicted a range for *C. l. baileyi* that included extreme southern Arizona and New Mexico, with *Canis lupus mogollonensis* occurring throughout most of Arizona, and *C. l. monstrabilis*, *Canis lupus youngi*, *C. l. nubilis*, and *C. l. mogollonensis* interspersed in New Mexico. Bogan and Mehlhop (1983, p. 17) synonymized two previously recognized subspecies of gray wolf, *C. l. mogollonensis* and *C. l. monstrabilis,* with *C. l. baileyi*, concluding that *C. l. baileyi's* range included the Mogollon Plateau, southern New Mexico, Arizona, Texas, and Mexico. This extended *C .l. baileyi's* range northward to central Arizona and central New Mexico through the area that Goldman (1944) had identified as an intergrade zone with an abrupt transition from *C. l. baileyi* to *C. l. mogollensis*. Bogan and Mehlop's analysis did not indicate a sharp transition zone between *C. l. baileyi* and *C. l. mogollensis*, rather the wide overlap between the two subspecies led them to synonymize *C. l. baileyi* and *C. l. mogollensis*. Hoffmeister (1986, p. 466) suggested that *C. l. mogollonensis* should be referred to as *C. l. youngi* but maintained *C. l. baileyi* as a subspecies, stating that wolves north of the Mogollon Rim should be considered *C. l. youngi*. Nowak (1995, pp. 384-385) agreed with Hoffmeister's synonymizing of *C. l. mogollonensis* with *C. l. youngi*, and further lumped these into *C. l. nubilis,* resulting in a purported northern historical range for *C. l. baileyi* as just to the north of the Gila River in southern Arizona and New Mexico. Nowak (1995) and Bogan and Mehlhop (1983) differed in their interpretation of which subspecies to assign individuals that were intermediate between recognized taxa, thus leading to different depictions of historical

range for *C. l. baileyi*. Subsequently, Parsons (1996, p. 104) included consideration of dispersal distance when developing a probable historical range for the purpose of reintroducing *C. l. baileyi* in the wild pursuant to the Act, by adding a 322-km (200-mi) northward extension to the most conservative depiction of *C. l. baileyi* historical range (i.e., Hall and Kelson 1959). This description of historical range was carried forward in the Final Environmental Impact Statement "Reintroduction of the Mexican Wolf within its Historic Range in the Southwestern United States" in the selection of the Blue Range Wolf Recovery Area as a reintroduction location for *C. l. baileyi* (USFWS 1996).

Recent molecular genetic evidence from limited historical specimens supports morphometric evidence of an intergradation zone between *C. l. baileyi* and northern gray wolves (Leonard *et al.* 2005, pp. 15-16). This research shows that within the time period that the historical specimens were collected (1856-1916), a northern clade (i.e., group that originated from and includes all descendants from a common ancestor) haplotype was found as far south as Arizona, and individuals with southern clade haplotypes (associated with *C. l. baileyi*) occurred as far north as Utah and Nebraska. Leonard *et al.* (2005, p. 10) interprets this geographic distribution of haplotypes as indicating gene flow was extensive across the subspecies' limits during this historical period and Chamber's *et al.* (2012, p. 37) agrees this may be a valid interpretation.

**Evaluation of the Current *C. lupus* Listed Entity**

Our analysis begins with an evaluation of the current *C. lupus* listing (Figure 1). In our May 5, 2011, proposed rule to revise the List for the gray wolf in the eastern

United States we acknowledged that the current *C. lupus* listed entity should be revised. The recent 5–year status review for this entity further provides the basis for this assertion (Service 2012). Below we present our evaluation and conclusion in support of removing the current *C. lupus* entity from the List. Pursuant to this evaluation, our proposed determination as to which entities warrant the protections of the Act is included under **Status of Gray Wolf Listable Entities in the Contiguous United States and Mexico** later in this proposed rule.

*Is the currently listed C. lupus entity a valid listable entity under the Act?*

The Act allows us to list species, subspecies, and distinct population segments of any species of vertebrate fish or wildlife (16 U.S.C. 1532(16). The current *C. lupus* listing (Figure 1) is not an entire species (the species C. lupus was never deemed threatened or endangered given its abundance across its holarctic range) or an entire single gray wolf subspecies (the current listing occurs across an area occupied by multiple purported subspecies; see **Taxonomy** section). Therefore, we first consider whether the currently listed entity describes a population of *C. lupus* that should be evaluated against the standards of the 1996 Distinct Population Segment Policy.

The specific provision for listing distinct population segments of vertebrates was enacted through the 1978 Amendments to the Act (Public Law 95-362, November 10, 1978); these amendments replaced the ability to list certain “groups” of any fish or wildlife with the ability to list “distinct population segments” of vertebrate fish or wildlife and treat them as species under the Act. To interpret and implement the 1978

DPS amendment, the Service and the National Marine Fisheries Service jointly published the Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS policy) (61 FR 4722, February 7, 1996), setting policy standards for designating distinct population segments.

When the gray wolf was reclassified in March 1978 (replacing multiple subspecies listings with two *C. lupus* population listings as described further in the **Previous Federal Actions** section), it had been extirpated from much of its historical range in the contiguous United States. Although the 1978 reclassification listed two gray wolf entities (a threatened population in Minnesota and an endangered population throughout the rest of the contiguous United States and Mexico), these listings were not predicated upon a formal DPS analysis, because the reclassification predated the November 1978 amendments to the Act. The broadly defined geography of the 1978 reclassification was employed as an approach of convenience (as noted in 47 FR 9607, March 9, 1978), rather than an indication of where gray wolves existed or where gray wolf recovery would occur. Thus, the 1978 reclassification resulted in inclusion of large areas of the contiguous United States where gray wolves were extirpated, as well as the mid-Atlantic and southeastern United States—west to central Texas and Oklahoma—an area, which is generally accepted not to be within the historical range of *C. lupus* (Young and Goldman 1944, p. 413-416, 478; Nowak 1995, p. 395, Fig. 20). While this generalized approach to the listing appropriately protected dispersing wolves and facilitated recovery in the NRM and WGL region, it also erroneously included areas outside the species historical range and was misread by some publics as an expression of

a larger gray wolf recovery effort not required by the Act and never intended by the Service.

Recent scientific research and regulatory actions further necessitate our revisiting the current listing for *C. lupus*. The most recent scientific information indicates that the eastern wolf, previously described as the subspecies *C. lupus lycaon*, with a historical range that includes the northeastern United States and portions of the upper Midwest United States (eastern and western Great Lakes regions) should be recognized as a separate full species, *Canis lycaon* (See **Taxonomy** section). This new data indicates additional geographic areas contained with the current listed area were not historically occupied by gray wolves (specifically, the northeastern United States) and, thus, appear to be erroneously included in the current gray wolf listing. In addition, with the recent recovery and delisting of gray wolf populations in the NRM and WGL (see **Previous Federal Actions** section) and the associated revisions to the 1978 listing, the described boundary of the *C. lupus* listed entity has been modified and now includes all or portions of 42 States, and Mexico (Figure 1).

*Criteria for Identifying a Distinct Population Segment*

In accordance with the 1996 DPS policy, to be recognized as a DPS, a population of vertebrate animals must be both discrete and significant (61 FR 4722, February 7, 1996). A population of a vertebrate taxon may be considered discrete if it satisfies either of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence

of this separation), or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management or habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act. If we determine that a population segment is discrete, we next consider its biological and ecological significance in light of Congressional guidance (see Senate Report 151, 96th Congress, 1st Session) that the authority to list DPS's be used "* * * sparingly" while encouraging the conservation of genetic diversity. In carrying out this examination, the Service considers available scientific evidence of its significance to the taxon to which it belongs. This may include, but is not limited to, the following: (1) Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon, (2) evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon, (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside of its historic range, and/or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. If a vertebrate population is determined to be discrete and significant, we then evaluate the conservation status of the population to determine if it is threatened or endangered.

*Does the current* C. lupus *listed entity appropriately describe the existing gray wolf population(s)?*

Before beginning a DPS analysis, we must first identify and describe the population(s) under consideration. The DPS policy states that "in all cases, the organisms in a population are members of a single species or lesser taxon" (61 FR 4722, February 7, 1997). Our regulations define a "population" as a "group of fish or wildlife… in common spatial arrangement that interbreed when mature" (50 CFR 17.3). We have refined that definition in experimental gray wolf reintroduction rules to mean "at least two breeding pairs of gray wolves that each successfully raise at least two young" annually for 2 consecutive years (59 FR 60252 and 60266, November 22, 1994). This definition represents what we believe are the minimum standards for a gray wolf population (USFWS 1994). The courts have supported this definition. The U.S. Court of Appeals for the Tenth Circuit found that "by definition lone dispersers do not constitute a population or even part of a population, since they are not 'in common spatial arrangement' sufficient to interbreed with other members of a population" (*Wyoming Farm Bureau Federation* v. *Babbitt*, 199 F.3d 1224, 1234 (10th Cir. 2000)). The Court of Appeals for the Ninth Circuit held that, despite "sporadic sightings of isolated indigenous wolves in the release area [a gray wolf reintroduction site], lone wolves, or 'dispersers,' do not constitute a population" under the Act (*U.S.* v. *McKittrick*, 142 F. 3d 1170, 1175 (9th Cir. 1998), cert. denied, 525 U.S. 1072 (1999)). Thus, the courts have upheld our interpretation that pairs must breed to have a "population."

Below, we provide information on the distribution of gray wolves within the described boundary of the current *C. lupus* listed entity.

A single wild gray wolf (in this case *C. l. baileyi*) population, of at least 75 wolves (as of December 31, 2012), inhabits the southwestern United States today in

central Arizona and New Mexico (Figure 3). In Mexico, efforts to reestablish a wild population in Mexico began in 2011. Of eight wolves released between October 2011 and October 2012, two wolves are "fate unknown", four are confirmed dead, and two are alive as of January 2, 2013 (USFWS, our files). Additional releases in Mexico are expected in 2013. In addition, a captive population of 240 to 300 *C. l. baileyi* exists in the United States and Mexico today in about 50 captive breeding facilities. For more information on gray wolves in the southwestern United States and Mexico see the *C. l. baileyi* analysis below.

There are currently two confirmed gray wolf packs in the federally listed portion of Washington State (Lookout pack and Teanaway pack). Reproduction was confirmed in the Teanaway pack in June 2012 and has not been documented since 2009 in the Lookout pack. To date, 2 radio-collared wolves from the Imnaha pack in northeast Oregon have dispersed west, across the NRM DPS boundary, and are currently in the federally listed portion of Oregon and northern California. However, no packs or reproduction have been documented in the federally listed areas of Oregon or California. For more information on the gray wolves in the Pacific Northwest see the Pacific Northwest DPS analysis below.

We also have recent records of a few lone long-distance dispersing individual gray wolves within the boundary of the current *C. lupus* listed entity; however, these lone individuals are believed to be dispersing away from the more saturated habitat in the primary range, of the recovered NRM and WGL DPSs or Canada populations, into peripheral areas where wolves are scarce or absent ( Licht and Fritts 1994, p. 77; Licht and Huffman 1996, p. 171-173; 76 FR 26100, May 5, 2011; Jiminez 2012 pers comm.).

For example, a gray wolf dispersing south from the NRM DPS was trapped near Morgan, Utah in 2002 and another was killed in an agency control action in Utah in 2010 (Jiminez 2012 pers comm.). In addition, we have two records for individual wolves near Idaho Springs and Rifle, Colorado in 2004 and 2009, respectively (Jiminez 2012 pers comm.). An adult gray wolf killed by a vehicle near Sturgis, South Dakota was a disperser from the Greater Yellowstone area in the Rocky Mountains to the west (Fain *et. al.* 2010 cited in 76 FR 26100). A few individual dispersing gray wolves have been reported in other areas of the Midwest, including a gray wolf that dispersed from Michigan to north-central Missouri (Mech and Boitani 2003, p. 16; Treves *et al*. 2009, p.194) and another that dispersed from Wisconsin to eastern Indiana (Thiel *et al*. 2009, p. 122 and Treves *et al*. 2009, p. 194). At least two wolves have been reported in Illinois, one in 2002 and one in 2005 (Great Lakes Directory 2003, unpaginated). Two individual wolves were also reported (on different occasions) in Nebraska (Anschutz *in litt.* 2003, Anschutz *in litt.* 2006, Jobman *in litt.* 1995). Although it is possible for these dispersers to encounter and mate with another wolf outside the primary range of the recovered populations, we have no information demonstrating that any of these naturally dispersing animals have formed persistent reproducing packs or constitute a population (for a more thorough discussion on Pacific Northwest wolves and whether they constitute a population, see the Pacific Northwest DPS analysis below). Thus, *C. l. baileyi* is the only population within the current listing, with a likelihood that wolves in the Pacific northwest will soon meet this standard (again, see the Pacific Northwest DPS analysis below for more information on that status of wolves in this area). We are not aware of any other confirmed gray wolf

populations occurring within the described boundary of the current *C. lupus* listed entity (Figure 1).

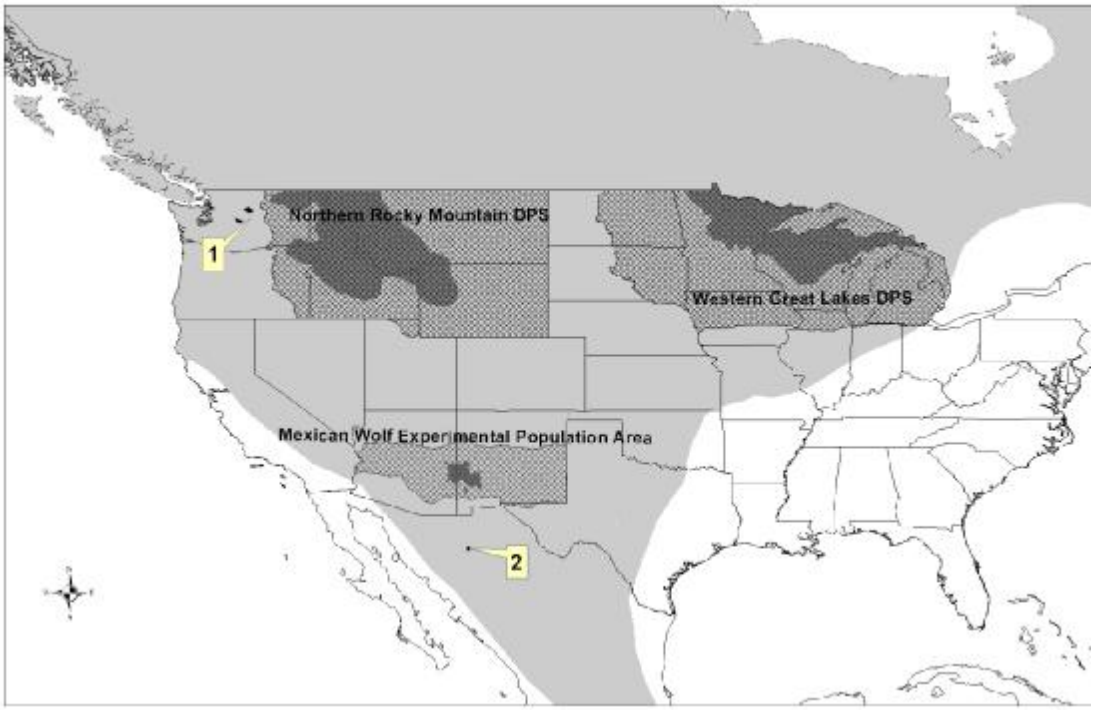


Figure 3: Current distribution of gray wolves (*Canis lupus*), including the recovered and delisted populations, in the contiguous United States and Mexico. Light gray areas represent the approximate historical distribution of gray wolves. Both the Northern Rocky Mountain DPS and Western Great Lake DPS are recovered and delisted and not part of the currently listed entity (see Figure 1). Darker areas within the cross-hatched areas represent our estimation of currently occupied range within the DPSs or Mexican Wolf Experimental Population Area. Gray wolf packs that currently exist in: (1) Washington and (2) Mexico are illustrated as black polygons. Map is for illustrative purposes only and does not address suitable habitat for gray wolves.

Based on the current distribution of gray wolves in the contiguous United States and Mexico we determine that the only gray wolves that currently meet our definition of

a gray wolf population, outside of the recovered and delisted NRM and WGL gray wolf populations, is the population of gray wolves (in this case *C. l. baileyi*) in the southwestern United States (see PNW DPS analysis below for a detailed discussion of the wolves occupying that region). It is evident that the listed entity as it is currently described in the CFR (Figure 1) bears no rational relationship to the existing gray wolf population inhabiting the southwestern United States (Figure 3). Not only does the current *C. lupus* listing include large areas of the contiguous United States that the best available information indicates are outside of the historical range of the species, but it also includes areas in the Great Plains and the western United States that do not currently support extant gray wolf populations. Furthermore, large portions of this area (*e.g.*, the Great Plains) lack sufficient suitable habitat to support persistent wolf pack occupancy. Finally, no other areas within the boundary of the current *C. lupus* listed entity, outside of those areas being evaluated for *C. l. baileyi* recovery, have been identified as necessary for recovery of any existing or planned wolf populations under the Act. Therefore, we conclude that the currently listed *C. lupus* entity does not appropriately describe the existing gray wolf population. Furthermore, the current amorphous listing does not reflect what is necessary or appropriate for wolf recovery under the Act; specifically, it is far more expansive than what we envision for wolf recovery, what is necessary for wolf recovery, and even what is possible for wolf recovery in the contiguous United States and Mexico. It is because of these disconnects that we further contend that it would not be appropriate to conduct a DPS analysis on the single extant population of gray wolves occurring in the southwestern United States using the broadly defined geography of the currently listed entity as its boundary. It is instead more logical to take a fresh

comprehensive look at the status of gray wolves in the contiguous United States and Mexico by employing a standard process of analysis and the best available information to carefully consider whether any of the gray wolves that make up the current *C. lupus* listed entity are part of a valid species, subspecies, or DPSs of gray wolf that warrant protections under the Act.

*Conclusion*

As stated previously, the current *C. lupus* listed entity is neither an entire species nor an entire single subspecies, was listed prior to the issuance of the 1996 DPS policy, and is the outcome of a broad, generalized contiguous United States and Mexico reclassification and subsequent targeted delistings of the recovered NRM and WGL gray wolf populations (see **Previous Federal Actions** section). Further, the current listed entity erroneously includes the eastern United States; a region of the contiguous United States that the best scientific information indicates is outside of the historical range of *C. lupus* (see *Wolf Species of the United States* section). Other portions of the listing lack sufficient suitable habitat to support persistent wolf pack occupancy. Furthermore, the remnant lower 42-State and Mexico listing is far more expansive than what we envision for gray wolf recovery, what is necessary for gray wolf recovery, and even what is possible for gray wolf recovery in the contiguous United States and Mexico.

Therefore, based on the best scientific information available we find that the current *C. lupus* listed entity as it is described on the List does not represent a valid species under the Act. This conclusion is based on our assertion that given our current knowledge it would not make rational sense to consider listing the current *C. lupus* entity

(Figure 1) as a DPS, therefore; we propose to remove the current *C. lupus* listed entity from the List. However, we must also consider whether this entity should be replaced with a valid listing for the *C. lupus* species, or a subspecies, or a DPS of *C. lupus* that is threatened or endangered in the contiguous United States and Mexico. If any gray wolf population occupying in any portion of the current *C. lupus* listed entity is deemed part of a valid listable entity that is threatened or endangered under the Act, they will be relisted concurrent with any final decision to remove the current *C. lupus* listed entity from the List and, therefore, will never experience a lapse in the Act's protections due to this action. The remainder of this rule considers this question.

**Status of Gray Wolf Listable Entities in the Contiguous United States and Mexico**

Given our intentions to remove the current *C. lupus* entity from the List, we now consider whether and to what extent *C. lupus* should be listed in the contiguous United States and Mexico. More specifically, we address whether any gray wolves covered by the current *C. lupus* listed entity (Figure 1) belong to a valid listable entity that warrants the protections of the Act. Because we are focused on the status of gray wolves in the contiguous United States and Mexico, we concentrate our analyses on the *C. lupus* species and subspecies or DPSs of *C. lupus* with ranges that are within the contiguous United States and Mexico. Thus, this phase of the analysis begins with a consideration of the status of *C. lupus* rangewide followed by analyses of potential threats facing each of three North American gray wolf subspecies—*C. l. nubilus*, *C. l. occidentalis*, and *C. l. baileyi*—as well as consideration of a potential DPS of *C. lupus*. If we determine that the

species (*C. lupus*), or a subspecies (*C. l. nubilus*, *C .l. occidentalis*, *C. l. baileyi*), or a DPS of *C. lupus* is threatened or does not warrant the protections of the Act, then we will consider whether there are any significant portions of their ranges where they are in danger of extinction or likely to become endangered within the foreseeable future.

*Summary of Factors Affecting the Species*

Section 4 of the Act (16. U.S.C. 1533) and its implementing regulations (50 CFR 424) set forth the procedures for adding species to, reclassifying species on, or removing species from the Federal List of Endangered and Threatened Wildlife. "Species" is defined by the Act as including any species or subspecies of fish or wildlife or plants, and any distinct vertebrate population segment of fish or wildlife that interbreeds when mature (16 U.S.C. 1532(16)). Once the "species" is determined, we then evaluate whether that species may be endangered or threatened because of one or more of the five factors described in section 4(a)(1) of the Act. Those factors are:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

Under section 3 of the Act, a species is ‘‘endangered’’ if it is in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6)), and is ‘‘threatened’’ if it is likely to become endangered in the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532 (20)). The word ‘‘range’’ refers to the range in which the species currently exists, and the word ‘‘significant’’ refers to the value of that portion of the range being considered to the conservation of the species. The “foreseeable future” is the period of time over which events or effects reasonably can or should be anticipated, or trends extrapolated.

In considering what factors might constitute threats; we must look beyond the exposure of the species to a particular factor to evaluate whether the species may respond to the factor in a way that causes actual impacts to the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat, and during the status review, we attempt to determine how significant a threat it is. The threat is significant if it drives or contributes to the risk of extinction of the species, such that the species warrants listing as endangered or threatened as those terms are defined by the Act. However, the identification of factors that could impact a species negatively may not be sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that the potential threat is likely to materialize and that it has the capacity (i.e., it should be of sufficient magnitude and extent) to affect the species’ status such that it meets the definition of endangered or threatened under the Act.

We considered and evaluated the best available scientific and commercial

information for these analyses. Information pertaining to *C. lupus, C. l. nubilus, C. l. occidentalis,* and *C. l. baileyi* in relation to the five factors provided in section 4(a)(1) of the Act is discussed below.

*Does the rangewide population of C. lupus warrant the protections of the Act?*

Our first evaluation considers whether the gray wolves that are included in the current *C. lupus* listing (Figure 1) warrant the protections of the Act as part of a species-level rangewide listing of *C. lupus.* We begin this evaluation by summarizing the historical and current global distribution of gray wolves, followed by a discussion of the species' current status and threats.

*C. lupus - Historical Global Distribution*

*Canis lupus* historically occurred across much of North America, Europe, and Asia (Mech 1970, pp. 32-33). Recent genetic work now suggests gray wolves also occurred (and still occur) in portions of North Africa (Rueness *et al.* 2011, pp. 1-5; Gaubert *et al.* 2012, pp. 3-7). In North America, *C. lupus* formerly occurred from the northern reaches of Alaska, Canada, and Greenland to the central mountains and the high interior plateau of southern Mexico (Mech 1970, p. 31; Nowak 2003, p. 243).

C. lupus - *Current Global Distribution*

The historical worldwide range for *C. lupus* has been reduced by approximately one-third (Mech and Boitani 2010, p. 5). A majority of this range contraction has occurred in developed areas of Europe, Asia, Mexico, and the United States by poisoning and deliberate persecution (Boitani 2003 pp. 318-321; Mech and Boitani 2010, p. 5). *Canis lupus* currently occupies portions of North America, Europe, North, Central and South Asia, the Middle East, and possibly North Africa (Mech and Boitani 2004, p 125-128; Linnell *et al.* 2008, p. 48; 77 FR 55539; 76 FR 81676; Rueness *et al.* 2011, pp. 1-5; Gaubert *et al.* 2012, pp. 3-7). Summaries of rangewide population data, by range country, are available in Boitani 2003 (pp. 322-323) and Mech and Boitani 2004 (pp. 125-128). In addition, a detailed overview of *C. lupus* populations in Europe (including the European part of Russia) can be found in Linnell *et al.* 2008 (p. 48, and 63-67). Available population data for North America is presented in detail in our recent rulemakings (77 FR 55539, September 10, 2012 and 76 FR 81676, December 28, 2011) and in the status reviews below. Based upon recent available population data for the species, *C. lupus* number more than 160,000 individuals globally (Mech and Boitani 2004, p 125-128; Linnell *et al.* 2008, p. 48; 77 FR 55539; 76 FR 81676) and, according to one estimate, may number as high as 200,000 (Boitani 2003, p. 322-323).

*Current Status of* C. lupus

The most recent global assessment by the IUCN Species Survival Commission Wolf Specialist Group classifies the species *C. lupus* as Least Concern globally (Mech

and Boitani 2010, entire), although at the regional level some populations are seriously threatened. Plants and animals that have been evaluated to have a low risk of extinction are classified as Least Concern. Widespread and abundant taxa are included in this category. The worldwide population trend for the species is currently identified as stable (Mech and Boitani 2010, p. 4). Gray wolves are found in 46 countries around the world and the species maintains legal protections in 21 countries (Boitani 2003, pp. 322-323). The arrest of wolf population declines and subsequent natural recolonization occurring since 1970 is attributed to legal protection, land-use changes, and human population shifts from rural areas to cities (Mech and Boitani 2010, p. 5). Mech and Boitani generally identify the following as ongoing threats to the species: (1) competition with humans for livestock, especially in developed countries; (2) exaggerated concern by the public concerning the threat and danger of wolves; and (3) fragmentation of habitat, with resulting areas becoming too small for populations with long-term viability (Mech and Boitani 2010, p. 5).

*Conclusion*

Although *C. lupus* has undergone significant range contraction in portions of its historical range, the species continues to be widespread and, as a whole, is stable. The species is currently protected in many countries; however, in some portions of the range, *C. lupus* populations are so abundant that they are managed as furbearers with open hunting and trapping seasons. In addition, *C. lupus* is currently categorized as Least Concern by the IUCN. We have found no substantial evidence to suggest that gray

wolves may be at risk of extinction throughout their global range now or may likely to become so in the foreseeable future. Further, we can point to the recovered, and delisted, populations in the northern Rocky Mountains and the western Great Lakes and our analyses for the North American subspecies *C. l. nubilus* and *C. l. occidentalis* below as evidence that the species is not at risk of extinction throughout all of its range; therefore, we will not consider this question further for the purposes of this proposed rule.

*Does the North American subspecies* C. l. nubilus *warrant the protections of the Act?*

*C. l. nubilus* - Historical Distribution

The historical range of *C. l. nubilus* was described by Nowak (1995, p. 396) as "Southeastern Alaska, southern British Columbia, contiguous U.S. from Pacific to Great Lakes region and Texas, Ontario except southeastern, northern and central Quebec, Newfoundland, northern Manitoba, Keewatin, eastern Mackenzie, Baffin Island, occasionally west-central Greenland (now evidently extirpated in the western contiguous U.S.)".

*C. l. nubilus* - Current Distribution

For purposes of this review we will discuss the current distribution of *Canis lupus nubilus* by state/province or region in which it is found. Management of the gray wolf

species is carried out by individual states and provinces, complicating the discussion of status by biological population. No state or province in the range of *C. l. nubilus* monitors wolf populations to the extent that precise estimates of population size can be made. For this reason, population estimates should be regarded as estimates based on professional judgment of the agencies involved.

*United States*—The historical range of *Canis lupus nubilus* in the United States is thought to be unoccupied with the exception of the western Great Lakes region (delisted due to recovery, 76 FR 81666, December 28, 2011) and a small number of wolves in the Pacific Northwest (Figure 3). The first account of breeding by wolves (the Lookout pack) in Washington State since the 1930s was documented in the North Cascades in 2008. In the spring of 2011, a new pack was documented, and genetic testing of a member of the pack confirmed that it was a gray wolf closely related to (consistent with being an offspring of) the Lookout pack breeding pair (Robinson *et al.* 2011, *in litt.*, pp. 1-2). Dispersing wolves have been documented in Oregon, and one in California, but there currently are no packs of known *C. l. nubilus* origin in either state.

Despite the fact that the area is recognized as historical *C. l. nubilus* range, microsatellite genotyping indicated that the two packs currently occupying Washington west of the NRM DPS were descended from wolves occurring in (1) coastal British Columbia (*C. l. nubilus*) and (2) northeastern British Columbia (*C. l. occidentalis*), northwestern Alberta (*C. l. occidentalis*), or the reintroduced populations in central Idaho and the greater Yellowstone area (*C. l. occidentalis*) (Pollinger 2008, pers. comm.; Nowak 1995, p. 397). Intergrade zones, or zones of reproductive interaction, between neighboring wolf populations have long been a recognized characteristic of historical

gray wolf distribution (Mech 1970, p. 223; Brewster and Fritts 1995, p. 372). While historical subspecies delineations based on morphology suggest that a biological boundary limiting dispersal or reproductive intermixing likely existed between eastern and western Oregon and Washington prior to the extirpation of wolves from the region (Bailey 1936, pp. 272-275; Young and Goldman 1944, p. 414; Hall and Kelson 1959, p. 849, Figure 6), Chambers *et al.* (2012, p. 43) argues that historical or modern boundaries should not be viewed as static or frozen in any particular time; but that they are dynamic processes and boundaries can shift over time. It is likely that historical biological boundaries between wolves in the Northern Rockies and wolves in the Pacific Northwest have changed with modifications to land use, creating habitat more favorable to dispersal across the region. Additionally, the recolonization of this area is in its infancy and the ultimate recolonization pattern of wolves in historical *C. l. nubilus* range is unpredictable. Therefore, for the purposes of this rule, we will consider wolves west of the NRM DPS in Oregon and Washington *C. l. nubilus.*

*British Columbia*—Wolves currently range throughout most of British Columbia, with *Canis lupus nubilus* occupying the western and coastal regions and *Canis lupus occidentalis* occupying the inland portion of the province. *C. l. nubilus* has reoccupied most of its historical range, including Vancouver Island and other islands along the mainland coast. Surveys in 1997 estimated 8,000 wolves in British Columbia, and populations are believed to be increasing (COSEWIC 2001, p. 22; Hatler *et al.* 2003, p. 5). Agencies generally do not distinguish among subspecies when reporting harvest or estimating population sizes; however, COSEWIC (2001 p. 38) estimated wolf numbers

by ecological areas. They concluded that approximately 2,200 wolves occupy the Pacific Ecological Area, which coincides with *C. l. nubilus'* historical range

*Northwest Territories and Nunavut*—There were an estimated 10,000 gray wolves in the Northwest Territories and Nunavut in 2001, (COSEWIC 2001, p. 22). The COSEWIC report does not differentiate among subspecies; however, many of the estimated numbers were likely to be *Canis lupus nubilus* due to their geographic range including most of mainland Nunavut and a portion of mainland Northwest Territories.

*Manitoba*— *Canis lupus nubilus* occupies boreal forests and tundra in northern Manitoba, while *C. l. occidentalis* occupies forests in the south. The total wolf population numbers approximately 4,000 to 6,000 and appears to be stable (COSEWIC 2001, p. 21; Hayes and Gunson 1995, p. 22). Although a population estimate for each subspecies does not exist, most of the high quality wolf habitat occurs in northern Manitoba, where human densities and rates of agriculture are lower; therefore, we expect at least half of the 4,000 – 6,000 wolves occupy the north, where they fall into *C. l. nubilus* range.

*Ontario*—Ontario is home to both *Canis lupus nubilus* and *Canis lycaon.* Wolves currently occupy approximately 85 percent of their historical range in this province, and although current ranges of the 2 subspecies are not entirely clear, *C. l. nubilus* likely dominates the boreal and tundra regions of the province in the north, while *C. lycaon* probably originally occupied most of southern Ontario (east of the Mississippi River and from the Gulf Coast north to the St. Lawrence and Great Lakes) (Ontario Ministry of Natural Resources 2005, p. 4). Population estimates suggest that around 5,000 wolves

(*C. l. nubilus*) occupy the northern regions and that a total of 8,850 wolves (*C. l. nubilus* and *C. lycaon*) exist provincewide (Ontario Ministry of Natural Resources 2005, pp. 7-9).

*Quebec*—Wolves (*Canis lupus nubilus* and *Canis lycaon*) currently occupy the entire province of Quebec except the regions south of the St. Lawrence River (Jolicoeur and Hénault 2010, p. 1). Like Ontario, the reported boundaries between the two subspecies have always been approximate and vary among studies. *C. l. nubilus* generally occupies areas north of Quebec City, within the distribution of moose and caribou. The total population is estimated at 7,000 individuals (Jolicoeur and Henault 2010, p. 1), with an increasing trend the past 10 years, following deer population trends and despite heavy exploitation (M. Hénault, unpubl. data). Subspecies population estimates are not available; however, the area occupied by *C. lycaon* is small compared to that occupied by *C. l. nubilus*, and it is likely that the majority of the 7,000 wolves in Quebec are *C. l. nubilus*.

*Newfoundland/Labrador*— *Canis lupus nubilus* is extirpated from Newfoundland. Approximately 1,500 wolves occupy Labrador (COSEWIC 2001, p. 18).

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) published an assessment and status report on *Canis lupus* in 2001 (COSEWIC 2001, entire). The assessment evaluates the status and protection level of wolves across jurisdictions. Assessments are complete for *Canis lupus nubilus*, *Canis lupus occidentalis*, and *Canis lycaon*. The subspecific ranges described are not entirely consistent with those used in this proposed rule (*C. l. occidentalis* range described by COSEWIC included Manitoba, Ontario, Quebec, and Newfoundland-Labrador, which the Service now considers part of *C. l. nubilus* range, following Nowak (2002, pp. 395-596)).

This discrepancy is inconsequential, however, as COSEWIC found that both *C. l. nubilus* and *C. l. occidentalis* are "Not at Risk" based on widespread, large, stable populations, with no evidence of decline over the last 10 years despite liberal harvest (COSEWIC 2001, p.ii). Furthermore, Environment Canada found that export of legally obtained harvested wolves is non-detrimental to the survival of the *C. lupus* in Canada (Environment Canada 2008). Supporting information included biological characteristics, current status, harvest management, control of harvest, harvest trend, harvest monitoring, benefits of harvest, and protection of harvest. The finding describes stable to increasing populations, a lack of threats, and high confidence in the current Canadian harvest management system. Most jurisdictions operate under an adaptive management strategy, which imposes strict control of harvest and is reactive to changing conditions, with the aim of ensuring sustainable harvest and maintaining biodiversity.

*Summary of Information Pertaining to the Five Factors*

The portion of the range of *Canis lupus nubilus* encompassed by the Western Great Lakes DPS was recently delisted due to recovery (76 FR 8166). Therefore, this analysis focuses on assessing threats to wolves in the remaining portion of the subspecies' range. Gray wolves identified as *C. l. nubilus* in the contiguous United States, outside of the WGL DPS, are currently listed under the Act. Thus, in this analysis we evaluate threats currently facing the subspecies and threats that are reasonably likely to affect the subspecies if the protections of the Act were not in place.

Factor A. The Present or Threatened Destruction, Modification or Curtailment of its Habitat or Range

Wolves are habitat generalists (Mech and Boitani 2003, p. 163) and once occupied or transited most of the U. S. and Canada. However, much of *Canis lupus nubilus'* historical range (Chambers *et al.* 2012, pp. 34-42) within this area has been modified for human use. While lone wolves can travel through, or temporarily live, almost anywhere (Jimenez *et al.* In review, p. 1), much of the historical range is no longer suitable habitat to support wolf packs (Oakleaf *et al.* 2006, p. 559; Carroll *et al.* 2006, p. 32, Mladenoff *et al.* 1995, p. 287). The areas that wolves currently occupy correspond to "suitable" wolf habitat as modeled by Oakleaf *et al.* (2006, entire), Carroll *et al.* (2006, entire), Mladenoff (1995, entire), and Mladenoff *et al.* (1999, entire). Although these models analyzed only habitat in the contiguous United States, the principles of suitable wolf habitat in Canada are similar; that is, wolves persist where ungulate populations are adequate to support them and conflict with humans and their livestock is low. The areas considered "unsuitable" in these models are not occupied by wolves due to human and livestock presence and the associated lack of tolerance of wolves and livestock depredation. Our 2009 NRM DPS delisting rule includes more information on wolf suitable habitat models (74 FR 15123, pp. 15157-15159). In that document we concluded that the most important habitat attributes for wolf pack persistence are forest cover, public land, high ungulate (elk) density, and low livestock density. Unsuitable habitat is characterized by low forest cover, high human density and use, and year-round livestock presence (Oakleaf *et al.* 2006, Fig. 2). We conclude that similar areas in adjacent Canada are also unsuitable for wolf colonization and occupation for the same reasons.

*Canis lupus nubilus* maintains robust populations across much of its historical range, with the exception of prairie areas and large intermountain valleys in southern portions of Canada where conflicts with humans preclude wolf presence, and large portions of the United States that have been irreversibly modified for human use, throughout the Southern Rocky Mountains and Colorado Plateau, northern California, western Oregon, and western Washington. It is not uncommon for recolonization to occur by subspecies other than those historically present because of changes in distribution. For example, *Canis lupus nubilus* was historically present in northeastern Oregon, but that region is currently being recolonized by *C. l. occidentalis* from Idaho due to proximity (i.e., the closest population of *C. l. nubilus* in Canada). Sufficient suitable habitat exists in the occupied area to continue to support wolves into the future (Mladenoff *et al.*1995, pp. 286-289; Mladenoff *et al.*1999, pp. 41-43; Carroll *et al.* 2006). Wolf populations should remain strong in these areas with management activities that focus on wolf population reduction in some areas to maintain populations of wild ungulates and reduce conflicts with livestock. Traditional land-use practices throughout the vast majority of the subspecies' current range do not appear to be affecting viability of wolves, and do not need to be modified to maintain the subspecies. We do not anticipate overall habitat changes in the subspecies' range to occur at a magnitude that would impact the subspecies rangewide, because wolf populations are distributed across the current range, are strong, and are able to withstand high levels of mortality due to their high reproductive rate and vagility (Fuller *et al.* 2003, p. 163; Boitani 2003, pp. 328-330). Much of the subspecies' range occurs on public land where wolf conservation is a priority and conservation plans have been adopted to ensure continued wolf persistence

(73 FR 10514, p. 10538). Areas in Canada within the subspecies' range include large areas with little human and livestock presence which are having little to no effect on wolf persistence.

*Other Components of Wolf Habitat*—Another important factor in maintaining wolf populations is the native ungulate population. Primary wild ungulate prey within the range of *Canis lupus nubilus* include elk, white-tailed deer, mule deer, moose, bison, and caribou. Bighorn sheep, dall sheep, mountain goats, and pronghorn also are common but not important as wolf prey. Each state or province within the range of *C. l. nubilus* manages its wild ungulate populations to maintain sustainable populations for harvest by hunters. Each state or province monitors big game populations to adjust hunter harvest in response to changes in big game population numbers and trends. Predation is a factor that affects those numbers and trends, and is considered when setting harvest quotas. We know of no future condition that would cause a decline in ungulate populations significant enough to affect *C. l. nubilus* throughout its range.

Human population growth and land development will continue in the range of *Canis lupus nubilus*, including increased development and conversion of private low-density rural land to higher density urban developments, road development and transportation facilities (pipelines and energy transmission lines), resource extraction (primarily oil and gas, coal, and wind development in certain areas), and more recreationists on public lands. Despite efforts to minimize impacts to wildlife (Brown 2006, pp. 1-3), some of this development will make some areas of the subspecies' range less suitable for wolf occupancy. However, it is unlikely that these potential developments and increased human presence will affect the subspecies in the future for

the following reasons: (1) wolves are habitat generalists and one of the most adaptable large predators in the world, and became extirpated in the southern portion of the subspecies' range only because of deliberate human persecution (Fuller *et al.* 2003, p. 163; Boitani 2003, pp. 328-330); (2) land-use restrictions on land development are not necessary to ensure the continued conservation of the subspecies. Even active wolf dens can be quite resilient to nonlethal disturbance by humans (Frame and Meier 2007, p. 316); (3) vast areas of suitable wolf habitat and the current wolf population are secure in the subspecies' range (national parks, wilderness, roadless areas, lands managed for multiple uses, and areas protected by virtue of remoteness from human populations) and are not available for or suitable to intensive levels of land development.

Development on private land near suitable habitat will continue to expose wolves to more conflicts and higher risk of human-caused mortality. However it is likely that the rate of conflict is well within the wolf population's biological mortality threshold (generally between 17 to 48 percent ([Fuller *et al.* 2003 +/- 8 percent], pp. 184-185; Adams *et al.* 2008 [29 percent], p. 22; Creel and Rotella 2010 [22 percent], p. 5; Sparkman *et al.* 2011 [25 percent], p. 5; Gude *et al.* 2011 [48 percent], pp. 113-116; Vucetich and Carroll In Review [17 percent]) , especially given the large amount of secure habitat that will support a viable wolf population and will provide a reliable and constant source of dispersing wolves (Mech 1989, pp. 387-8). Wolf populations persist in many areas of the world that are far more developed than the range of *Canis lupus nubilus* currently is or is likely to be in the future (Boitani 2003, pp. 322-323). Habitat connectivity in the range of *C. l. nubilus* may be reduced below current levels, but wolves

have exceptional abilities to disperse through unsuitable habitat (Jimenez *et al.* In review, p. 1), and such impacts would still not affect the subspecies rangewide.

Given the large number of wolves across the subspecies' range and the species' natural vagility, natural habitat connectivity is ensured over most of the range. We have not identified any occupied areas in Canada or the United States where lack of connectivity is affecting *Canis lupus nubilus* now or likely to do so in the future.

The large amount of public lands and lands that are naturally inaccessible due to topography and/or remoteness from human settlement that cannot or will not be developed within the range of the subspecies assures that adequate suitable habitat for wolves will exist into the future. Even though some habitat degradation will occur in smaller areas of suitable habitat, the quantity and quality of habitat that will remain will be sufficient to maintain natural connectivity into the future (e.g. Carroll *et al.* 2006 p.32).

Human populations in the southern portion of the subspecies' range are expected to increase (Carroll *et al.* 2006, p. 30). Increasing human populations do not necessarily lead to declining predator populations. Mortality can be limited with adequate management programs (Linnell *et al.* 2001, p. 348), research and monitoring, and outreach and education about living with wildlife. In Canada and the United States, government lands such as national parks and Crown Land provide habitat for prey species as well as wolves.

Management plans of appropriate land-management agencies and governments manage public lands to limit resource impacts from human use of those lands, and these plans are more than adequate to support a viable wolf population across the range of

*Canis lupus nubilus*. In Canada, large expanses of remote and inaccessible habitat accomplish the same thing. Habitat suitability for wolves will change over time with human population growth, land development, activities, and attitudes, but not to the extent that it is likely to affect the subspecies rangewide.

Summary of Factor A

We do not foresee that impacts to suitable and potentially suitable habitat will occur at levels that will significantly affect wolf numbers or distribution or affect population growth and long-term viability of *Canis lupus nubilus*. See the recent WGL DPS delisting rule (76 FR 81688, pp. 81688-81693) for a full discussion of this factor for *C. l. nubilus*. In Canada, even higher levels of certainty of habitat availability and security are provided by large areas of relatively inaccessible land, in addition to lands with protections provided by government regulations. These large areas of wolf habitat are likely to remain suitable into the future.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Wolves in the western Great Lakes were delisted (76 FR81693) based in part on the existence of well-managed programs for legal take for commercial, recreational, scientific, or educational purposes for that population. In Canada and in the northwestern United States, overutilization for commercial, recreational, scientific, or educational

purposes has not had a significant effect on *Canis lupus nubilus*. Mortality rates caused by commercial, recreational, scientific, or educational purposes are not anticipated to exceed sustainable levels in the future. These activities have not affected the viability of the wolves in the past, and we have no reason to believe that they would do so in the future. In Canada, wolf populations are managed through public hunting and trapping seasons.

*Scientific Research and Monitoring*—Each of the States and Provinces in the range of *Canis lupus nubilus* conduct scientific research and monitoring of wolf populations. Activities range from surveys of hunter observations of wolf locations and numbers to aerial counting surveys to darting wolves from airplanes and fixing them with radio collars for intensive monitoring. Even the most intensive and disruptive of these activities (anesthetizing for the purpose of radio-collaring) involves a very low rate of mortality for wolves (73 FR 10542, February 27, 2008). We expect that capture-related mortality by governments, Tribes, and universities conducting wolf monitoring, nonlethal control, and research will remain below three percent of the wolves captured, and will be an insignificant source of mortality to *C. l. nubilus*.

*Education*—We are unaware of any wolves that have been removed from the wild solely for educational purposes in recent years. Wolves that are used for such purposes are typically privately held captive-reared offspring of wolves that were already in captivity for other reasons. However, States may get requests to place wolves that would otherwise be euthanized in captivity for research or educational purposes. Such requests have been, and will continue to be, rare; would be closely regulated by the State and provincial wildlife management agencies through the requirement for State permits for

protected species; and would not substantially increase human-caused wolf mortality rates.

*Commercial and Recreational Uses*—Wolves in Oregon and Washington are protected by state Endangered Species Acts (Washington Administrative Code (WAC) 232-12-014 and 232-12-011; Oregon Code of Regulations (ORS) 496.171 to 496.192 and 498.026). Wolves in California are currently undergoing a status review to determine whether listing is warranted under the state Endangered Species Act (California Fish & Game Code, Sections 2050 – 2085). While in candidacy status, California will treat wolves as a State-listed species. Wolf management plans in Oregon (ODFW 2010, entire) and Washington (Wiles *et al.* 2011, entire) establish recovery goals for each state and help protect wolves from overutilization for commercial, recreational, scientific, and educational purposes. Since their listing under the Federal Act, no wolves have been legally killed or removed from the wild in the northwest United States (outside of the NRM DPS) for either commercial or recreational purposes. Some wolves may have been illegally killed for commercial use of the pelts and other parts, but illegal commercial trafficking in wolf pelts or parts and illegal capture of wolves for commercial breeding purposes happens rarely. We believe these state Endangered Species Acts will continue to provide a strong deterrent to illegal killing of wolves by the public in the absence of Federal protections.

Hunting and trapping occurs across the range of *Canis lupus nubilus* in Canada, and are managed through provincial and territorial wildlife acts whose regulations provide a framework for sustainable harvest management and monitoring (Environment Canada 2008). Harvest strategies are reviewed annually and involve regulatory controls

as well as management plans. Seasons do not distinguish between subspecies of *Canis lupus* and vary across jurisdictions and management unit from "no closed season" to "no open season" with an average open season of 9 to 10 months. In some provinces, harvest is also monitored by mandatory carcass checks, reporting or questionnaires. Where local wolf populations are declining or of concern, seasons and harvest strategies may be more restrictive and bag limits or quotas may be applied (COSEWIC 2001, pp.18-24), and where concern is low, liberal regulations typically prevail. Hunting of gray wolves is not allowed in Washington, Oregon, or California; however, lethal removal of depredating wolves has been allowed in eastern Washington and eastern Oregon (*i.e.*, in the NRM DPS) where wolves are no longer federally protected.

Wolves in British Columbia are currently designated as both a game animal and a furbearer. Seasons run from 4.5 months to 8 months long, and bag limits range between two wolves and unlimited wolves depending on location. Average annual numbers of wolves killed by hunting, trapping, and control for livestock, along with estimated percent of the population taken annually from 1986 to 1991 were 945 wolves, totaling 11 percent of the population in British Columbia (Hayes and Gunson 1995, p.23).

The Northwest Territories and Nunavut manage wolves as a big game and furbearing species through hunting and trapping seasons (Nunavut 2012, pp. 1-9). Harvest numbers are known only for wolf pelts sold on the open market as pelts used domestically are not counted by the Provincial governments (COSEWIC 2001, p. 23). In the past 10 years, fur auction sales have ranged from 711 to 1,469 pelts annually from these two territories (COSEWIC 2001, p. 25). Although the amount to which domestic use adds to the total harvest is unknown, it is believed to be relatively insignificant

(COSEWIC 2001, p. 25). The average annual number of wolves killed in the Northwest Territories and Nunavut by hunting, trapping, and control for livestock protection from1986 to 1991 was 793 wolves, totaling 7 to 8 percent of the population (Hayes and Gunson 1995, p.23).

Wolves are classified as big game and furbearer in Manitoba (Manitoba 2012a, entire). Hunters and trappers can take anywhere from one to unlimited wolves during a 5.5 to 12 month season (Manitoba 2012a, entire; Manitoba 2012b, entire). The average annual number of wolves killed in Manitoba by hunting, trapping, and control for livestock protection, from 1986 to 1991 was 295 wolves, totaling 7to 10 percent of the population (Hayes and Gunson 1995, p.23).

Wolves are classified as small game and furbearers in Ontario. Hunting and trapping seasons last from September 15 through March 15, with a bag limit of two wolves for hunters and no bag limit for trappers (Ontario Ministry of Natural Resources (OMNR) 2005, pp. 21-22). Annual wolf harvest by hunters is likely in the range of 110 to260 wolves per season and trapper harvest in Ontario averaged 337 wolves (range: 285 to 1,248) annually from the 1971/1972 season to the 2002/2003 season (OMNR 2005, pp. 21-22). The combined harvest equates to approximately 6 percent (range: 4 to17 percent) of the provincewide population of *C. lupus* in Ontario.

In Quebec, wolves are classified as big game and furbearer and seasons range from 4.5 months for trapping to 6 months for hunting (Jolicoeur and Henault 2010). Harvest rates, based on annual fur sales and population estimates, average 5.9 percent (range: 2.8 to 29.5 percent) for the entire province. The average annual number of wolves killed in Quebec by hunting, trapping, and control for livestock protection from

1986 to 1991 was 945 wolves, totaling 11 percent of the population (Hayes and Gunson 1995, p.23).

In Labrador, wolves are classified as furbearers and can be hunted or trapped during the 6 month season. Approximately 100 to 350 wolves are killed by hunters annually.

Wolf populations can maintain themselves despite sustained human-caused mortality rates of 17 to 48 percent ([Fuller *et al.* 2003 +/- 8 percent], pp. 184-185; Adams *et al.* 2008 [29 percent], p. 22; Creel and Rotella 2010 [22 percent], p. 5; Sparkman *et al.* 2011 [25 percent], p. 5; Gude *et al.* 2011 [48 percent], pp. 113-116; Vucetich and Carroll In Review [17 percent]). Recent studies suggest the sustainable mortality rate may be lower, and that harvest may have a partially additive or even super additive (i.e., harvest increases total mortality beyond the effect of direct killing itself, through social disruption or the loss of dependent offspring_effect on wolf mortality) (Creel and Rotella 2010, p.6), but substantial debate on this issue remains (Gude *et al.* 2012, p.p. 113-116). When populations are maintained below carrying capacity and natural mortality rates and self-regulation of the population remain low, human-caused mortality can replace up to 70 percent of natural mortality (Fuller *et al.* 2003, p. 186). Wolf pups can also be successfully raised by other pack members and breeding individuals can be quickly replaced by other wolves (Brainerd *et al.* 2008, p. 1). Collectively, these factors mean that wolf populations are quite resilient to human-caused mortality if it is adequately regulated. This trend is evident in this subspecies in that, despite liberal harvest imposed across the range of *Canis lupus nubilus* in Canada, populations are still high and trends stable to increasing.

In Canada, some wolves may have been illegally killed for commercial use of pelts and other parts, but because licenses are not required to hunt wolves in several provinces, illegal commercial trafficking in wolf pelts or parts and illegal capture of wolves for commercial breeding purposes happens rarely. We do not expect the use of wolves for scientific purposes to change in proportion to total wolf numbers. Although exact figures are not available throughout the range, such permanent removals of wolves from the wild have been very limited and we have no substantial information suggesting that this is likely to change in the future.

In summary, states and provinces have humane and professional animal handling protocols and trained personnel that will ensure population monitoring and research result in little unintentional mortality. Furthermore, the States' and Provinces' permitting process for captive wildlife and animal care will ensure that few, if any, wolves will be removed from the wild solely for educational purposes. We conclude that any potential wolf take resulting from commercial, scientific, or educational purposes in the range of the subspecies does not appear to be affecting the viability of *Canis lupus nubilus.* Furthermore, states and provinces have regulatory mechanisms in place to ensure that populations remain viable (see discussion under factor D).

Factor C. Disease or Predation

This section discusses disease and parasites, natural predation, and all sources of human-caused mortality not covered under factor B above (the factor B analysis includes sources of human-caused mortality for commercial and recreational uses). The array of

diseases, parasites, and predators affecting *Canis lupus nubilus* is similar to that affecting other wolf subspecies. The following analysis focuses on wolves in the WGL because it is the most intensively studied population of *Canis lupus nubilus* and is a good surrogate for assessing the rest of the subspecies' range. Although we lack direct information on disease rates and mortality rates from disease for the subspecies rangewide, it is likely that the impact of disease and predation is similar for other parts of the range; that is, disease and predation have a variety of sources, rates of disease are largely density-dependent, and disease and predation are not significantly affecting the subspecies.

A wide range of diseases and parasites have been reported for the gray wolf, and several of them have had significant but temporary impacts during the recovery of the species in the 48 contiguous States (Brand *et al.* 1995, p. 419; WI DNR 1999, p. 61, Kreeger 2003, pp. 202– 214). We fully anticipate that, in the range of *Canis lupus nubilus*, these diseases and parasites will follow the same pattern seen in other members of the genus in North America (Brand *et al.* 1995, pp. 428–429; Bailey *et al.* 1995, p. 445; Kreeger 2003, pp. 202–204; Atkinson 2006, p. 1–7; Smith and Almberg 2007, 17–19; Johnson 1995a, b). Although destructive to individuals, most of these diseases seldom cause significant, long-term changes in population growth (Fuller *et al.* 2003, pp.176-178; Kreeger 2003, pp. 202-214).

Canine parvovirus (CPV) infects wolves, domestic dogs (*Canis familiaris*), foxes (*Vulpes vulpes*), coyotes, skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*). The population impacts of CPV occur via diarrhea-induced dehydration leading to abnormally high pup mortality (Wisconsin Department of Natural Resources 1999, p. 61). Clinical CPV is characterized by severe hemorrhagic diarrhea and vomiting; debility and

subsequent mortality (primarily pup mortality) is a result of dehydration, electrolyte imbalances, and shock. Canine parvovirus has been detected in nearly every wolf population in North America including Alaska (Bailey *et al.* 1995, p. 441; Brand *et al.* 1995, p. 421; Kreeger 2003, pp. 210–211; Johnson *et al.* 1994), and exposure in wolves is thought to be almost universal. Nearly 100 percent of the wolves handled in Montana (Atkinson 2006), YNP (Smith and Almberg 2007, p. 18), and Minnesota (Mech and Goyal 1993, p.331) had blood antibodies indicating nonlethal exposure to CPV. The impact of disease outbreaks to the overall NRM wolf population has been localized and temporary, as has been documented elsewhere (Bailey *et al.* 1995, p. 441; Brand *et al.* 1995, p. 421; Kreeger 2003, pp. 210–211). Despite these periodic disease outbreaks, the NRM wolf population increased at a rate of about 22 percent annually from 1996 to 2008 (Service *et al.* 2009, Table 4). Mech *et al.* (2008, p. 824) recently concluded that CPV reduced pup survival, subsequent dispersal, and the overall rate of population growth in Minnesota (a population near carrying capacity in suitable habitat). After the CPV became endemic in the population, the population developed immunity and was able to withstand severe effects from the disease (Mech and Goyal, p.7). These observed effects are consistent with results from studies in smaller, isolated populations in Wisconsin and on Isle Royale, Michigan (Wydeven *et al.* 1995, entire; Peterson *et al.* 1998, entire) but indicate that CPV also had only a temporary population effect in a larger population.

Canine distemper virus (CDV) is an acute disease of carnivores that has been known in Europe since the sixteenth century and infects dogs worldwide (Kreeger 2003, p. 209). This disease generally infects dog pups when they are only a few months old, so mortality in wild wolf populations might be difficult to detect (Brand *et al.* 1995, pp.

420–421). Mortality from CDV among wild wolves has been documented only in two littermate pups in Manitoba (Carbyn 1982, pp. 111–112), in two Alaskan yearling wolves (Peterson *et al.* 1984, p. 31), and in two Wisconsin wolves (an adult in 1985 and a pup in 2002 (Thomas *in litt.* 2006; Wydeven and Wiedenhoeft 2003b, p. 20)). Carbyn (1982, pp. 113–116) concluded that CDV was partially responsible for a 50 percent decline in the wolf population in Riding Mountain National Park (Manitoba, Canada) in the mid-1970s. Serological evidence indicates that exposure to CDV is high among some wolf populations — 29 percent in northern Wisconsin and 79 percent in central Wisconsin from 2002 to 2004 (Wydeven and Wiedenhoeft 2004b, pp. 23–24 Table 7; 2005, pp. 23–24 Table 7), and similar levels in YNP (Smith and Almberg 2007, p. 18). However, the continued strong recruitment in Wisconsin and elsewhere in North American wolf populations indicates that distemper is not likely a significant cause of mortality (Brand *et al.* 1995, p. 421). These outbreaks will undoubtedly occur when wolf densities are high and near carrying capacity, but as documented elsewhere CDV will not likely significantly affect *C. l. nubilus*.

Lyme disease, caused by a spirochete bacterium, is spread primarily by deer ticks (*Ixodes dammini*). Host species include humans, horses (*Equus caballus*), dogs, white-tailed deer, mule deer, elk, white-footed mice (*Peromyscus leucopus*), eastern chipmunks (*Tamias striatus*), coyotes, and wolves. Lyme disease infections in wolves have been reported only in the WGL. In this region, the disease might be suppressing population growth by decreasing wolf pup survival (Wisconsin Department of Natural Resources 1999, p. 61); Lyme disease has not been reported from wolves beyond the Great Lakes regions and is not expected to be a factor affecting *Canis lupus nubilus* rangewide

(Wisconsin Department of Natural Resources 1999, p. 61).

Mange (*Sarcoptes scabeii*) is caused by a mite that infests the skin. The irritation caused by feeding and burrowing mites results in intense itching, resulting in scratching and severe fur loss, which can lead to mortality from exposure during severe winter weather or secondary infections (Kreeger 2003, pp. 207–208). Advanced mange can involve the entire body and can cause emaciation, staggering, and death (Kreeger 2003, p. 207). In a long-term Alberta wolf study, higher wolf densities were correlated with increased incidence of mange, and pup survival decreased as the incidence of mange increased (Brand *et al.* 1995, pp. 427–428). Mange has been shown to temporarily affect wolf population growth rates and perhaps wolf distribution (Kreeger 2003, p. 208).

Mange has been detected in wolves throughout North America (Brand *et al.* 1995, pp. 427–428; Kreeger 2003, pp. 207–208). In Montana and Wyoming, proportions of packs with mange fluctuated between 3 and 24 percent from 2003 to 2008 (Jimenez *et al.* 2008b; Atkinson 2006, p. 5; Smith and Almberg 2007, p. 19). In packs with the most severe infestations, pup survival appeared low, and some adults died (Jimenez *et al.* 2008b); however, evidence suggests infestations do not normally become chronic because wolves often naturally overcome them. Mange has been detected in Wisconsin wolves every year since 1991, with no impact on population growth (Wydeven *et al.* 2009, pp. 96 -97).Despite its constant presence as an occasional mortality factor, the wolf population expanded from 39 to 41 wolves in 1991 to its present level of 815 or more in winter 2011 to 2012 (Wydeven et al. 2012).

Dog-biting lice (*Trichodectes canis*) commonly feed on domestic dogs, but can infest coyotes and wolves (Schwartz *et al.* 1983, p. 372; Mech *et al.* 1985, p. 404). The

lice can attain severe infestations, particularly in pups. The worst infestations can result in severe scratching, irritated and raw skin, substantial hair loss particularly in the groin, and poor condition. While no wolf mortality has been confirmed, death from exposure and/or secondary infection following self-inflicted trauma, caused by inflammation and itching, appears possible. Dog-biting lice were first confirmed on two wolves in Montana in 2005, on a wolf in south-central Idaho in early 2006 (Service *et al.* 2006, p. 15; Atkinson 2006, p. 5; Jimenez *et al.* 2010), and in 4 percent of Minnesota wolves in 2003 through2005 (Paul *in litt.* 2005), but their infestations were not severe. Dog lice infestations are not expected to have a significant impact even at a local scale in *C. l. nubilus*.

Other diseases and parasites, including rabies, canine heartworm, blastomycosis, bacterial myocarditis, granulomatous pneumonia, brucellosis, leptospirosis, bovine tuberculosis, hookworm, coccidiosis, and canine hepatitis have been documented in wild wolves, but their impacts on future wild wolf populations are not likely to be significant (Brand *et al.* 1995, pp. 419– 429; Hassett *in litt.* 2003; Johnson 1995, pp. 431, 436–438; Mech and Kurtz 1999, pp. 305–306; Thomas *in litt.* 1998, Thomas *in litt.* 2006, WI DNR 1999, p. 61; Kreeger 2003, pp. 202–214). Continuing wolf range expansion, however, likely will provide new avenues for exposure to several of these diseases, especially canine heartworm, raccoon rabies, and bovine tuberculosis (Thomas *in litt.* 2000, *in litt.* 2006), further emphasizing the need for disease monitoring programs.

*Natural Predation*

No wild animals habitually prey on wolves. Other predators, such as mountain

lions (*Felis concolor*), black bears (*Ursus Americanus*), and grizzly bears (*Ursus arctos horribilis*) (USFWS 2005, p. 3), or even large prey, such as deer, elk, and moose (Mech and Nelson 1989, pp. 207– 208; Smith *et al.* 2001, p. 3), occasionally kill wolves, but this has been documented only rarely. Other wolves are the largest cause of natural predation among wolves (less than three percent rate of natural wolf mortality in the NRM). Intraspecific-strife mortality is normal behavior in healthy wolf populations and is an expected outcome of dispersal conflicts and territorial defense. This form of mortality is something with which the species has evolved and it should not affect *Canis lupus nubilus.*

*Human Predation*

Wolves are susceptible to human-caused mortality, especially in open habitats such as those that occur in the western United States (Bangs *et al.* 2004, p. 93). An active eradication program is the sole reason that wolves were extirpated from their historical range in the United States (Weaver 1978, p. i). Humans kill wolves for a number of reasons. In all locations where people, livestock, and wolves coexist, some wolves are killed to resolve conflicts with livestock (Fritts *et al.* 2003, p. 310; Woodroffe *et al.* 2005, pp. 86–107, 345–7). Occasionally, wolf killings are accidental (*e.g.*, wolves are hit by vehicles, mistaken for coyotes and shot, or caught in traps set for other animals) or killed in self-defense (Bangs *et al.* 2005, p. 346).

However, many wolf killings are intentional, illegal, and never reported to authorities. Wolves may become unwary of people or human activity, increasing their vulnerability to human-caused mortality (Mech and Boitani 2003, pp. 300–302). The

number of illegal killings is difficult to estimate and impossible to accurately determine because they generally occur with few witnesses. Illegal killing was estimated to make up 70 percent of the total mortality rate in a north central Minnesota wolf population and 24 percent in the NRM (Liberg *et al.* 2011, pp. 3-5). Liberg *et al.* (2011, pp.3-5) suggests more than two-thirds of total poaching may go unaccounted for, and that illegal killing can pose a severe threat to wolf recovery. In the NRM, poaching has not prevented population recovery, but it has affected wolf distribution (Bangs *et al.* 2004, p. 93) preventing successful pack establishment and persistence in open prairie or high desert habitats (Bangs *et al.* 1998, p. 788; Service *et al.* 1989–2005). We would expect a similar pattern for *Canis lupus nubilus* in the northwestern United States, but not in Canada, where harvest regulations are liberal and social tolerance of wolves is higher.

Vehicle collisions contribute to wolf mortality rates throughout North America. They are expected to rise with increasing wolf populations, and as wolves colonize areas with more human development and a denser network of roads and vehicle traffic. Highway mortalities will likely constitute a small proportion of total mortalities.

Populations of *Canis lupus nubilus* are high and stable to increasing in the many areas throughout Canada. We have no reason to believe that threats of disease and predation have increased recently or will increase. Therefore, we conclude that neither disease nor predation, including all forms of human-caused mortality, is significantly affecting *C. l. nubilus* throughout its range.

Factor D: The Inadequacy of Existing Regulatory Mechanisms

The Act requires us to examine the adequacy of existing regulatory mechanisms with respect to those existing and foreseeable threats discussed under the other factors that may affect *Canis lupus nubilus*. Wolves within the WGL DPS were delisted based in part on the fact that there would be adequate regulatory mechanisms in place following delisting to facilitate the maintenance of the recovered status of the wolves in the western Great Lakes. For a full discussion of the regulatory mechanisms in place for gray wolves in the western Great Lakes, see the December 28, 2011, final delisting rule (76 FR 81666, pp. 81701-81717).

Wolves are classified as endangered under both the Washington and Oregon State Endangered Species Acts (Washington Administrative Code (WAC) 232-12-014 and 232-12-011; Oregon Code of Regulations (ORS) 496.171 to 496.192 and 498.026). Unlawful taking (when a person hunts, fishes, possesses, maliciously harasses or kills endangered fish or wildlife, and the taking has not been authorized by rule of the commission) of endangered fish or wildlife is prohibited in Washington (RCW 77.15.120). Prohibitions and limitations regarding endangered species in Oregon are established by the Oregon Fish and Wildlife Commission to ensure the survival of the species and may include take avoidance ("to kill or obtain possession or control of any wildlife", ORS 496.004) and protecting resource sites (ORS 496.182). Wolves in California are currently undergoing a status review to determine whether listing is warranted under the California Endangered Species Act (Fish and Game Code 2050-2069). Oregon and Washington also have adopted wolf management plans (California is currently developing a wolf management plan) intended to provide for the conservation and reestablishment of wolves in these States (ODFW 2010, entire; Wiles *et al.* 2011,

entire). These plans include population objectives, education and public outreach goals, damage management strategies, and monitoring and research plans. Wolves will remain on each State's respective endangered species list until the population objectives (four breeding pairs for three consecutive years in Oregon and four breeding pairs for 3 consecutive years in each of three geographic regions plus 3 wolves anywhere in Washington) have been reached. Once the objectives are met, wolves will be either reclassified to threatened or removed from the State's endangered species lists. Once removed, the States will use regulated harvest to manage wolf populations. Wolves in the western two thirds of Oregon will maintain protected status until four breeding pairs occupy that region for three consecutive years.

Both plans also recognize that management of livestock conflicts is a necessary component of wolf management (Service 1980, p.4; Service 1987, p.3; Hayes and Gunson 2005, p. 27). Control options are currently limited within *Canis lupus nubilus'* historical range in Oregon and Washington, where they are federally protected. If Federal delisting occurs, guidelines outlined in each State's plan define conditions under which depredating wolves can be harassed or killed by agency officials (ODFW 2010, pp. 43-54; Wiles *et al.* 2011, pp. 72-94).

Within the range of *Canis lupus nubilus* in Canada, wolf populations are managed as big game and as a furbearer; hunting and trapping are the principal management tools used to keep populations within the limits of human tolerance. Each Province within the range has committed to maintain sustainable populations while allowing for harvest and minimizing conflict with livestock (COSEWIC 2001, pp. 18-29, 44-46). Maintaining

wild ungulate populations in numbers that allow for liberal human harvest for local consumption is also a priority in many areas (COSEWIC 2001, pp. 18-26).

Although wolves are not dependent on specific habitat features other than an adequate food supply and human tolerance, there are State, Provincial, and Federal land-management regimes in place that provide protection for wolves and wolf habitat throughout the range of *Canis lupus nubilus*. Canadian National Parks in the southern portion of the range of *C. l. nubilus* do not allow hunting, while National Parks in the northern portion of the range allow hunting by Native Peoples only (COSEWIC 2001, p. 26). National Parks and Monuments also exist in Washington (three National Parks and three National Monuments) totaling 7,707 $km^2$ (1,904,451 million acres) and Oregon (one National Park and two National Monuments) totaling 800 $km^2$ (197,656 acres); some of these areas will likely act as refugia once wolves are removed from States' endangered species lists. These land-management regimes provide refugia for wolf populations from hunting, trapping, and control activities and in turn these protected populations may serve as a source of dispersing wolves for low-density populations.

We have long recognized that control of wolf numbers and especially depredating wolves was central to maintaining public support for wolf conservation. Much of the impact of livestock production on *Canis lupus nubilus* occurred during the period between settlement and the mid-20th century when wolves were extirpated from most of the United States due to depredations on livestock. Wolves have not re-populated these regions due to continued lack of human tolerance to their presence and habitat alteration. In Canada, outside of relatively high-human-density areas, wolf populations have remained strong since the cessation of widespread predator poisoning campaigns in the

1950s. We have no information to suggest that the current regulatory regime in Canada is not adequate to provide for the conservation of *C. l. nubilus*, and so we conclude that the jurisdictions in these areas have been successful in their search for an appropriate balance between wolf conservation, human tolerance, and providing for human uses. Therefore both in Canada, and in the United States, in the absence of the Act, the existing regulatory mechanisms are currently adequate to provide for the long-term conservation of *C. l. nubilus*.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Wolves in the western Great Lakes were delisted based in part on the conclusion that other natural or manmade factors are unlikely to affect the viability of wolves in the western Great Lakes in the future. For a full discussion of factor E for *Canis lupus nubilus* in the Western Great Lakes DPS see the December 28, 2011, final delisting rule (76 FR 81666, pp. 81717-81721).

*Public Attitudes Toward the Gray Wolf* – Throughout much of Canada, in contrast to the contiguous United States, wolves are not dependent on human tolerance for their conservation. Even during the height of wolf control that included broadcast indiscriminate poisoning and trapping campaigns by the public and by government agencies, wolves were able to maintain viable populations in much of *Canis lupus nubilus'* historical range simply by virtue of remote and rugged terrain and low human population densities. However, in southern Canada and in the United States today public attitudes toward wolves are important conservation issues. In these areas with higher

human densities and the presence of livestock, the primary determinant of the long-term conservation of gray wolves will likely be human attitudes toward this large predator. These attitudes are largely based on the real and perceived conflicts between human activities and values and wolves, such as depredation on livestock and pets, competition for surplus wild ungulates between hunters and wolves, concerns for human safety, wolves' symbolic representation of wildness and ecosystem health, killing of wolves by humans, and the wolf-related traditions of Native American Tribes or local culture. It is important to find a balance in wolf management that will sustain wolf populations but also address other human concerns in a way that maintains tolerance of wolves among the human populations that live with them (Bangs *et al.* 2009, p. 111; 62 FR 15175, April 2, 2009). Addressing these concerns will often involve lethal take of wolves or other removal methods (Bangs *et al.* 2009, pp. 107-111. These activities, when employed in an overall management framework, are essential wolf-conservation activities as they provide the public with assurances that human interests and needs will be considered appropriately during wolf-management decisions (Bangs *et al.* 2009, pp. 111-114.

*Predator control*—Wolf numbers have been the subject of control efforts to reduce conflicts with livestock and to increase ungulate numbers in Canada since the turn of the 20th century (Boertje *et al.* 2010, p. 917). Since the 1970s, wolf control has been focused on increasing populations of wild ungulates, mostly moose but also caribou, for human consumption and in some cases to conserve caribou herds that were at risk (Russell 2010, pp. 6-12). Wolf control has included both lethal and nonlethal methods using public hunting and trapping seasons, aerial gunning by government agents, and experimentation with predator exclosures, sterilization, and supplemental feeding

(Russell 2010, pp. 6-12).

Predator-control programs as they currently exist are not affecting the viability of *Canis lupus nubilus* for several reasons: (1) The types of control measures that have resulted in effective extirpation of wolf populations from large areas are no longer permitted or prescribed by the States and Provinces that pursue wolf control. Historically, wolves were persecuted by people seeking to eliminate wolves from the landscape using any means necessary. These means included government agencies systematically poisoning and trapping wolves. The goal of wolf-control programs and associated research in Canada today is to maintain sustainable (though low-density) wolf populations. Control programs do not employ indiscriminant broadcast poisoning, and trapping or shooting of wolves is limited by estimates of population numbers with the goal of reducing but not eliminating wolf populations. (2) Wolf control is very expensive and so is not likely to be applied broadly enough and consistently enough to reduce the rangewide population of *Canis lupus nubilus* substantially. Typically, wolf-control areas are re-populated within 4 years of cessation of control efforts, indicating that population control is temporary and reliant on constant application of control efforts (Boertje *et al.* 2010, p. 920). (3) Wolf control must be applied over a large area to be effective (National Research Council 1997, p. 10). This fact combined with number 2 above ensures that wolf control is not likely to be applied unless wolf populations are high enough for the perceived benefits to outweigh the costs. This situation is not likely to exist over a large portion of the subspecies' range simultaneously. (4) Wolves are extremely resilient with high population-growth potential and high rates of dispersal. After control operations, wolf populations recover to pre-control levels within a few

years. (5) Wolf control will be applied only where wolf populations are high. This means that wolf control may act as a density-dependent population-control mechanism. When wolf populations are high, ungulate populations become depressed leading to pressures for management authorities to employ predator control actions to address the situation. As predator populations are reduced and ungulate populations rebound, pressure to continue the control actions is reduced leading to reduction or cessation of the program to reduce expenditures. This dynamic likely supplies some added protection to the long term viability of the subspecies.

*Climate Change*—Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Throughout their circumpolar distribution, gray wolves persist in a variety of ecosystems with temperatures ranging from -70F to 120F (-57C to 49C) with wide-ranging prey type and availability (Mech and Boitani 2003, p. xv). *Canis lupus nubilus* are historically and currently known to inhabit a range of ecotypes subsisting on large ungulate prey as well as small mammals. Due to this plasticity, we do not consider *C. l. nubilus* to be vulnerable to climate change. Similarly, elk, the primary prey in many areas, are known to be habitat generalists due to their association with wide variation in environmental conditions (Kuck 1999, p.1). We recognize that climate change may have detectable impacts on the ecosystems that affect *C. l. nubilus*. For example, to the degree that warmer temperatures and decreased water availability limit prey abundance, we would also expect decreased wolf densities. However, we do not consider these potential impacts of climate change to be affecting *C. l. nubilus* now or to likely do so in the future. For a full discussion of potential impacts of climate change on wolves, please see our recent final delisting rule for the gray wolf in Wyoming (77 FR55597-55598, September 10, 2012).

*Summary of Factor E*

Natural or manmade factors are not affecting the viability of *Canis lupus nubilus*. Positive public attitudes continue to be fostered through management of conflicts and hunting and trapping opportunities and their associated economic benefits. Wolf control to increase ungulate numbers is pursued in local areas but is not likely to significantly affect the subspecies. In addition, control actions are not aimed at extirpation of wolf

populations, but instead seek to reduce overall density of wolves while maintaining viable populations.

Cumulative Effects

A species may be affected by more than one factor in combination. Within the preceding review of the five listing factors, we discussed potential factors that may have interrelated impacts on *Canis lupus nubilus*. Our analysis did not find any significant affects to *C. l. nubilus*. However, we recognize that multiple sources of mortality acting in combination have greater potential to affect wolves than each source alone. Thus, we consider how the combination of factors may affect *Canis lupus nubilus*. *Canis lupus nubilus* occurs as widespread, large, and resilient populations across much of its historical geographic range and in recent years has expanded in distribution. Given the current size of the *C. l. nubilus* population in Canada and the lack of identified threats, we do not find any combination of factors to be a significant threat.

Isolation of *Canis lupus nubilus* in the Pacific Northwest, including western British Columbia and western Washington, from the larger population of *C. l. nubilus* in central and eastern Canada, in combination with small population size, could exacerbate the potential for other factors to disproportionately affect that population. While the current population estimate is large (2,200 wolves), increased mortality (resulting from hunting, vehicle collisions, poaching, natural sources of mortality) could reduce the population to a level where effects of small population size take effect. Small population size directly and significantly increases the likelihood of inbreeding depression, which may decrease individual fitness, hinder population growth, and increase the population's

extinction risk. Small population size also increases the likelihood that concurrent mortalities from multiple causes that individually may not be resulting in a population decline (e.g., vehicle collisions, natural sources of mortality) could collectively do so. Combined effects from disease, catastrophe, or hybridization events that normally could be sustained by a larger, resilient population have the potential to affect the size, growth rate, and genetic integrity of a smaller *C. l. nubilus* population. The combined effects of genetic and environmental events to a small population could represent a significant effect. However, given the current size of the *C. l. nubilus* population in the west and active wolf recolonization occurring in Washington, as well as the extant population of *C. l. nubilus* in central and eastern Canada, we do not find the combination of factors to be significant at this time.

*Conclusion*

As required by the Act, we considered the five factors in assessing whether the subspecies *Canis lupus nubilus* is threatened or endangered throughout all of its range. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the subspecies. We reviewed the information available in our files, other available published and unpublished information, and we consulted with recognized experts and other Federal, State, and tribal agencies. We found that wolves occupying *C. l. nubilus'* historical range are widespread, exist as large, stable populations, with no evidence of decline over the last 10 years despite liberal harvest. During this process we did not identify any threats to the subspecies, indicating that *C. l. nubilus* is not in danger of extinction throughout its range and does not,

therefore, meet the definition of an endangered species. It is also not likely to become endangered within the foreseeable future throughout all of its range. See the Significant Portion of the Range Analysis section below for our evaluation as to whether this subspecies may or may not be in danger of extinction in a significant portion of its range.

*Does the North American subspecies* C. l. occidentalis *warrant the protections of the Act?*

*C. l. occidentalis* - Historical Distribution

The historical range of *C. l. occidentalis* includes all of Alaska except for the southeastern Coast, British Columbia east of the coastal mountains, all of Yukon, Alberta, Saskatchewan, northwestern Montana, northern Idaho, western Manitoba, and western Northwest Territories. *C. l. occidentalis* range is bordered on the east and west by the subspecies *C. l. nubilis*, and on the northeast by *C. l. arctos* (Nowak 1995, Fig. 20).

*C. l. occidentalis* Current Distribution

For purposes of this status review we will discuss the current distribution of *C. l. occidentalis* by state/province or region in which it is found. Within the range of the subspecies populations are not isolated from one another; however, management of the species is carried out by individual states and provinces complicating the discussion of

status by biological population. No state or province in the range of *C. l. occidentalis* monitors wolf populations to the extent that precise estimates of population size can be made. For this reason, population estimates should be regarded as estimates using professional judgment of the agencies involved.

*Contiguous United States*—The historical range of *C. l. occidentalis* in the contiguous United States included Montana and Idaho (delisted due to recovery 76 FR 25590, May 5, 2011). Subsequent expansion of populations of this subspecies into eastern Oregon and Washington (delisted due to recovery 76 FR 25590, May 5, 2011) and Wyoming (delisted due to recovery 77 FR 55530, September 10, 2012) has resulted in a large recovered population of this subspecies. Currently there are only a few members of *C. l. occidentalis* known in the contiguous United States outside of the delisted areas; these wolves are in the Pacific Northwest. The first account of breeding by wolves (the Lookout pack) in Washington State since the 1930s was documented in the North Cascades (outside of the delisted area) in 2008. Preliminary genetic testing of the breeding male and female suggested they were descended from wolves occurring in (1) coastal British Columbia (*C. l. nubilus*) and (2) northeastern British Columbia (*C. l. occidentalis*), northwestern Alberta (*C. l. occidentalis*), or the reintroduced populations in central Idaho and the greater Yellowstone area (*C. l. occidentalis*) (Pollinger 2008, pers. comm.; Nowak 1995, p. 397). In the spring of 2011, a new pack was documented, and genetic testing of a pack member confirmed that this individual was a gray wolf that was closely related to (consistent with being an offspring of) the Lookout pack breeding pair (Robinson *et al.* 2011, *in litt.*, pp. 1-2).

*Alaska*—Alaska has a robust population of *C. l. occidentalis* found over most of its historical range at densities that are strongly correlated with variations in ungulate biomass (Orians *et al.* 1997, p. 3). Alaska's wolf population is estimated by Alaska Department of Fish and Game (ADF&G) to be 7,000 to 11,000 (Alaska Department of Fish and Game 2007, p. 8). A smaller number of *C. l. nubilis* also occur in southeastern Alaska

*C. l. occidentalis* in Canada

The COSEWIC published an assessment and status report on *C. lupus* in 2001 (COSEWIC 2001, entire). The assessment evaluates the status and protection level of wolves across jurisdictions for *C. l. nubilus*, *C. l. occidentalis*, *C. l. lycaon*, and *C. l. arctos*. The subspecific ranges described are not entirely consistent with those used for this status review (*C. l. occidentalis* range described by COSEWIC included Manitoba, Ontario, Quebec and Newfoundland-Labrador, which the Service considers part of *C. l. nubilus* range). This discrepancy, however, is inconsequential as COSEWIC found that both *C. l. nubilus* and *C. l. occidentalis* are "Not at Risk" based on widespread, large, stable populations, with no evidence of decline over the last 10 years despite liberal harvest (COSEWIC 2001, p.ii). For the purposes of this analysis, where the COSEWIC report differs from Nowak (1995, Fig. 20) in interpretation of subspecies boundaries, we have used Provincial population estimates to infer subspecies numbers.

Furthermore, Environment Canada published a Non-Detriment Finding for *C. lupus* in Canada in 2008 (Environment Canada 2008). Supporting information included

biological characteristics, current status, harvest management, control of harvest, harvest trend, harvest monitoring, benefits of harvest, and protection of harvest. The finding describes stable to increasing populations, a lack of threats, and high confidence in the current Canadian harvest management system. Most jurisdictions operate under an adaptive management strategy, which imposes strict control of harvest and is reactive to changing conditions, with the aim of ensuring sustainable harvest and maintaining biodiversity.

*Yukon Territories*—An estimated 4,500 wolves inhabited the Yukon in 2001(COSEWIC 2001, p. 22). Wolves are managed as big game and as furbearers with bag limits set for residents and non-residents.

*Northwest Territories and Nunavut*—There were an estimated 10,000 wolves in the Northwest Territories and Nunavut in 2001 (COSEWIC 2001, p. 22), these wolves compose three subspecies: *C. l. occidentalis*, *C. l. nubilis*, and *C. l. arctos*. The distribution of the three subspecies is known only in a general sense, and the boundaries between subspecies are not discrete. In general, *C. l. arctos* inhabits the Arctic Islands of Nunavut, *C. l. nubilis* inhabits most of the mainland portion of Nunavut, and *C. l. occidentalis* inhabits all of Northwest Territories and the western edge of mainland Nunavut (Nowak 1995, Fig. 20). The COSEWIC report does not differentiate between *C. l. occidentalis* and *C. l. arctos*, however many of the estimated numbers were likely to be *C. l. occidentalis* due to their geographic range including most of mainland Northwest Territories and a portion of mainland Nunavut.

*British Columbia*—Two gray wolf subspecies are present in British Columbia: *C. l. occidentalis* and *C. l. nubilis*. *C. l. nubilis* inhabits coastal areas including some coastal

islands. *C. l. occidentalis* is widely distributed on the inland portion of the province. Generally, government agencies do not distinguish between subspecies when reporting take or estimating population sizes. Therefore, determining exactly what portion of reported numbers for British Columbia are *C. l. nubilis* and which are *C. l. occidentalis* is not possible. Where possible, we have separated accounts of wolves in coastal areas from those inland, but our ability to do this is limited by the lack of sub-specific reporting. There were an estimated 8,000 wolves present in British Columbia in 1997 (COSEWIC 2001, p. 22). The COSEWIC report estimates that there were 2,200 wolves in the "Pacific" region of British Columbia in 1999, and it is likely that this estimate refers to *C. l. nubilis*, leaving the remaining 5,800 wolves in British Columbia referable to *C. l. occidenalis* (COSEWIC 1999, Table 7).

*Alberta—C. l. occidentalis* range across Alberta with the exception of the prairie area in the southeastern portion of the province where they were extirpated in the early 1900s (COSEWIC 2001, p. 13). An estimated 5,000 wolves were present in 1997.

*Saskatchewan—C. l. occidentalis* range across Saskatchewan outside of prairie areas where they were extirpated in the early 1900s (COSEWIC 2001, p. 13). In 1997 an estimated 2,200 to 4,300 wolves inhabited the province, with an average harvest of 238 per year (COSEWIC 2001, p. 21).

*Manitoba—C. l. occidentalis* inhabits western and southern Manitoba and shares an intergradation zone with *C. l. nubilis* in the north-central portion of the province (Chambers *et al.* 2012, Fig. 13). Provincial records and accounts generally do not distinguish between these subspecies, so it is impossible to determine which subspecies is being referred to in government documents. There were an estimated 4,000 to 6,000

wolves of both subspecies in Manitoba in 1997, and average harvest was 366 (COSEWIC 2001, p. 21).

*Summary of Information Pertaining to the Five Factors*

The portion of the range of *C. l. occidentalis* in the contiguous United States is recovered and was recently delisted (76 FR 25590, May 5, 2011; 77 FR 55530, September 10, 2012). Therefore this analysis focuses on assessing threats to wolves in the remaining portion of the subspecies' range.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

*Canis lupus occidentalis* ranges over portions of 13 States and Provinces in the western United States and western Canada. This area represents nearly all of the subspecies' historical range (Chambers *et al.* 2012) with the exception of prairie areas and large inter-mountain valleys in the southern and eastern portion of the range where conflicts with livestock preclude wolf presence. Within this area, wolves maintain robust populations in virtually all areas where wild ungulate populations are high enough to support wolves and where human and livestock presence are low enough to tolerate wolf populations. The areas that wolves occupy correspond to "suitable" wolf habitat as modeled by Oakleaf *et al.* (2006, entire) and Carroll *et al.* (2006 entire). Although these models analyzed only habitat in the contiguous United States, the principles of suitable

wolf habitat in Canada and Alaska are similar; that is, wolves persist where ungulate populations are adequate to support them and conflict with humans and their livestock is low. The areas considered "unsuitable" in these models are not occupied by wolves due to human and livestock presence and the associated lack of tolerance of wolves and livestock depredations. See our April 2, 2009, Northern Rocky Mountains DPS final delisting rule for more information on wolf suitable habitat models (74 FR 15123, pp. 15157-15159). In that document we concluded that the most important habitat attributes for wolf pack persistence are forest cover, public land, high ungulate (elk) density, and low livestock density. The area depicted in Oakleaf *et al.* (2006, Fig. 2) illustrates where suitable wolf habitat occurs in the southern portion of *C. l. occidentalis* distribution. In this area, habitat is generally suitable in the large forested public land complexes in Idaho, Montana, and Wyoming and unsuitable in prairie habitats where forest cover is lacking, human density and use is high, and livestock are present year-round. We conclude that similar areas in adjacent Canada are also unsuitable for wolf colonization and occupation for the same reasons.

Wolves referable to *C. l. occidentalis* currently occupy nearly the entire historical range of the species; the only exceptions are areas that have been modified for human use such as prairies and some valley bottoms. We believe that enough suitable habitat exists in the currently occupied area to continue to support wolves into the future. It is likely that wolf populations will remain viable in these areas and that management activities will continue to focus on wolf population reduction in many areas to maintain populations of wild ungulates and reduce conflicts. We do not anticipate overall habitat changes in the subspecies' range to occur at a magnitude that would pose a threat to the

subspecies because wolf populations are distributed across the current range, populations are stable, and are able to withstand high levels of mortality due to their high reproductive rate and vagility. Much of the subspecies' southern range (*i.e.*, within the contiguous United States) is in public ownership where wolf conservation is a priority and management plans have been adopted to ensure continued wolf persistence (74 FR 15123, p. 15159-15160; 77 FR 55530, pp. 55576-55577). Areas in Canada and Alaska within the subspecies' range include large areas with little human and livestock presence where there are no threats to wolf persistence.

*Other Components of Wolf Habitat*—Another important factor in maintaining wolf populations is the native ungulate population. Primary sources of wild ungulate prey within the range of *Canis lupus occidentalis* include elk, white-tailed deer, mule deer, moose, bison, and caribou. Bighorn sheep, dall sheep, mountain goats, and pronghorn also are common but not important as wolf prey. Each state or province within the range of *C. l. occidentalis* manages its wild ungulate populations to maintain sustainable populations for harvest by hunters. Each state or province monitors big game populations to adjust hunter harvest in response to changes in big game population numbers and trends. Predation is a factor that affects those numbers and trends and is considered when setting harvest quotas. We know of no future condition that would cause a decline in ungulate populations significant enough to affect *C. l. occidentalis* rangewide.

Human population growth and land development will continue in the range of *Canis lupus occidentalis*, including increased development and conversion of private low-density rural land to higher density urban developments, road development and

transportation facilities (pipelines and energy transmission lines), resource extraction (primarily oil and gas, coal, and wind development in certain areas), and more recreationists on public lands. Despite efforts to minimize impacts to wildlife (Brown 2006, pp. 1-3), some of this development will make some areas of the subspecies' range less suitable for wolf occupancy. However, it is unlikely that these potential developments and increased human presence will affect the subspecies in the future for the following reasons: (1) wolves are habitat generalists and one of the most adaptable large predators in the world, and only became extirpated in the southern portion of the subspecies' range because of deliberate human persecution (Fuller *et al.* 2003, p. 163; Boitani 2003, pp. 328-330); (2) land-use restrictions on human development are not necessary to ensure the continued conservation of the subspecies. Even active wolf dens can be quite resilient to nonlethal disturbance by humans (Frame *et al.* 2007, p. 316); (3) vast areas of suitable wolf habitat and the current wolf population are secure in the subspecies' range (national parks, wilderness, roadless areas, lands managed for multiple uses, and areas protected by virtue of remoteness from human populations) and are not available for or suitable to intensive levels of human development.

Development on private land near suitable habitat will continue to expose wolves to more conflicts and higher risk of human-caused mortality. However it is likely that the rate of conflict is well within the wolf population's biological mortality threshold (generally from 17 to 48 percent ([Fuller *et al.* 2003 +/- 8 percent], pp. 184-185; Adams *et al.* 2008 [29 percent], p. 22; Creel and Rotella 2010 [22 percent], p. 5; Sparkman *et al.* 2011 [25 percent], p. 5; Gude *et al.* 2011 [48 percent], pp. 113-116; Vucetich and Carroll In Review [17 percent]), especially given the large amount of secure habitat that will

support a viable wolf population and will provide a reliable and constant source of dispersing wolves (Mech 1989, pp. 387-8). Wolf populations persist in many areas of the world that are far more developed than the range of *Canis lupus occidentalis* currently is or is likely to be in the future (Boitani 2003, pp. 322-323). Habitat connectivity in the range of *C. l. occidentalis* may be reduced below current levels, but wolves have exceptional abilities to disperse through unsuitable habitat (Jimenez *et al.* In review, p. 1) and such impacts would still not have a significant effect on the subspecies.

Given the large number of wolves across the subspecies' range and the species' natural vagility, natural habitat connectivity is ensured over most of the range. However, we have not identified any occupied areas in Canada or the United States where lack of connectivity is affecting *Canis lupus occidentalis* now or is likely to do so in the future.

The large amount of public lands and lands that are naturally inaccessible due to topography and/or remoteness from human settlement that cannot or will not be developed within the range of the subspecies assures that adequate suitable habitat for wolves will exist into the future. Even though some habitat degradation will occur in smaller areas of suitable habitat, the quantity and quality of habitat that will remain will be sufficient to maintain natural connectivity (e.g. Carroll *et al.* 2006 p.32).

Human populations in the southern portion of the subspecies' range are expected to increase (Carroll *et al.* 2006, p. 30). Increasing human populations do not necessarily lead to declining predator populations. Mortality can be limited with adequate management programs (Linnell *et al.* 2001, p. 348), research and monitoring, and outreach and education about living with wildlife. In Canada and the United States,

government lands such as national parks, and Crown Land provide habitat for prey species as well as wolves.

Management plans of appropriate land-management agencies and governments manage public lands to limit resource impacts from human use of those lands, and these plans are more than adequate to support a viable wolf population across the range of *Canis lupus occidentalis*. In Canada and Alaska, large expanses of remote and inaccessible habitat accomplish the same thing. Habitat suitability for wolves will change over time with human development, activities, and attitudes, but not to the extent that it is likely to affect the subspecies rangewide.

Summary of Factor A

We do not foresee that impacts to suitable and potentially suitable habitat will occur at levels that will significantly affect wolf numbers or distribution or affect population growth and long-term viability of *C. l. occidentalis*. See the NRM DPS delisting rule (74 FR 15123, April 2, 2009) for a full discussion of this factor for the contiguous United States. In Canada and Alaska, even higher levels of certainty of habitat availability and security are provided by large areas of relatively inaccessible land, in addition to lands with protections provided by government regulations. These large areas of suitable wolf habitat will remain suitable into the future.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Wolves within the NRM DPS were delisted based in part on the existence of well-managed program for legal take for commercial, recreational, scientific, or educational purposes for that population. For a full discussion of the regulatory mechanisms in place for the NRM DPS, see the final delisting rules (74 FR 15123, April 2, 2009 and 77 FR 55530, September 10, 2012). In Canada and Alaska overutilization for commercial, recreational, scientific, or educational purposes has not had a significant effect on *C. l. occidentalis*. Mortality rates caused by commercial, recreational, scientific, or educational purposes are not anticipated to exceed sustainable levels in the future. These activities have not affected the viability of the wolves in the past, and we have no reason to believe that they would do so in the future. In Canada and Alaska wolves are managed for harvest by recreational hunters and trappers.

*Scientific Research and Monitoring*— Each of the states and provinces in the range of *C. l. occidentalis* conduct scientific research and monitoring of wolf populations. Activities range from surveys of hunter observations of wolf locations and numbers to aerial counting surveys to darting wolves from airplanes and fixing them with radio collars for intensive monitoring. Even the most intensive and disruptive of these activities (anesthetizing for radio telemetry) involves a very low rate of mortality for wolves (73 FR 10542, February 27, 2008). We expect that capture-caused mortality by governments, Tribes, and universities conducting wolf monitoring, nonlethal control, and research will remain below three percent of the wolves captured, and will be an insignificant source of mortality to *C. l. occidentalis*.

*Education*—We are unaware of any wolves that have been removed from the wild solely for educational purposes in recent years. Wolves that are used for such purposes are typically privately held captive-reared offspring of wolves that were already in captivity for other reasons. However, states may receive requests to place wolves that would otherwise be euthanized in captivity for research or educational purposes. Such requests have been, and will continue to be, rare; would be closely regulated by the state and provincial wildlife management agencies through the requirement for state permits for protected species; and would not substantially increase human-caused wolf mortality rates.

*Commercial and Recreational Uses*—Across the subspecies' range any legal take is regulated by provincial or state law to maintain sustainable wolf populations while also protecting big game numbers and providing for recreational hunting and trapping (See factor D). Because wolves are highly territorial, wolf populations in saturated habitat naturally limit further population increases through wolf-to-wolf conflict or dispersal to unoccupied habitat. As stated previously, wolf populations can maintain themselves despite high human-caused mortality rates (Mech 2001, p.74; Fuller *et al.* 2003, pp 184-185; Adams *et al.* 2008, p. 22; Creel and Rotella 2010, p. 5; Sparkman *et al.* 2011, p. 5; Gude *et al.* 2011, pp. 113-116; Vucetich and Carroll In Review). Wolf pups can be successfully raised by other pack members and breeding individuals can be quickly replaced by other wolves (Brainerd *et al.* 2008, p. 1). Collectively, these factors mean that wolf populations are quite resilient to human-caused mortality if it is regulated. States and provinces within the range of *C. l. occidentalis* regulate human-caused mortality to manipulate wolf distribution and overall population size to help reduce

conflicts with livestock and, in some cases, human hunting of big game, just as they do for other resident species of wildlife. States, provinces, and some tribes allow regulated public harvest of surplus wolves for commercial and recreational purposes by regulated private and guided hunting and trapping. Such take and any commercial use of wolf pelts or other parts is regulated by state or provincial law (see discussion of state/provincial laws and regulations under factor D). The regulated take of those wolves is not a threat to the subspecies because the states and provinces allow such take only for wolves that are surplus to maintaining a sustainable population. We do not expect this to change in the future.

Alaska's wolves are managed as a furbearer (Alaska Department of Fish and Game 2011, entire), and also as a predator species that may be subject to control measures to increase big game numbers (Titus 2007, entire; ADF&G 2007, entire). The state of Alaska monitors wolf populations using a variety of methods including aerial surveys in winter and reports by trappers (Alaska Department of Fish and Game (ADFG) 2007, p. 10). Alaska's wolf management is guided by the principal of sustainable yield, such that annual harvest should not exceed the annual regeneration of a resource unless management goals encompass reducing a population to a lower, but still sustainable, level (ADFG, 2007, p. 6). In designated Intensive Predator Control Areas high numbers of ungulates species are maintained by law for human consumption. In these areas, if ADFG determines that wild ungulate (generally moose and caribou) populations are being depressed below pre-determined population objectives, ADFG must consider and evaluate intensive management actions (which may include wolf population reduction) as a means of attaining the objectives (ADFG 2007, p. 6). This control program has been

thoroughly scientifically vetted; see Orians *et al.* 1997, (entire) for further information on the scientific basis of Alaska's predator control program.

The Yukon has a wolf management policy and has implemented wolf control to increase ungulate populations (COSEWIC 2001, p. 22; Government of Yukon 2012, entire). The total take of wolves due to hunting, trapping, and control efforts has not exceeded three percent of the population per year since 1993 when control efforts began (COSEWIC 2001, p. 22).

Northwest Territories manages wolves as a harvestable species both through hunting and trapping with specific seasons for harvest for both aboriginal and non-aboriginal hunters (COSEWIC 2001, p. 23; Government of Northwest Territories 2011, pp. 7-12). There is no bag limit for aboriginal hunters but non-aboriginal hunters are limited to one wolf per season. Harvest numbers are known only for wolf pelts sold on the open market as pelts used domestically are not counted by the Provincial government (COSEWIC 2001, p. 23). In the past 10 years, fur auction sales have ranged from 711-1,469 pelts annually from these 2 territories (COSEWIC 2001, p. 25). Although the amount to which domestic use adds to the total harvest is not known, it is not thought to be significant (COSEWIC 2001, p. 25).

In British Columbia wolves are legally classified as a furbearer and as big game and may be taken during fall and winter (COSEWIC 2001, p. 22; British Columbia Ministry of Environment 2011, entire). Official records from 1992 to 1997 indicate that from 287 to 588 wolves were harvested during these years. Again, it is likely that most of these animals were *C. l. occidentalis* due to their wide range in the province.

Wolves are managed as “furbearing carnivores” in Alberta and can be harvested during open seasons with proper license on Crown (government) Land and any time without a license on private property (COSEWIC 2001, p. 21; Government of Alberta 2011a, entire; 2011b, entire). Wolves are also lethally removed in response to livestock depredation (COSEWIC 2001, p. 21). Wolves are classified as a furbearer in Saskatchewan and can be taken only by licensed trappers during trapping season (COSEWIC 2001, p. 21; Government of Saskatchewan 2011, entire). In Manitoba, wolves are managed as a big game species and can be taken by hunters and trappers in season or on agricultural lands at any time (COSEWIC 2001, p. 21; Government of Manitoba 2011a, entire; 2011b, entire).

In summary, the states and provinces have regulatory and enforcement systems in place to limit human-caused mortality of wolves in all areas of the subspecies’ distribution where regulated take is important to maintaining wolf populations into the future. Canadian Provinces and Alaska maintain wolf populations to be sustainably harvested by hunters and trappers. The states and provinces have humane and professional animal handling protocols and trained personnel that will continue to ensure that population monitoring and research result in few unintentional mortalities. Furthermore, the states’ and provinces’ permitting processes for captive wildlife and animal care will continue to ensure that few, if any, wolves will be removed from the wild solely for educational purposes. We conclude that any potential wolf take resulting from commercial, scientific, or educational purposes in the range of the subspecies is and will continue to be regulated so that these factors are not affecting the viability of *C. l. occidentalis* now and are not likely to do so in the future.

Factor C. Disease or Predation

Wolves within the NRM DPS were delisted based in part on our conclusion that impacts from disease and predation do not pose a significant threat to that population. For a full discussion of this factor in the NRM DPS, see the final delisting rules (74 FR 15162-15166, April 2, 2009; 77 FR 55582-55588, September 10, 2012). The array of diseases, parasites, and predators affecting *Canis lupus occidentalis* is similar to that affecting other wolf subspecies. For a full discussion of the effects of disease, parasites, and predators on wolves see factor C in the *Canis lupus nubilis* section above, the information there applies to *C. l. occidentalis* as well. No diseases or parasites, even in combination, are of such magnitude that they are significantly affecting *C. l. occidentalis*. Similarly, predation, including human predation, is not significantly affecting the subspecies. The rates of mortality caused by disease, parasites, and predation are well within acceptable limits, and we do not expect those rates to change appreciably in the future.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The Act requires us to examine the adequacy of existing regulatory mechanisms with respect to those existing and foreseeable threats, discussed under the other factors that may affect *C. l. occidentalis*. Wolves within the NRM DPS were delisted based in part on our conclusion that there would be adequate regulatory mechanisms in place for

that population following delisting. For a full discussion of the regulatory mechanisms in place for gray wolves in the NRM DPS, see the final delisting rules (74 FR 15123, April 2, 2009; and 77 FR 55530, September 10, 2012). Within the range of *C. l. occidentalis* in Canada and Alaska, wolf populations are managed as big game and as a furbearer and with hunting and trapping the principal management tool used to keep populations within the limits of human tolerance. Each state and province within the range has committed to maintain sustainable populations while allowing for harvest and minimizing conflict with livestock. Maintaining wild ungulate populations in numbers that allow for liberal human harvest for local consumption is also a priority in many areas.

Although wolves are not dependent on specific habitat features other than an adequate food supply and human tolerance, there are state, provincial, and Federal land-management regimes in place that provide protection for wolves and wolf habitat throughout the range of *C. l. occidentalis* in Alaska and Canada. In Alaska, lands managed by the National Park Service and the Service are not subject to predator control by the state of Alaska (Boertje *et al.* 2010, p. 923). In addition, National Parks do not allow hunting. In Canada, National Parks in the southern portion of the range of *C. l. occidentalis* do not allow hunting, while National Parks in the northern portion of the range allow hunting by Native Peoples (COSEWIC 2001, p. 26). These land-management regimes provide refugia for wolf populations from hunting, trapping, and control activities, and in turn these protected populations may serve as a source of dispersing wolves for low-density populations.

We have long recognized that control of wolf numbers and especially depredating wolves is central to maintaining public support for wolf conservation. Much of the

impact of livestock production on *C. l. occidentalis* in Alaska and Canada occurred during the period between settlement and the mid-twentieth century when wolves were extirpated from the prairie regions and larger intermountain valleys of southern Canada due to depredations on livestock. Wolves have not re-populated these regions due to continued lack of human tolerance to their presence. Outside of these relatively high human density areas, wolf populations have remained resilient since the cessation of widespread predator poisoning campaigns in the 1950s. We have no information to suggest that the current regulatory regime in Alaska or Canada is not adequate to provide for the conservation of *C. l. occidentalis*, and so we conclude that the jurisdictions in these areas have been successful in their search for an appropriate balance between wolf conservation, human tolerance, and providing for human uses. Therefore, both in Canada and the United States the existing regulatory mechanisms are currently adequate to provide for the long-term conservation of *C. l. occidentalis.* This will remain the case after the current *C. lupus* listed entity is delisted as only a few *C. l. occidentalis* are known to reside outside of the already delisted area in the northern Rocky Mountains.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Wolves in the NRM DPS were delisted based in part on our conclusion that other natural or manmade factors are unlikely to pose a threat to the wolves in the NRM DPS in the future. For a full discussion of this factor for the NRM DPS, see the final delisting rules (74 FR 15123, April 2, 2009 and 77 FR 55530, September 10, 2012).

*Public Attitudes Toward the Gray Wolf* – In much of Alaska and Western Canada, in contrast to the contiguous United States, wolves are not dependent on human tolerance for their conservation. Even during the height of wolf control efforts that included broadcast indiscriminate poisoning and trapping campaigns by the public and government agencies, wolves were able to maintain viable populations in much of Canada and Alaska simply by virtue of remote and rugged terrain and low human population densities. However, in much of coastal Alaska and southern Canada today, public attitudes toward wolves are important conservation issues. In these areas with higher human densities and the presence of livestock, the primary determinant of the long-term conservation of gray wolves will be human attitudes toward this large predator. These attitudes are largely based on the real and perceived conflicts between human activities and values and wolves, such as depredation on livestock and pets, competition for surplus wild ungulates between hunters and wolves, concerns for human safety, wolves' symbolic representation of wildness and ecosystem health, killing of wolves by people, and the wolf-related traditions of Native American Tribes or local culture. It is important to find a balance in wolf management that will sustain wolf populations but also address other human concerns in a way that maintains tolerance of wolves among the human populations that live with them. Addressing these concerns will often involve lethal take of wolves or other removal methods. These activities, when employed in an overall management framework, are essential wolf conservation activities as they provide the public with assurances that human interests and needs will be considered appropriately during wolf management decisions. At this time, it appears that this balance has been achieved across the range of *C. l. occidentalis* through the many management actions employed in the

many jurisdictions involved and that public attitudes do not constitute a threat to the subspecies.

*Predator control*—Wolf numbers have been the subject of control efforts to reduce conflicts with livestock and to increase ungulate numbers in Alaska and Canada since the turn of the twentieth century (Boertje *et al.* 2010, p. 917). Since the 1970s, wolf control has been focused on increasing populations of wild ungulates, mostly moose but also caribou both for human consumption and in some cases to conserve caribou herds that were at risk (Russell 2010, pp. 6-12). Wolf control has included both lethal and nonlethal methods using public hunting and trapping seasons, aerial gunning by government agents, and experimentation with predator exclosures, sterilization, and supplemental feeding (Russell 2010, pp. 6-12). The state of Alaska has been the most active in wolf control since the 1970s, maintaining predator control areas where wolf numbers are reduced to increase moose populations for human harvest (see Titus 2007, entire for a review of Alaska's Intensive Predator Management program). Other jurisdictions have employed wolf control to address specific perceived problems or experimentally to determine if wolf control is an effective ungulate management tool (Russell 2010, pp. 6-12).

Predator control programs as they currently exist are not a threat and are not expected to become a threat to *C. l. occidentalis* for several reasons: (1) the types of control measures that have resulted in effective extirpation of wolf populations from large areas are no longer permitted or prescribed by the states and provinces that pursue wolf control. Historically, wolves were persecuted by people seeking to eliminate wolves from the landscape using any means necessary. These means included government

agencies systematically poisoning and trapping with the expressed goal of extirpation of wolves if at all possible. Wolf control programs and associated research in Alaska and Canada today have as their goal, the maintenance of sustainable (though low density) wolf populations. They do not employ indiscriminate broadcast poisoning, and trapping or shooting of wolves is limited by estimates of population numbers with the goal of reducing but not eliminating wolf populations. (2) Wolf control is very expensive and so is not likely to be applied broadly enough and consistently enough to reduce the range-wide population of *C. l. occidentalis* substantially. For example, in Alaska where wolf control is most active, control areas are located near human populations and cover approximately nine percent of the state. This relatively small area of coverage by control activities leaves most of the state as "refuge" for wolf populations where regulated hunting and trapping occurs, but special control efforts are not prescribed. Typically, wolf control areas are re-populated within 4 years of cessation of control efforts indicating that population control is temporary and reliant on constant application of control efforts (Boertje *et al.* 2010, p. 920). (3) Wolf control must be applied over a large area to be effective (National Research Council 1997, p. 10). This fact, combined with number 2 above, ensures that wolf control is not likely to be applied unless wolf populations are high enough for the perceived benefits to outweigh the costs. This situation is not likely to exist over a large portion of the subspecies' range simultaneously. (4) Wolves are extremely resilient with high population growth potential and high rates of movement. After control operations, wolf populations recover to pre-control levels within a few years. (5) Wolf control will only be applied where wolf populations are high. This means that wolf control may act as a density-dependent

population control mechanism. When wolf populations are high, ungulate populations become depressed leading to pressures for management authorities to employ predator control actions to address the situation. As predator populations are reduced and ungulate populations rebound, pressure to continue the control actions is reduced leading to reduction or cessation of the program to reduce expenditures. This dynamic likely supplies some added protection and makes it even less likely that wolf control will become a threat to the subspecies.

*Climate Change*—Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Throughout their circumpolar distribution, gray wolves persist in a variety of ecosystems with temperatures ranging from -70F to 120F (-57C to 49C) with wide ranging prey type and availability (Mech and Boitani 2003, p. xv). *C. l. occidentalis* are historically and currently known to have inhabited a range of ecotypes subsisting on large ungulate prey as well as small mammals. Due to this plasticity, we do not consider *C. l. occidentalis* to be highly vulnerable to climate change. Similarly, elk and bison, the primary prey in many areas, are known to be habitat generalists due to their association with wide variation in environmental conditions (Kuck 1999, p.1). We recognize that climate change may have detectable impacts on the ecosystems that affect *C. l. occidentalis*. For example, temperature and precipitation changes could lead to changes in tree cover over large areas in boreal Canada and Alaska. These changes could result in increased forage and lower rates of winter die-off for ungulates, and possible beneficial effects to wolves. There is no indication that these potential impacts of climate change are affecting *C. l. occidentalis* at the current time or in the future. For a full discussion of potential impacts of climate change on wolves, please see our recent final delisting rule for the gray wolf in Wyoming (77 FR 55597-55598, September 10, 2012).

*Summary of Factor E*

Natural or manmade factors are not a threat to *C. l. occidentalis* nor are they likely to become a threat in the future. Positive public attitudes continue to be fostered through management of conflicts and hunting/trapping opportunities and their associated economic benefits. Genetic viability is good with no prospects for widespread loss of

genetic diversity. Wolf control to increase ungulate numbers is pursued in local areas but is not likely to have a significant effect on wolves. In addition control actions are not aimed at extirpation of wolf populations, but instead seek to reduce overall density of wolves while maintaining viable populations.

*Cumulative Effects*

A species may be affected by more than one factor in combination. Within the preceding review of the five listing factors, we discussed potential factors that may have interrelated impacts on *Canis lupus occidentalis*. Our analysis did not find any significant affects to *C. l. occidentalis.* However, we recognize that multiple sources of mortality acting in combination have greater potential to affect wolves than each source alone. Thus, we consider how the combination of factors may affect *C. l. occidentalis.* *Canis lupus occidentalis* occurs as well-connected, resilient populations across most of its historical geographic range and has expanded into some areas of historical *C. l. nubilis* range in recent years. Given the current size of the *C. l. occidentalis* population in Canada and Alaska and the lack of identified affects, we do not find any combination of factors to be a significant threat.

*Conclusion*

As required by the Act, we considered the five factors in assessing whether the subspecies *C. l. occidentalis* is threatened or endangered throughout all of its range. We examined the best scientific and commercial information available regarding the past,

present, and future threats faced by the subspecies. We reviewed the information available in our files, other available published and unpublished information, and we consulted with recognized experts and other Federal, state, and tribal agencies. We also reviewed the report from COSEWIC (1999, entire) for status and threats to Canadian wolf populations (See Canada in the Status section above). During this process we did not identify any affects to the subspecies that would rise to the level of threatening or endangering this subspecies. See the Significant Portion of the Range Analysis section below for our evaluation as to whether this subspecies may or may not be in danger of extinction in a significant portion of its range

*Does the North American subspecies* C. l. baileyi *warrant the protections of the Act?*

Subspecies Description

*C. l. baileyi* is the smallest extant gray wolf in North America. Adults weigh 23 to 41 kg (50 to 90 lbs) with a length of 1.5 to 1.8 m (5 to 6 ft) and height at shoulder of 63-81 cm (25-32 in) (Brown 1988, p. 119). *C. l. baileyi* are typically a patchy black, brown to cinnamon, and cream color, with primarily light underparts (Brown 1988, p. 118). Solid black or white coloration, as seen in other North American gray wolves, does not exist in *C. l. baileyi*. Basic life history for *C. l. baileyi* is similar to that of other gray wolves (Mech 1970, entire; USFWS 1982, p. 11; USFWS 2010, p. 32-41).

Historical Distribution and Causes of Decline

Prior to the late 1800s, *C. l. baileyi* inhabited the southwestern United States and Mexico. In Mexico, *C. l. baileyi* ranged from the northern border of the country southward through the Sierra Madre Oriental and Occidental and the altiplano (high plains) to the Neovolcanic Axis (a volcanic belt that runs east-west across central-southern Mexico) (SEMARNAP 2000, p. 8), although wolf distribution may not have been continuous through this entire region (McBride 1980, pp. 2-7). *C. l. baileyi* is the only subspecies known to have inhabited Mexico. In the United States, *C. l. baileyi*(and, in some areas, *C. l. nubilis* and the previously recognized subspecies *C. l. monstrabilis*, *C. l. mogollonensis,* and *C. l. youngi*), inhabited montane forests and woodlands in portions of New Mexico, Arizona, and Texas (Young and Goldman 1944, p. 471; Brown 1983, pp.22-23) (see Taxonomy). In southern Arizona, *C. l. baileyi* inhabited the Santa Rita, Tumacacori, Atascosa-Pajarito, Patagonia, Chiricahua, Huachuca, Pinaleno, and Catalina mountains, west to the Baboquivaris and east into New Mexico (Brown 1983, pp. 22-23). In central and northern Arizona, *C. l. baileyi* and other subspecies of gray wolf were interspersed (Brown 1983, pp. 23-24). *C. l. baileyi* and other subspecies were present throughout New Mexico, with the exception of low desert areas, documented as numerous or persisting in areas including the Mogollon, Elk, Tularosa, Diablo and Pinos Altos Mountains, the Black Range, Datil, Gallinas, San Mateo, Mount Taylor, Animas, and Sacramento Mountains (Brown 1983, pp. 24-25). Gray wolf (other subspecies) continued eastward into the Trans-Pecos region of Texas and northward up the Rocky Mountains and to the Grand Canyon (Young and Goldman 1944, pp. 23, 50, 404-405).

Population estimates of gray wolves, and specifically *C. l. baileyi*, prior to the late 1800s are not available for the southwestern United States or Mexico. Some trapping records and rough population estimates are available from the early 1900s, but do not provide a rigorous estimate of population size of *C. l. baileyi* in the United States or Mexico. For New Mexico, a state-wide carrying capacity (potential habitat) of about 1,500 gray wolves was hypothesized by Bednarz, with an estimate of 480 to 1030 wolves present in 1915 (ibid, pp. 6, 12). Brown summarized historical distribution records for the wolf from McBride (1980, p. 2) and other sources, showing most records in the southwestern United States as being from the Blue Range and the Animas region of New Mexico (Brown 1983, p. 10). In Mexico, Young and Goldman (1944, p. 28 ) stated that from 1916 to 1918 *C. l. baileyi* was fairly numerous in Sonora, Chihuahua, and Coahuila, although McBride comments that *C. l. baileyi* apparently did not inhabit the eastern and northern portions of Coahuila, even in areas with seemingly good habitat (1980, p. 2). The 1982 Mexican Wolf Recovery Plan cautioned, "…It is important…not to accept unquestioningly the accounts of the 1800s and early 1900s that speak of huge numbers of wolves ravaging herds of livestock and game…The total recorded take indicates a much sparser number of wolves in the treated areas than the complaints of damage state or signify, even when one remembers that these figures do not reflect the additional numbers of wolves taken by ranchers, bounty-seekers and other private individuals (USFWS 1982, p. 4)."

*C. l. baileyi* populations declined rapidly in the early and mid-1900s, due to government and private efforts across the United States to kill wolves and other predators responsible for livestock depredation. By 1925, poisoning, hunting, and trapping efforts

drastically reduced *C. l. baileyi* populations in all but a few remote areas of the southwestern United States, and control efforts shifted to wolves in the borderlands between the United States and Mexico (Brown 1983, p. 71). Bednarz (1988, p. 12) estimated that breeding populations of *C. l. baileyi* were extirpated from the United States by 1942. The use of increasingly effective poisons and trapping techniques during the 1950s and 1960s eliminated remaining wolves north of the United States – Mexico border, although occasional reports of wolves crossing into the United States from Mexico persisted into the 1960s. Wolf distribution in northern Mexico contracted to encompass the Sierra Madre Occidental in Chihuahua, Sonora, and Durango, as well as a disjunct population in western Coahuila (from the Sierra del Carmen westward). Leopold (1959, p. 402) found conflicting reports on the status of the Coahuila population and stated that wolves were likely less abundant there than in the Sierra Madre Occidental.

When *C. l. baileyi* was listed as endangered under the Act in 1976, no wild populations remained in the United States or Mexico, although small pockets of several wolves may have persisted in Mexico. McBride (1980, pp. 2-8) surveyed the distribution of the last wild populations of *C. l. baileyi*. He mapped 3 general areas where wolves were recorded as still present in the Sierra Madre Occidental: 1) northern Chihuahua and Sonora border (at least 8 wolves); 2) western Durango (at least 20 wolves in 2 areas); and 3) a small area in southern Zacatecas. Although occasional anecdotal reports have been made during the last three decades that a few wild wolves still inhabit forested areas in Mexico, no publically available documented verification exists. Several *C. l. baileyi* captured in the wild in Mexico from 1977 to 1980 became the basis for the captive

breeding program that has enabled the reintroduction of *C. l. baileyi* to the wild (see below, Current Distribution – In Captivity).

*C. l. baileyi* - Current Distribution – United States

Today, a single wild population of a minimum of 75 *C. l. baileyi* (December 31, 2012 population count) inhabits the United States in central Arizona and New Mexico. We began reintroducing captive-born *C. l. baileyi* to the wild in 1998 as a nonessential experimental population under section 10(j) of the Act in the Blue Range Wolf Recovery Area (BRWRA) within the Mexican Wolf Experimental Population Area (MWEPA). The BRWRA consists of the entire Gila and Apache National Forests in east-central Arizona and west-central New Mexico (6,845 $mi^2$ or 17,775 $km^2$). The MWEPA is a larger area surrounding the BRWRA that extends from Interstate Highway 10 to Interstate Highway 40 across Arizona and New Mexico and a small portion of Texas north of US Highway 62/180 (63 FR 1752; January 12, 1998).

*C. l. baileyi* associated with the BRWRA also occupy the Fort Apache Indian Reservation of the White Mountain Apache Tribe, adjacent to the western boundary of the BRWRA. Since 2000, an agreement between the Service and the White Mountain Apache Tribe permits the release, dispersal, and establishment of *C. l. baileyi* onto the reservation, providing an additional 6,475 $km^2$ (2,500 $mi^2$) of high quality forested wolf habitat for the reintroduction (USFWS 2001, p. 4). Information about the number and location of wolves on the reservation is not publically available by request of the White Mountain Apache Tribe.

Since 1998, we have been striving to establish a population of at least 100 wild wolves in the BRWRA. This population target was first recommended in the 1982 Mexican Wolf Recovery Plan as an interim goal upon which to base future recovery goals and expectations and was subsequently brought forward in our 1998 Final Rule, "Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico". We continue to acknowledge that this population target is appropriate as an interim objective (USFWS 1982, p. 28, USFWS 1996, p. 1-1) but insufficient for recovery and delisting of *C. l. baileyi*, as the subspecies would still be in danger of extinction with a single population of this size (USFWS 2010, pp. 78-79).

Detailed information on the status of the nonessential experimental population and the reintroduction project can be found in the 2001 to 2011 annual reports and the 2010 Mexican Wolf Conservation Assessment (USFWS 2010) available at www.fws.gov/southwest.es/mexicanwolf.

*C. l. baileyi* - Current Distribution - Mexico

Mexico initiated the re-establishment of *C. l. baileyi* to the wild (see Historical Distribution) with the release of five captive-bred *C. l. baileyi* into the San Luis Mountains just south of the US-Mexico border in October, 2011. As of February 2012, four of the five released animals were confirmed dead due to ingestion of illegal poison. The status of the fifth wolf is unknown. A sixth wolf was released in March, 2012; its fate is unknown as only its collar was found in April 2012 (USFWS, our files). In October 2012, a pair of wolves was released and is alive as of January 2, 2013. Mexico

plans to release additional wolves in this area, and possibly several other locations in Mexico in 2013; however, a schedule of releases is not publicly available at this time. We expect the number of wolves in Mexico to fluctuate from zero to several wolves or packs of wolves during 2013 in or around Sonora, Durango, and Chihuahua.

*C. l. baileyi* - Current Distribution – In Captivity

Due to the extirpation of *C. l. baileyi* in the United States and Mexico, the first step for the recovery of the subspecies was the development of a captive breeding population to ensure the subspecies did not go extinct. A binational captive breeding program between the United States and Mexico, referred to as the Mexican Wolf Species Survival Plan (SSP), was initiated in 1977 to 1980 with the capture of the last three remaining *C. l. baileyi* in the wild in Mexico and subsequent addition of four wolves from captivity in Mexico and the United States. The individual wolves used to establish the captive breeding program are considered the "founders" of the breeding population. There are seven founder wolves that represent three founding lineages (family groups): McBride (also known as the Certified lineage; 3 individuals), Ghost Ranch (2 individuals), and Aragon (2 individuals). Through the breeding of seven founding wolves from these three lineages and generations of their offspring, the population has expanded through the years to its current size.

Close to 300 *C. l. baileyi* are now housed in captivity as part of the SSP captive management program (258 wolves in 52 facilities, 34 facilities in the United States and 18 facilities in Mexico as of October 12, 2012) (Siminski and Spevak 2012, p. 2). The

SSP is a binational captive breeding program between the United States and Mexico whose primary purpose is to raise wolves for the Service and the General del Vida Silvestre (in Mexico) for reintroduction into the wild. This program is an essential component of *C. l. baileyi* recovery. Specifically, the purpose of the SSP is to re-establish *C. l. baileyi* in the wild through captive breeding, public education, and research. This captive population is the sole source of *C. l. baileyi* available to re-establish the species in the wild and is imperative to the success of the *C. l. baileyi* reintroduction project and any additional efforts to reestablish the subspecies that may be pursued in the future in Mexico or the United States.

*C. l. baileyi* are routinely transferred among the zoos and other SSP holding facilities to facilitate genetic exchange (through breeding), thus maintaining the health and genetic diversity of the captive population. The SSP maintains the goal of housing a minimum of 240 wolves in captivity at all times to ensure the security of the species in captivity, while still being able to produce surplus animals for reintroduction.

In the United States, *C. l. baileyi* from captive SSP facilities that are identified for potential release are first sent to one of three pre-release facilities to be evaluated for release suitability and to undergo an acclimation process. All wolves selected for release in the United States and Mexico are genetically redundant to the captive population, meaning their genes are already well represented. This minimizes any adverse effects on the genetic integrity of the remaining captive population in the event wolves released to the wild do not survive.

Habitat Description

Historically, *C. l. baileyi* was associated with montane woodlands characterized by sparsely- to densely-forested mountainous terrain consisting of evergreen oaks (*Quercus* spp.) or pinyon (*Pinus edulus*) and juniper (*Juniperus* spp.) to higher elevation pine (*Pinus* spp.), mixed conifer forests, and adjacent grasslands at elevations of 4000 to 5000 ft (1219 to 1524 m) where ungulate prey were numerous. Factors making these vegetation communities attractive to *C. l. baileyi* likely included the abundance of ungulate prey, availability of water, and the presence of hiding cover and suitable den sites. Early investigators reported that *C. l. baileyi* probably avoided desert scrub and semi-desert grasslands that provided little cover, food, or water (Brown 1988, pp. 19-22).

Prior to their extirpation in the wild, *C. l. baileyi* were believed to have preyed upon white-tailed deer (*Odocoileus virginianus*), mule deer (*O. hemionus*), elk (*Cervus elaphus*), collared peccaries (javelina) (*Tayassu tajacu*), pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), jackrabbits (*Lepus spp.*), cottontails (*Sylvilagus spp.*), and small rodents (Parsons and Nicholopoulos 1995, pp. 141-142); white-tailed deer and mule deer were believed to be the primary sources of prey (Brown 1988, p. 132; Bednarz 1988, p. 29).

Today, the BRWRA (and adjacent Fort Apache Indian Reservation) provides high quality forested habitat for *C. l. baileyi*, including petran montane and great basin conifer forests and Madrean evergreen woodlands that are inhabited by elk, mule deer, and white-tailed deer (USFWS 1996, p. 3-5; AMOC and IFT 2005, p. TC-3). *C. l. baileyi* in the BRWRA show a strong preference for elk compared to other ungulates (AMOC and IFT 2005, p. TC-14, Reed *et al.* 2006, pp. 56, 61; Merkle *et al.* 2009, p. 482). Other

documented sources of prey include deer (*O. virginianus* and *O. hemionus*) and occasionally small mammals and birds (Reed *et al.* 2006, p. 55). *C. l. baileyi* are also known to prey and scavenge on livestock (Reed *et al.* 2006, p. 1129).

*Summary of Information Pertaining to the Five Factors*

Several threats analyses have been conducted for *C. l. baileyi*. In the initial proposal to list *C. l. baileyi* as endangered in 1975 and in the subsequent listing of the entire gray wolf species in 1978, the Service found that threats from habitat loss (factor A), sport hunting (factor B), and inadequate regulatory protection from human persecution (factor D) were responsible for *C. l. baileyi's* decline and near extinction (40 FR 17590, April 21, 1975; 43 FR 9607, March 9, 1978). In the 2003 reclassification of the gray wolf into three distinct population segments, threats identified for the gray wolf in the Southwestern Distinct Population Segment (which included Mexico, Arizona, New Mexico, and portions of Utah, Colorado, Oklahoma, and Texas) included illegal killing and (negative) public attitudes (68 FR 15804, April 1, 2003). The 2010 Mexican Wolf Conservation Assessment (Conservation Assessment) contains the most recent five-factor analysis for *C. l. baileyi* (USFWS 2010, p. 60). The purpose of the Conservation Assessment, which was a non-regulatory document, was to evaluate the status of the *C. l. baileyi* BRWRA reintroduction project within the broader context of the subspecies' recovery. The Conservation Assessment found that the combined threats of illegal shooting, small population size, inbreeding, and inadequate regulatory protection were

hindering the ability of the current population to reach the population objective of at least 100 wolves in the BRWRA (USFWS 2010, p. 60).

The threats we address in this five-factor analysis and our conclusions about a given factor may differ from previous listing actions due to new information, or, in the case of the Conservation Assessment, the difference in perspective necessitated by the listing process compared to that of the Conservation Assessment, which was focused on recovery. For example, in this five-factor analysis we analyze currently occupied habitat, whereas the Conservation Assessment included discussion of unoccupied habitat that may be important in the future for recovery. In this five-factor analysis, we are assessing which factors pose a threat to the existing population of wolves in the BRWRA or would pose a threat to these wolves if the protections of the Act were not in place.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

As previously discussed, wolves are considered habitat generalists with fairly broad ecological capabilities and flexibility in using different prey and vegetation communities (Peterson and Ciucci 2003, p.104-111). Gray wolves hunt in packs, primarily pursuing medium to large hooved mammals. Wolf density is positively correlated to the amount of ungulate biomass available and the vulnerability of ungulates to predation (Fuller *et al.* 2003, p. 170-175). These characterizations apply to *C. l. baileyi* and form our basis for defining suitable habitat.

We define suitable habitat for *C. l. baileyi* as forested, montane terrain containing adequate wild ungulate populations (elk, white-tailed deer, and mule deer) to support a wolf population. Suitable habitat has minimal roads and human development, as human access to areas inhabited by wolves can result in wolf mortality. Specifically, roads can serve as a potential source of wolf mortality due to vehicular collision and because they provide humans with access to areas inhabited by wolves, which can facilitate illegal killing of wolves. Although the road itself could be considered a form of habitat modification, the primary threat to wolves related to roads stems from the activities enabled by the presence of roads (i.e., vehicular collision and illegal killing) rather than a direct effect of the road on the wolf such as a boundary to dispersal. We address illegal killing under factor C. Disease or Predation, and vehicular collision under factor E. Other.

For *C. l. baileyi* , we define habitat destruction, modification, or curtailment as a decrease or modification in the extent or quality of forested, montane terrain in currently occupied habitat, or a decrease in ungulate populations in currently occupied habitat, such that wolves would not persist in that area. In order to assess whether habitat destruction, modification, or curtailment is a threat to *C. l. baileyi*, we consider information related to land status (as a characteristic of quality related to minimal human development), ungulate population density, and the effects of catastrophic wildfire on wolves and ungulates. Our definitions of suitable habitat and of habitat destruction, modification, and curtailment are the same for the United States and Mexico. Climate change, which has sometimes been addressed under factor A by the Service in other listing rules, is addressed under factor E. Other.

*United States— C. l. baileyi* currently occupied range includes the BRWRA and the adjacent Fort Apache Indian Reservation. The 17,775 km² (6,845 mi²) BRWRA has consistently been identified as one of the highest quality sites for *C. l. baileyi* establishment in the Southwest based on its size, public land status, prey abundance, low road density, and additional characteristics such as topography, water availability, and historic inhabitance by wolves (Johnson *et al.* 1992, pp. 28-42, 47-48; USFWS 1996, pp. 2-2 – 2-4; Carroll *et al.* 2005, pp. 1, 30, 31; Carroll *et al.* 2006, p. 33). The Fort Apache Indian Reservation provides an additional 6,475 km² (2,500 mi²) of high quality forested wolf habitat for the reintroduction (USFWS 2001, p. 4) (see Current Distribution – United States). Although wolves occasionally occupy areas outside of the BRWRA or Fort Apache Indian Reservation within the MWEPA, the Service does not currently allow *C. l. baileyi* to establish territories on public lands wholly outside of the BRWRA boundaries (63 FR 1754; January 12, 1998). In compliance with existing regulations pursuant to our nonessential experimental population designation, wolves that establish territories wholly outside the BRWRA but inside the MWEPA are captured and returned to a recovery area or to captivity. The Service does not routinely capture and return wolves that make occasional forays onto public land outside of the BRWRA (63 FR 1771; January 12, 1998). Therefore, given our current regulations for the nonessential experimental population (63 FR 1771; January 12, 1998), we do not consider temporary occupation outside the BRWRA or Fort Apache Indian Reservation to be relevant to this analysis. We are currently proposing revisions to our regulations for the nonessential experimental population (CITE TODAYS FR pg #).

We consider the public land status of the BRWRA to be an important characteristic of the quality of the reintroduction area: 95 percent of the BRWRA is U.S Department of Agriculture (USDA) Forest Service lands, made up of the entire Gila and Apache National Forests (with a number of small private inholdings making up the last 5 percent). Public lands such as National Forests are considered to have (more) appropriate conditions for wolf reintroduction and recovery efforts because they typically have significantly lesser degrees of human development and habitat degradation than other land ownership types (Fritts and Carbyn 1995, p. 26). We do not have any information or foresee any change in the size, status, ownership, or management of the Gila and Apache National Forests in the future. If *C. l. baileyi* were not protected by the Act, we cannot foresee any changes to the status of these National Forests such that suitability for wolves would significantly diminish.

The most prevalent biotic communities in the BRWRA include petran montane and great basin conifer forests, plains and great basin grasslands, Madrean evergreen woodland, and semi-desert grasslands (USFWS 1996, pp. 3-5). Elevation in the BRWRA ranges from 1219 to 3353m (4,000 to 11,000 ft), from the lowlands of the San Francisco River to the top of Mount Baldy, Escudilla Mountain, and the Mogollon Mountains. In 2011 (minimum population count of 58), wolves occupied 6,959 $km^2$ (2,687 $mi^2$) (approximately 40 percent) of the BRWRA, utilizing habitat throughout a wide range of elevations (based on location of home ranges in 2011, USFWS 2011, p. 23). (We are in the process of calculating occupied range for 2012, in which our minimum population estimate rose to 75 wolves.)

The vegetation communities of the BRWRA support elk, white-tailed deer, and mule deer. Prior to the reintroduction, the Service determined that adequate prey was available in the BRWRA to support a population of at least 100 wolves based on estimates of elk and deer (USFWS 1996, pp. 4-20). Our current estimates continue to support this finding. In 2005, we assessed documented predation events in the BRWRA and confirmed that prey were adequate to support the population (AMOC and IFT 2005, p. TC-19). More recently, we estimated a "theoretical biologically supportable wolf population" using the number of elk and deer presented in the Final Environmental Impact Statement, "Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States" (USFWS 1996), and in more recent estimates (Heffelfinger, unpublished data) that relates Ungulate Biomass Index (UBI) to wolves per 1,000 $km^2$ (Fuller *et al.* 2003, p. 171). (The UBI scales wild ungulates on the landscape to deer equivalents. For instance, an elk is considered three times the size of deer in the UBI scale, whereas the smaller cous white-tailed deer were scaled as a 0.5 deer equivalent. Mule deer were given a score of 1.) Our results suggest that estimated current ungulate populations in the BRWRA could support from 203 to 354 wolves. However, we recognize that other factors may limit how many wolves could be supported on the landscape, such as management of wolves related to interactions with livestock and humans, patchy distribution of prey, uncertainties associated with a multi-prey system, and social interactions among wolves. No observation or documentation of behavior (e.g., high levels of intraspecific strife) or significant levels of wolf mortality due to starvation have been made during the course of the reintroduction, supporting our

conclusion that wolves are not food limited in the BRWRA (AMOC and IFT 2005, pp. 20-21; Service files).

Current and reasonably foreseeable management practices in the Gila and Apache National Forests are expected to support ungulate populations at levels that will sustain the current wolf population as it grows toward the population objective of at least 100 wild wolves. Prey populations throughout all of Arizona and New Mexico continue to be monitored by the state wildlife agencies within Game Management Units, the boundaries of which are defined in each state's hunting regulations. If *C. l. baileyi* was not protected by the Act, we do not predict any significant resulting change to the ungulate populations that inhabit the Gila and Apache National Forests such that habitat suitability for wolves would diminish.

Wildfire is a type of habitat modification that could affect the *C. l. baileyi* population in two primary ways -- by killing of wolves directly or by causing changes in the abundance and distribution of ungulates. Two recent large wildfires, the Wallow Fire and the Whitewater-Baldy Complex Fire, have burned within close proximity to denning wolf packs in the BRWRA. Due to their very large size and rapid spread, both of these fires are considered catastrophic wildfires.

On May 29, 2011, the Wallow Fire began in Arizona and spread to over 538,000 acres (217,721 ha) in Arizona (Apache, Navajo, Graham, and Greenlee Counties; San Carlos Apache Indian Reservation, Fort Apache Indian Reservation) and New Mexico (Catron County) by the end of June (www.inciweb.org/incident/2262; accessed July 5, 2011). The Wallow Fire was human-caused (www.inciweb.org/incident/2262; accessed July 5, 2011) and is the second largest fire in Arizona's recorded history

(www.nasa.gov/mission_pages/fires/main/ariz-fire-20110609, accessed November 1, 2012).

The Wallow Fire burned through approximately 11 percent of the BRWRA. Three known or presumed wolf pack denning locations (Rim pack, Bluestem pack, Hawks Nest pack) were within the fire's boundaries (USFWS 2011). Although we had initial concern that denning pups (which are not as mobile as adults or may depend on adults to move them from the den) may not survive the fire due to their proximity to the rapidly spreading fire, we did not document any wolf mortalities as a result of the fire. Telemetry information indicated all radio-collared animals survived, and pups from two of the packs whose den areas burned survived through the year's end to be included in the end-of-year population survey. While denning behavior was observed in the third pack, the presence of pups had not been confirmed prior to the fire, and no pups were documented with this pack at the year's end (USFWS 2011).

In addition to possible direct negative effects of the Wallow Fire (i.e., mortality of wolves, which we did not document), we also considered whether the fire was likely to result in negative short or long-term effects to ungulate populations. The Wallow Fire Rapid Assessment Team's post-fire assessment hypothesized that elk and deer abundance will respond favorably as vegetation recovers, with ungulate abundance exceeding pre-fire conditions within 5 years due to decreased competition of forage and browse with fire-killed conifers (Dorum 2001, p. 3). Based on this information, we recognize the potential for this fire to result in beneficial (increased prey) effects for *C. l. baileyi* over the next few years that we will continue to monitor.

On May 16, 2012, the Whitewater-Baldy Complex fire was ignited by lightning

strikes. As of July 23, 2012, it had burned 297,845 acres and was 95 percent contained (www.inciweb.org/incident/2870). This fire burned through an additional (to the Wallow Fire) 7 percent of the BRWRA. The Whitewater-Baldy Complex Fire was contained 2 mi (3 km) from a denning wolf pack to the north (Dark Canyon pack) and 5 mi (8 km) from a denning wolf pack to the east (Middle Fork pack). We have not documented any adverse effects, including mortality, from the fire to these packs. We similarly hypothesize, as with the Wallow Fire, that elk and deer abundance will respond favorably as vegetation recovers in the burned area, with ungulate abundance exceeding pre-fire conditions within several years.

Given that we have not observed any wolf mortality associated with the Wallow and Whitewater-Baldy Complex fires, these specific fires have not significantly affected the *C. l. baileyi* population. Moreover, although these fires demonstrate the possibility that a catastrophic wildfire within the reintroduction area could result in mortality of less mobile, denning pups, we recognize that adult wolves are highly mobile animals and can move out of even a catastrophic fire's path. While mortality of pups would slow the growth of the population over a year or two, the adult, breeding animals drive the ability of the population to persist. We do not consider even these catastrophic fires to be a significant mortality risk to adult wolves given their mobility and, therefore, do not consider wildfire to be a threat to *C. l. baileyi*. Further, we predict that these fires will result in changes in vegetation communities and prey densities that will be favorable to wolves within a few years. We have no reason to believe there would be changes to the effects of fire on *C. l. baileyi* if they were not protected by the Act.

*Mexico— C. l. baileyi* has been extirpated from the wild in Mexico for over 30 years. Recently, researchers and officials in Mexico identified priority sites for reintroduction of *C. l. baileyi* in the states of Sonora, Durango, Zacatecas, Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas based on vegetation type, records of historical wolf occurrence, and risk factors affecting wolf mortality associated with proximity to human development and roads (Araiza *et al.* 2012, pp. 630-637). Subsequently, officials in Mexico reintroduced eight wolves to the wild during 2011 and 2012 (see Current Distribution – Mexico). Four of these wolves are confirmed dead, the status and fate of 2 wolves is unknown, and 2 wolves are alive (as of January 2, 2013).

We recognize that wolves are being reintroduced in Mexico to areas identified as priority sites based on current research (Araiza et al. 2012). However, we also note that Araiza et. al's habitat assessment does not include assessment of prey availability within the six identified areas, which is a critical indicator of habitat suitability. Some information on prey availability is currently being collected and synthesized by Mexico for specific locations, but is not publically available at this time. We also note that due to the majority of land in Mexico being held in private ownership, large patches of secure public land are unavailable in Mexico to support reintroduction, which has been an important characteristic of reintroduction sites in the United States. We will continue to observe the status of the wolf reintroduction effort in Mexico during 2013. At this time, because our focus in this analysis is on currently occupied range, the absence of a wolf population in Mexico precludes analysis of habitat threats to *C. l. baileyi* there.

Summary of Factor A

We have no information indicating that present or threatened habitat destruction, modification, or curtailment is significantly affecting *C. l. baileyi* or is likely to do so in the future. The BRWRA continues to provide an adequately sized area of protected, high quality, forested montane terrain with adequate ungulate populations to support the current population of about 75 wolves. We do not foresee any changes in the status of the area (as National Forest land) or management of ungulates in occupied habitat. Further, we do not consider wildfire to be resulting in habitat destruction, modification, or curtailment that is threatening *C. l. baileyi*, although we recognize that future catastrophic wildfires have the potential to slow the growth of the population if pup mortality occurs in several packs.

We have not conducted an analysis of threats under factor A in Mexico due to the lack of a *C. l. baileyi* population there for over thirty years. Based on the mortality of reintroduced wolves in Mexico during 2011-2012, we do not expect a population to be established there for several years.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Since the inception of the BRWRA *C. l. baileyi* reintroduction, we have not authorized legal killing or removal of wolves from the wild for commercial, recreational (i.e., hunting), scientific, or educational purposes. We are not aware of any instances of

illegal killing of BRWRA wolves for their pelts in the Southwest, or of illegal trafficking in *C. l. baileyi* pelts or parts. *C. l. baileyi* pelts and parts from wolves that die in captivity or in the wild may be used for educational or scientific purposes, such as taxidermy mounts for display, when permission is granted from the Service; most wolf parts are sent to a curatorial facility at the University of New Mexico to be preserved, catalogued, and stored. A recreational season for wolf hunting is not currently authorized in the Southwest, and may become so only in conjunction with post-delisting monitoring and applicable state management and regulation.

We have authorized, through a section 10(a)(1)(a) research and recovery permit under 50 CFR17.32, as well as in accordance with the Mexican wolf nonessential experimental population rule and section 10(j) management rule under 50 CFR 17.84(k), agency personnel to take any *C. l. baileyi* in the nonessential experimental population, as well as to conduct activities related directly to the recovery of reintroduced nonessential experimental populations of *C. l. baileyi* within Arizona and New Mexico. We have also authorized agency personnel to take any gray wolf in Arizona and New Mexico outside the BRWRA, with the exception of purposeful lethal take. While some removal of individual *C. l. baileyi* (including lethal take) has occurred by the Service as a result of these measures, these actions are conducted within the purpose of our recovery program to contribute to the conservation of the Mexican gray wolf.

Several *C. l. baileyi* research projects occur in the BRWRA or adjacent tribal lands by independent researchers or project personnel, but these studies have utilized radio-telemetry, scat analysis, and other non-invasive methods that do not entail direct handling of, or impact to, wolves (e.g., Cariappa *et al.* 2008, Breck *et al.* 2011, Rinkevich

2012). Non-lethal research for the purpose of conservation is also conducted on *C. l. baileyi* in the SSP captive breeding program; projects include research on reproduction, artificial insemination, gamete collection and preservation (see USFWS Mexican Wolf Recovery Program annual reports online at www.fws.gov/southwest/es/mexicanwolf for descriptions of past and current research projects). Research on disease and conditioned taste aversion is also being conducted in the SSP captive breeding program. In all cases, any take authorized by the Service for scientific, educational, and conservation purposes must benefit *C. l. baileyi* and promote its recovery.

Since reintroductions began in 1998, we are aware of 18 incidences in which *C. l. baileyi* were captured in non-governmental (private) traps, 8 of which resulted in injury (including 2 mortalities). Sixteen of the total incidents occurred in New Mexico. While these injuries may have a significant effect on the individual wolf and may affect that particular animal's pack, they are considered rare occurrences (18 known incidences in 14 years) and have not significantly affected the population.

Absent the protection of the Act, *C. l. baileyi* could be protected from overutilization in the United States by State regulations and programs in Arizona and New Mexico and Federal law in Mexico. Arizona Revised Statute Title 17 establishes Arizona Game and Fish Department (AGFD) with authority to regulate take of wildlife in the state of Arizona. "Take" (to pursue, shoot, hunt, trap, kill, capture, snare, or net) of wildlife in Arizona on lands under the authority of the Arizona Game and Fish Commission is prohibited, unless a provision (e.g., Commission Order, special rule, permit) is made to allow take. Arizona Game and Fish Commission Rules, Article 4, outlines additional restrictions that would provide further protections from overutilization

including regulating and outlining prohibitions on possession and transport of illegally taken wildlife, and regulating and placing restrictions on scientific collection/handling of wildlife. Because Commission Order 14 (Other Birds and Mammals) does not open a hunting season on wolves, all take of *C. l. baileyi* in Arizona is prohibited (except via special permit, as for science and management purposes). A season could be opened if the agency documented a harvestable surplus or identified a need for population reduction in a specific area.

Pursuant to the Wildlife Conservation Act of New Mexico, it is unlawful to take, possess, transport, export, process, sell, or offer for sale or ship any state or Federal endangered species (17-2-41 NMSA), thus as a state listed endangered species, *C. l. baileyi* would be protected from take related to overutilization.

Similarly, in Mexico, the General Wildlife Law ("Ley General de Vida Silvestre**"**, 2000, as amended) provides regulation against take of species identified by the Norma Oficial Mexicana NOM-059-SEMARNAT-2010, "Protección ambiental-Especies nativas de México de flora y fauna silvestres". These regulatory provisions are further discussed under factor D. The Inadequacy of Existing Regulatory Mechanisms.

Summary of Factor B

Based on available information, overutilization for commercial, recreational, scientific, or educational purposes does not occur or is exceedingly rare in the United States. There are no examples of these forms of take occurring in Mexico since their reintroduction program began in 2011. Arizona, New Mexico, and Mexico have

regulatory provisions under which *C. l. baileyi* could be protected against overutilization if the subspecies were not protected by the Act. Due to the non-existent or very low level of overutilization occurring, and the ability of the States and Mexico to regulate overutilization, we do not consider overutilization to be affecting *C. l. baileyi* now or in the future.

Factor C. Disease or Predation

A number of viral, fungal, and bacterial diseases and endo- and ectoparasites have been documented in gray wolf populations (Kreeger 2003, pp. 202-214). However, there is little research specific to disease in *C. l. baileyi* and little documentation of disease prevalence in wild wolves in the BRWRA population. We obtain the majority of our information on documented mortalities (from all sources, including disease) in the BRWRA from animals wearing radio collars. We may therefore underestimate the number of mortalities resulting from disease (e.g., due to uncollared wolves).

Typically, infectious diseases (such as viruses and bacteria) are transmitted through direct contact (e.g., feces, urine, or saliva) with an infected animal, by aerosol routes, or by physical contact with inanimate objects (fomites). Parasites are infective through water, food sources, or direct contact. Wolves are able to tolerate a number of parasites, such as tapeworms or ticks, although occasionally such organisms can cause significant disease, or even be lethal (Kreeger 2003, p. 202).

*C. l. baileyi* are routinely vaccinated for rabies virus, distemper virus, parvovirus, parainfluenza virus, and adenovirus before release to the wild from captive facilities. In

addition, common dewormers and external parasite treatments are administered. Wolves captured in the wild are vaccinated for the same diseases and administered dewormers and external parasite treatments. Kreeger (2003, pp. 208-211) describes the transmission route and effect of these diseases on gray wolves and can be referenced for general information. Recent rules for the Western Great Lakes and Northern Rocky Mountain gray wolf populations contain information from studies of disease occurrences in those geographic regions, and can also serve as a reference for a more comprehensive discussion of these (and other) diseases than that provided below (72 FR 6051, February 8, 2007; 73 FR 10513, February 27, 2008).

Rabies, caused by a rhabdovirus, is an infectious disease of the central nervous system typically transmitted by the bite of an infected animal. Rabies can spread between infected wolves in a population (e.g., among and between packs), or between populations, resulting in severe population declines. Rabies is untreatable and leads to death. A rabies outbreak in and near the BRWRA began in 2006 in eastern Arizona and continued through 2009, with positive rabies diagnoses (fox variant) in both foxes and bobcats. No wolves in the Blue Range population were diagnosed with rabies during this outbreak (AZDHS 2012; NMDH 2011) or throughout the history of the reintroduction.

Canine distemper, caused by a paramyxovirus, is an infectious disease typically transmitted by aerosol routes or direct contact with urine, feces, and nasal exudates. Death from distemper is usually caused by neurological complications (e.g., paralysis, seizures), or pneumonia. Distemper can cause high fatality rates, though survivors are occasionally documented in canine populations. Distemper virus may have been a contributing factor to high levels of pup mortality in Yellowstone National Park during

several summers (Smith and Almberg 2007, p. 18). Although wolf populations are known to be exposed to the virus in the wild, mortality from distemper in wild *C. l. baileyi* is uncommon. However, we expect *C. l. baileyi* pups, in general, would be most susceptible to death from distemper virus at a time period prior to when they are captured, collared, and vaccinated. Therefore, our collared sample of pups may not be accurately documenting this source of mortality.

Distemper has been documented in one wild litter of wolves in the BRWRA. Two sibling *C. l. baileyi* pups brought to a captive wolf management facility in 2000 from the wild were diagnosed with distemper (indicating they were exposed to the disease in the wild) and died in captivity (AMOC and IFT, p. TC-12). (Note: these captive deaths are not included in the BRWRA mortality statistics.) These are the only known mortalities due to distemper documented in relation to the current population (AMOC and IFT, p. TC-12).

Canine parvovirus is an infectious disease caused by a virus that results in severe gastrointestinal and myocardial (heart disease) symptoms. Parvovirus is persistent in the environment and can be spread by direct contact or viral particles in the environment. Symptoms of an infected adult animal may include severe vomiting and diarrhea, resulting in death due to dehydration or electrolyte imbalance. Pups may die from myocardial (heart) disease if infected with canine parvovirus while in utero or soon after birth from cardiac arrhythmias. Although canine parvovirus has been documented in wild wolf populations, there are few documented mortalities due to parvovirus; it is hypothesized that parvovirus can be a survivable disease, although less so in pups. Parvovirus is thought to have slowed various stages of colonization and dispersal of

wolves in the greater Minnesota population (Mech *et al.* 2008, p. 832-834).

Parvovirus has been documented in one wild litter of wolves in the BRWRA. Three sibling *C. l. baileyi* pups were documented having, and then dying from, parvovirus in 1999: one pup died in an acclimation release pen in the BRWRA, indicating it had been exposed to the disease in the wild (AMOC and IFT 2005, p. TC-12). (This pup is the single disease-related mortality documented for the wild population. The other two pups, while they also may have been exposed to the disease in the wild, were transferred to, and died at, a pre-release captive facility and are considered captive mortalities). Mortality from canine parvovirus has otherwise not been documented in the BRWRA population. However, we expect pups, in general, to be most susceptible to death from parvovirus prior to when they are captured, collared, and vaccinated. Therefore, our collared sample of pups may not be accurately documenting this source of mortality.

In summary, 3 of 92 total documented wolf deaths in the BRWRA population between 1998 and 2012 have been attributed to disease: 1 to canine parvovirus, 1 to chronic bacterial pleuritis (bacterial infection around the lungs), and 1 to bacterial pneumonia. The pleuritis and pneumonia cases, though bacterial diseases, are likely both secondary to other unknown natural factors, rather than contagious, infectious diseases. Potential pup mortality caused by infectious disease may be poorly documented in the free-ranging population because these pups are too young to radio collar and thus difficult to detect or monitor. In addition, collared animals are vaccinated, which reduces the potential for mortality to occur among collared wolves.

We do not have evidence that disease was a significant factor in the decline of *C.*

*l. baileyi* prior to its protection by the Act in the 1970's. However, we recognize that in a general sense, disease has the potential to affect the size and growth rate of a wolf population and could have a negative impact on the BRWRA population if the active vaccination program were not in place. We also recognize that some diseases are more likely to spread as wolf-to-wolf contact increases (Kreeger 2003, pp. 202-214), thus the potential for disease outbreaks to occur may increase as the current population expands in numbers or density, although the effect on the population may be lower because a larger wolf population would be more likely to sustain the epidemic. Absent the protection of the Act, the potential for disease to affect the *C. l. baileyi* population would primarily depend on whether state wildlife agencies or other parties provided a similar level of vaccination to the population as that which we currently provide.

In addition to disease, we must also assess whether predation is affecting *C. l. baileyi* now or in the future under factor C. In our assessment of predation, we focus on wild predators as well as intentional human killing of wolves.

Wild predators do not regularly prey on wolves (Ballard *et al.* 2003, pp. 259-271). Although large prey may occasionally kill wolves during self-defense (Mech and Peterson 2003, p. 134), this is rare and not considered predation on the wolf. Between 1998 and December 31, 2012, three documented *C. l. baileyi* mortalities are attributed to predators (wolf, mountain lion, and unknown) (USFWS 2012, Mexican Wolf Blue Range Reintroduction Population Statistics). This may be an underestimate (e.g., due to uncollared wolves), but we still consider the overall incidence to be low based on the occurrences we have documented. Monitoring of Northern Rocky Mountain wolf populations demonstrates that wolf-to-wolf conflicts may be the biggest source of

predation among gray wolves, but this typically occurs from territorial conflicts and has not occurred at a level sufficient to affect the viability of these populations (73 FR 10513; February 27, 2008). As the *C. l. baileyi* population begins to saturate available habitat, wolf mortalities resulting from territorial conflicts may become more prevalent but this type of mortality is not currently a concern. We do not foresee any change in the occurrence of wild predation on *C. l. baileyi* if the subspecies was not protected by the Act, and therefore do not consider predation from wild predators to be affecting *C. l. baileyi*.

Illegal shooting of wolves has been the biggest single source of mortality since the reintroduction began in 1998, and the largest single source of mortality in 8 separate years between 1998 and December 31, 2012 (USFWS 2013: Mexican Wolf Blue Range Reintroduction Project Statistics). Out of 92 wild wolf mortalities documented between 1998 and 2012, 46 deaths are attributed to illegal shooting (50% of total mortalities). Documented illegal shootings have ranged from zero to seven per year between 1998 and December 2012, with one or more occurring every year with the exception of 1999. Illegal shooting has varied from no impact to the population (e.g., in 1999 when no illegal shootings occurred) to resulting in the known mortality of about 15% of the population in a given year (e.g., in 2001). Forty-five percent of the illegal shootings have occurred during the last 4 to 5 years (as opposed to 55% in the first 14 years), signaling an increasing trend in this threat. Documented causes of illegal shooting in other gray wolf populations have included intentional killing and mistaken identity as a coyote or dog (Fuller *et al.* 2003, p. 181). We do not know the reason for each instance of illegal shooting of *C. l. baileyi* in the BRWRA.

We recognize that some wolf populations can maintain themselves despite sustained human-caused mortality rates of 17 to 48 percent ([Fuller *et al.* 2003 +/- 8 percent], pp. 184-185; Adams *et al.* 2008 [29 percent], p. 22; Creel and Rotella 2010 [22 percent], p. 5; Sparkman *et al.* 2011 [25 percent], p. 5; Gude *et al.* 2011 [48 percent], pp. 113-116; Vucetich and Carroll In Review [17 percent]) and that human-caused mortality sometimes replaces much of the wolf mortality in a population that would have occurred naturally (e.g., due to intraspecific strife from territorial conflicts occurring in populations that have saturated available habitat) (Fuller *et al.* 2003, p. 186). However, for the BRWRA population, which is small and is not near carrying capacity, we think it is likely that the majority of illegal shootings function as additive mortality to the BRWRA population (Murray et al 2010, pp. 2515, 2522). Illegal shooting has a negative effect on the size and growth rate of the BRWRA population, but the effect of these mortalities on the population has likely been masked to some degree by the number of captive wolves released into the wild over the course of the reintroduction effort (92 wolves). Additionally, we are unable to document all mortalities to the population (e.g., uncollared wolves), and therefore may be underestimating the number of mortalities caused by illegal shooting.

We expect that absent the protection of the Act, killing of wolves would continue at current levels or, more likely, increase significantly because Federal penalties would not be in place to serve as a deterrent. *C. l. baileyi* could be protected from take by state regulations in Arizona and New Mexico and Federal regulations in Mexico, but State penalties are less severe than Federal penalties (see a description and discussion of this under factor D) and Federal protection in Mexico does not infer protection for wolves in

the United States. Based on the continuous occurrence of illegal shooting taking place while *C. l. baileyi* is protected by the Act and the likelihood of increased occurrences of wolf shooting absent the protection of the Act, we consider illegal shooting of *C. l. baileyi* to be significant to the population. We further consider the threat of illegal shooting to *C. l. baileyi* in "Combination of Factors/Focus on Cumulative Effects", which discusses this and other threats within the context of the small, geographically isolated BRWRA population.

In Mexico, illegal killing of wolves released to the wild in 2011-2012 has already been documented. Necropsy results confirm that four wolves released in Sonora, Mexico, in 2011 were killed by feeding on poison-laced carcasses within several months of their release (USFWS, our files). Whether the poison was intentionally targeting *C. l. baileyi* or was aimed more generally at predators, especially coyotes, is unknown. However, the poison used was an illegal substance, and investigation into these mortalities is ongoing. Illegal killing of four wolves has significantly hindered Mexico's initial efforts to establish a population; continued monitoring of the wolves they release in the future will be necessary to document whether these initial events were by chance or are indication of a significant, ongoing threat to *C. l. baileyi* in Mexico.

Summary of Factor C

Based on the low incidence of disease and mortality from wild predators, we do not consider these factors to be significantly affecting *C. l. baileyi* nor do we expect them to in the future. Illegal shooting has been a continuous source of mortality to the

BRWRA population since its inception and we expect that if *C. l. baileyi* were not protected by the Act the number of shootings would increase substantially in the United States. Therefore, we consider illegal shooting to be significantly affecting *C. l. baileyi* in the United States. In Mexico, four wolves released in 2011 were illegally poisoned within months of their release to the wild, significantly hindering their reintroduction efforts. Illegal poisoning may affect the future *C. l. baileyi* population in Mexico significantly if such events continue.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The Act requires us to examine the adequacy of existing regulatory mechanisms with respect to those existing and foreseeable threats, discussed under the other factors, which may affect the Mexican wolf. In this five-factor analysis, we consider illegal shooting (factor C), inbreeding (factor E), and small population size (factor E) to be significantly affecting *C. l. baileyi*. We only address regulatory mechanisms related to illegal shooting in Factor D, as there aren't any regulatory mechanisms associated with inbreeding or small population size beyond the overarching protection of the Act.

As discussed in factor C, illegal killing (or "take", as it is referred to in the Act) of *C. l. baileyi* currently occurs at significant levels in both the United States and Mexico. In the United States, illegal shooting of *C. l. baileyi* has been a continuous source of mortality over the course of the BRWRA reintroduction. In Mexico, illegal killing has resulted in a setback to the reestablishment of a population of wolves in the State of Sonora and the Western Sierra Madre.

The Act provides broad protection of listed species to prohibit and penalize illegal take but is not serving as a deterrent to illegal killing of *C. l. baileyi* in the United States. Section 9 of the Act (Prohibited acts) prohibits the take of any endangered species. Section 11 (Penalties and enforcement) provides civil penalties up to $25,000, and criminal penalties up to $50,000 and/or not more than 1 year in jail for knowing violations of section 9. Experimental populations, such as *C. l. baileyi* in the Mexican Wolf Experimental Population Area, are treated as if they are listed as a threatened species, which limits criminal penalties to up to $25,000 and imprisonment for not more than 6 months.

All cases of suspected illegal shooting of *C. l. baileyi* in the United States are investigated by the Service's Division of Law Enforcement Special Agents. On-the-ground personnel involved in preventing and apprehending illegal take of *C. l. baileyi* include Service Special Agents, AGFD Game Wardens, New Mexico Department of Fish and Game Conservation Officers, U.S. Forest Service special agents and Law Enforcement Officers (LEOs), San Carlos Apache Tribe LEOs, and White Mountain Apache Tribe LEOs. Specific actions to reduce illegal take include targeted patrols during high-traffic periods (hunting seasons and holidays); the ability to restrict human activities within a 1-mi (1.6 km) radius of release pens, active dens, and rendezvous sites; proactive removal of road kills to reduce the potential of wolves scavenging, which may result in vehicular collision and illegal take of *C. l. baileyi* ; and monetary rewards for information that leads to a conviction for unlawful take of the subspecies. Of the 43 wolf mortalities classified as illegal shooting between 1998 and 2011, only 3 positive convictions have been made. This low number of convictions is due to a number of

factors, including lack of evidence to prosecute, difficulty in making positive convictions, as well as cases that have been solved but not convicted.

If *C. l. baileyi* were not protected by the Act, it would be protected by State regulations in Arizona and New Mexico, and by Federal law in Mexico. In Arizona, the (Mexican) gray wolf is managed as Wildlife of Special Concern (Arizona Game and Fish Commission Rules, Article 4, R12-4-401) and is identified as a Species of Greatest Conservation Need (Tier 1a, endangered) (Species of Greatest Conservation Need 2006, pending). Species with these designations are managed under the Nongame and Endangered Wildlife Management program by the Arizona Game and Fish Department (AGFD). This program seeks to protect, restore, preserve and maintain such species. These provisions, i.e., the Species of Greatest Conservation Need list and the Wildlife of Special Concern list, are non-regulatory. However, Arizona Revised Statute Title 17 establishes AGFD with authority to regulate take of wildlife in the state of Arizona. "Take" (to pursue, shoot, hunt, trap, kill, capture, snare, or net) of wildlife in Arizona on lands under the authority of the Arizona Game and Fish Commission is prohibited, unless a provision (e.g., Commission Order, special rule, permit) is made to allow take. Penalties for illegal take or possession of wildlife can include revocation of hunting license or civil penalties up to $8,000 depending on its classification as established through annual regulations.

In New Mexico, *C. l. baileyi* is listed as endangered (Wildlife Conservation Act, pp. 17-2-37 through 17-2-46 NMSA 1978). Pursuant to the Wildlife Conservation Act, it is unlawful to take, possess, transport, export, process, sell, or offer for sale or ship any state or Federal endangered species (17-2-41 NMSA). Penalties for violating the

provisions of 17-2-41 (endangered species) may include fines of up to $1,000 or imprisonment.

In Mexico, several legal provisions provide regulatory protection for *C. l. baileyi*. *C. l. baileyi* is classified as "E" ("probably extinct in the wild") by the Norma Oficial Mexicana NOM-059-SEMARNAT-2010, "Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo" (NOM-059-SEMARNAT-2010), which is a list of species at risk. This regulation does not directly provide protection of the listed species, rather it includes the criteria for downlisting, delisting or including a species or population on the list. The General Wildlife Law ("Ley General de Vida Silvestre**"**, 2000, as amended), however, has varying restrictions depending on risk status that only apply to species that are listed in the NOM-059-SEMARNAT-2010.

Mexico's Federal Penal Law ("Código Penal Federal" published originally in 1931) Article 420 assigns a fine of 300 to 3,000 days of current wage and up to nine years prison to those who threaten the viability of a species or population, transport a species at risk, or damage a specimen of a species at risk. Administrative fines are imposed by an administrative authority (PROFEPA, "Procuraduria Federal de Proteccion al Ambiente", or the Attorney General for Environmental Protection) and are calculated on the basis of minimum wage in Mexico-City ($62.33 daily Mexican pesos). The fines established in the General Wildlife Law range from 1,246.60 to 311,650 Mexican pesos (approximately US $98 to US $24,400) for the 4 minor infractions, to a range of 3,116 to 3,116,500 Mexican pesos (approximately U.S. $244 to U.S. $244,400) for the other

offenses, including the killing of a wolf. Penal fines are imposed by a judge and are calculated on the basis of the current daily wage of the offender including all his income.

We have no reason to believe that absent the Act's protections, shooting of *C. l. baileyi* in the United States would cease. Rather, it is likely that shooting of *C. l. baileyi* would increase, as State penalties (assuming wolves were granted protected status by the States) would be less severe than current Federal penalties under the Act. Thus, existing State penalties in Arizona and New Mexico would not serve as an adequate deterrent to illegal take. The illegal killing of four wolves in Mexico (see factor C) in 2011-2012 suggest that Federal penalties in Mexico may not be an adequate deterrent to illegal take there, although Federal fines in Mexico are potentially higher than those available under the Act in the United States.

Summary of Factor D

Regulatory mechanisms to prohibit and penalize illegal killing exist under the Act, but illegal shooting of wild *C. l. baileyi* in the United States persists. We believe that absent the protection of the Act, killing of wolves in the United States would increase, potentially drastically, because State penalties are less severe than current Federal penalties. The recent poisoning of several wolves reintroduced to Mexico suggests that illegal killing may be a challenge for that country's reintroduction efforts as well. Thus, in the absence of the Act, existing regulatory mechanisms are inadequate to provide for the long-term conservation of *C. l. baileyi*.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

We document sources of mortality in six categories as part of our ongoing monitoring of *C. l. baileyi* in the BRWRA: Illegal Shooting, Vehicle Collision, Natural, Other, Unknown, and Awaiting Necropsy. In factor C, we assessed illegal shooting in the United States, disease, and predation (our category "Natural" includes disease, predation, and other sources of mortality). In factor E, we assess the impacts to *C. l. baileyi* from the remaining sources of mortality; vehicle collision, natural, other, and unknown. As stated in our discussions of disease, predation, and illegal shooting, we may not be documenting all mortalities to the population because mortality of uncollared wolves is not typically detected; therefore, we may underestimate the number of mortalities attributed to any one cause discussed below. We also assess human intolerance of wolves, land-use conflicts, hybridization, inbreeding, climate change, and risks associated with small population size.

Our category of "Natural" causes of mortality includes a number of mortality sources, such as predation, starvation, interspecific strife, lightening, and disease. Because we have documented 3 or fewer natural mortalities of various causes per year since 1998, we do not consider natural mortalities to be occurring at a level, individually or collectively, that significantly affects *C. l. baileyi* (and see factor C for additional discussion of disease and predation) (USFWS 2012: Mexican Wolf Blue Range Reintroduction Project Statistics). Therefore, we do not further discuss these "Natural" causes of mortality. Similarly, mortalities caused by "Other" source of mortality (capture-related mortalities, public trap mortality, legal public shooting, etc.) and

"Unknown" causes are occurring at very low levels (4 of 88 mortalities (1 mortality or fewer per year), and 9 of 88 mortalities (2 mortalities or fewer per year), respectively) and are not occurring at a level that poses a threat to *C. l. baileyi*.

Vehicular collision has accounted for 15 percent of *C. l. baileyi* mortalities from 1998 to December 31, 2012 (14 out of 92 total documented *C. l. baileyi* deaths) (USFWS 2012: Mexican Wolf Blue Range Reintroduction Project Statistics). Thirteen out of 14 wolf mortalities attributed to vehicular collision throughout the course of the reintroduction (through December 31, 2012) occurred along paved US or State highways; one wolf died on a Forest Service dirt road as a result of vehicle collision. Five of the vehicle strikes occurred outside of the BRWRA boundary. The number of vehicular-related mortalities, which has ranged from zero to two per year, with the exception of a high of four vehicular-related wolf deaths in 2003, has not shown a trend (increasing or decreasing) over time. Given the occurrence of these mortalities on highways, it is likely that these collisions were accidental events that occurred from vehicles traveling at relatively high speeds. State and Federal efforts to build structures (such as overpasses or underpasses) to reduce the incidence rate of vehicular collisions with deer and elk may benefit wolves because these structures are located in areas of high density deer and elk populations, which are also areas where wolves are likely to occur, but no such structures exist in or near the BRWRA.

Roads, both paved and unpaved, in the BRWRA primarily exist to support forest management, livestock grazing, recreational access, resource protection, and transport of forest products on the Gila and Apache National Forests (USFWS 1996, pp. 3-13). Different types of roads present different threats to wolves - paved roads with higher

speed limits present more risk of wolf mortality due to vehicular collision than unpaved roads with lower speed limit, but both roads and trails can provide access into wolf habitat. National Forests contain various road types (paved, unpaved, opened, closed, etc.) and trails (motorized, non-motorized), but are generally considered to be driven at relatively low speeds and have relatively low traffic volume. Non-Forest Service roads (e.g., highways and other paved roads) are limited within the BRWRA, and include portions of US Highways 191 and 180, and State Highways 260,152, 90, 78, 32, and 12. U.S. highway 60 runs immediately to the north of this area.

Road density in the BRWRA was estimated at 0.8 mi road per $mi^2$ (1.28 km road per $km^2$) prior to the reintroduction (Johnson *et al.* 1992, p. 48). The USDA Forest Service Southwest Region recently calculated road densities for the Gila and Apache-Sitgreaves National Forests during analysis of alternatives to designate a system of roads, trails, and areas designated for motor vehicle use in compliance with the Travel Management Rule. They did not assess road use in terms of a baseline of traffic volume or projections of traffic volume for the future. Both the Gila and Apache-Sitgreaves National Forests continue to have an appropriately low density of roads for the wolf reintroduction effort in the BRWRA, with no plans to increase road density in either Forest -- road density in the Apache portion of the Apache-Sitgreaves National Forest is estimated at 0.94 mi road per $mi^2$ for all roads (1.5 km road per $km^2$) (open, closed, decommissioned) and motorized trails, or 0.43 mi road per $mi^2$ (0.69 km road per km2) for open roads and motorized trails (USDA 2010a, p. 102 ); road density in the Gila National Forest is estimated at 1.02 mi per $mi^2$ (1.64 km per $km^2$) for open and closed (but not decommissioned) roads and motorized trails (an overall average of 0.99 mi per

$mi^2$ (1.59 km per $km^2$) (USDA 2010b, p. 149). It has been recommended that areas targeted for wolf recovery have low road density of not more than 1 linear mile of road per square mile of area (1.6 linear km of road per 2.56 square kilometers; Thiel 1985, pp. 406-407), particularly during colonization of an area (Fritts *et al.* 2003, p. 301).

In summary, road density in the BRWRA remains within recommendations for wolf habitat and *C. l. baileyi* reintroduction efforts. Mortalities from vehicular collision show a strong pattern of occurrence on high-speed paved State or U.S. highways rather than on Forest Service roads, and are occurring at relatively low levels (2 or fewer mortalities per year, with the exception of one year in which 4 mortalities were attributed to vehicular collision). In absence of Federal protection, we expect that incidence of wolf-vehicular collision would continue at similar levels, due to the accidental nature of these incidents. At this level, with or without the protections of the Act, we do not consider vehicular collision to be significantly affecting *C. l. baileyi*.

*Human Intolerance*—Human attitudes have long been recognized as a significant factor in the success of gray wolf recovery efforts to the degree that it has been suggested that recovery may depend more on human tolerance than habitat restoration (see Boitani 2003, p.339, Fritts *et al.* 2003; Mech 1995). In the Southwest, extremes of public opinion vary between those who strongly support or oppose the recovery effort. Support stems from such feelings as an appreciation of the wolf as an important part of nature and an interest in endangered species restoration, while opposition may stem from negative social or economic consequences of wolf reintroduction, general fear and dislike of wolves, or Federal land-use conflicts.

Recent public polling in Arizona and New Mexico shows that most respondents

have positive feelings about wolves and supports the reintroduction of *C. l. baileyi* to public land (Research and Polling 2008a, p.6, Research and Polling 2008b, p.6). These polls targeted people statewide in locations outside of the reintroduction area, and thus provide an indication of regional support.

Meanwhile, we suspect that human intolerance of wolves is resulting in some of the illegal shooting occurring in the BRWRA. Without additional information (e.g., convictions), we are unable to confirm whether, or the degree to which, disregard for or dissention to the reintroduction project is a causative factor in illegal shootings. Similarly, in Mexico, we do not yet know whether the illegal poisoning of four reintroduced *C. l. baileyi* was purposeful and stemmed from dissension to the reintroduction or rather was targeted more generally at (other) predators. We recognize that humans can be very effective at extirpating wolf populations if human-caused mortality rates continue at high levels over time, as demonstrated by the complete elimination of wolves across the Southwest and Mexico prior to the protection of the Act; however at this time we do not have enough information to determine whether, or the degree to which, human intolerance may pose a threat to *C. l. baileyi*.

*Land-Use Conflicts*— Historically, land-use conflict between wolves and livestock producers was a primary cause of the wolf's endangerment due to human killing of wolves that depredated livestock. At the outset of the reintroduction effort, the amount of permitted grazing in the recovery area was identified as a possible source of public conflict for the project due to the potential for wolves to depredate on livestock (USFWS 1996, p. 4-4). Service removal of wolves due to livestock depredation has occurred in 9 out of 15 years of the reintroduction effort, reaching a high of 16 and 19 removals in

2006 and 2007, respectively (USFWS 2012 Mexican Wolf Blue Range Project Statistics). Proactive efforts (e.g., hazing, fencing, fladry, range riders) to minimize depredations have increased in recent years, resulting in fewer removals from 2008 to 2012 than in the first 10 years of the program. Since 2007, we have only removed one wolf from the BRWRA population due to confirmed livestock depredation, which occurred in 2012 (USFWS BRWRA Monthly Project Updates, October 2012).

The Service is committed to actively managing depredating wolves to improve human tolerance in the BRWRA, while recognizing that management removals must be part of an overall management scheme that will promote the growth of the nonessential experimental population. Thus these removals are critical to ameliorating some conflicts that result from inhabitance of the BRWRA by wolves and livestock production. Because our depredation-response removals are employed in an overall management framework with an objective to establish a population of at least 100 wild wolves, we do not view land-use conflicts to be a threat to *C. l. baileyi*. In absence of protection by the Act, land-use conflicts would still occur in areas where wolves and livestock coexist. However, because *C. l. baileyi* is protected by State law, we expect that livestock producers and State agencies would continue to employ effective practices of hazing or other active management measures to reduce the likelihood of occurrence of depredation incidents. Therefore, we do not think that land-use conflicts would significantly affect *C. l. baileyi* if it was not protected by the Act.

*Hybridization*—Hybridization between wolves and other canids can pose a significant challenge to recovery programs (e.g., the red wolf recovery program)

(USFWS 2007, pp. 10-11) because species in *Canis* can interbreed and produce viable offspring. In the BRWRA, we consider hybridization to be a rare event. Three confirmed hybridization events between *C. l. baileyi* and dogs have been documented since the reintroduction project began in 1998. In the first two cases, hybrid litters were humanely euthanized (USFWS 2002, p. 17, USFWS 2005:16.) In the third case, four of five pups were humanely euthanized; the fifth pup, previously observed by project personnel but not captured, has not been located and its status is unknown (USFWS 2012: Blue Range Reintroduction Area Monthly Project Updates, June 24, 2011). No hybridization between *C. l. baileyi* and coyotes has been confirmed through our genetic monitoring of coyotes, wolves, and dogs that are captured in the wild.

Our ability to respond to hybridization events has negated any potential impact to the BRWRA population from these events (e.g., threaten the genetic integrity of the population). Moreover, the likelihood of hybrid animals surviving, or having detectable impacts on wolf population genetics or viability, is low due to aspects of wolf sociality and fertility cycles (Mengel 1971, p. 334; Vila and Wayne 1999, pp. 195-199).

We do not foresee any change in the likelihood of hybridization events occurring, or the potential effect of hybridization events, if *C. l. baileyi* was not protected by the Act; that is, we still think that hybridization events and effects would be rare. Therefore, we do not consider hybridization to be affecting the *C. l. baileyi* population now nor is it likely to do so or in the future.

*Inbreeding*—The potential for inbreeding (mating between close relatives) to negatively affect the captive and reintroduced *C. l. baileyi* populations has been a topic of concern for over a decade (Parsons 1996, pp. 113-114; Hedrick *et al.* 1997, pp. 65-68).

Inbreeding affects traits that reduce population viability, such as reproduction (Kalinowski *et al.* 1999, pp. 1371-1377; Asa *et al.* 2007, pp. 326-33; Fredrickson *et al.* 2007, pp. 2365-2371), survival (Allendorf and Ryman 2002, pp. 50-85), and disease resistance (Hedrick *et al.* 2003, pp. 909-913). Inbreeding can occur in any population, but is most likely to occur in small populations due to limited choice of mates. The relatively high potential for inbreeding depression to occur in *C. l. baileyi* is a result of the small number of founders (seven individual wolves from three lineages) of the captive population. Because the captive population is the only source of wolves for the wild population, and because the wild population is small, the wild population of *C. l. baileyi* is highly susceptible to inbreeding. Wolf social structure also influences inbreeding, as only a subset of adult animals breed (e.g., alpha male and females).

Minimization of inbreeding (and maintenance of long-term adaptive potential) can be achieved by ensuring that the captive and wild populations, and individual wolves, contain adequate genetic ancestry from each of the founding lineages (Ghost Ranch, Aragon, and McBride) (see Current Distribution – In Captivity) and through population growth. In both the captive and wild populations, research has shown that packs producing pure McBride pups, which are highly inbred, have smaller litter sizes than packs producing cross-lineage pups, which are much less inbred. This demonstrates a restored fitness among wolves with mixed ancestry (that is, wolves with ancestry from more than one of the three founding lineages) (Fredrickson *et al.* 2007, p. 2368). Although the release of cross-lineage wolves has the potential to increase the fitness, growth rate, and genetic variation of the BRWRA population, results from the captive population suggest that some of the fitness increase observed may be lost in two to four

generations (Fredrickson *et al.* 2007, p. 2368). In the captive population, recommended levels of representation of each of the lineages are achieved through the selection of wolf pairings that minimize the loss of genetic material (Siminski and Spevak 2012, p. 8).

In the wild population, where we cannot control which wolves mate, we recognize that it is important to increase representation of the Ghost Ranch and Aragon lineages to as much as 25 percent through the additional release of wolves with the appropriate genetic ancestry. The representation of the three lineages in the wild population as of October 12, 2012, was approximately 81 percent McBride, 5 percent Aragon, and 14 percent Ghost Ranch (Siminski and Spevak 2012, p. 7). The Aragon and Ghost Ranch lineages are currently represented by only a few wild wolves each. The American Zoo and Aquarium Association Mexican Wolf SSP has recommended that until the representation of the Ghost Ranch and Aragon lineages has increased and demographic stability is achieved in the wild population, careful consideration of genetic diversity should be prioritized during decisions to permanently remove wolves. Based on research documenting viability-related inbreeding effects in *C. l. baileyi* and our awareness that the wild population may be at risk of inbreeding due to low representation of some genetic ancestry represented in the captive population but not in the wild population, we consider inbreeding to be significantly affecting *C. l. baileyi* currently and in future. If wolves were not protected by the Act, the risk of inbreeding would remain, and may increase if States or other parties did not actively promote genetic diversity in the reintroduced population by releasing wolves with appropriate genetic ancestry to the population.

*Small Population Size*— Rarity may be considered a threat to a species depending

on the species' biological characteristics and other threats acting upon it. We consider several types of information to determine whether small population size is a threat to *C. l. baileyi*, including historical conditions, consideration of stochastic (or, chance) events, theoretical recommendations of population viability, and applied population viability models specific to *C. l. baileyi*. We discuss three types of stochastic events – demographic, environmental, and catastrophic -- as the fourth type of stochastic event – genetic – is addressed under the subheading of Inbreeding. We further discuss the significance of small population size in Combination of Factors/Focus on Cumulative Effects, below.

Historical abundance and distribution serve as a qualitative reference point against which to assess the size of the current population. Pre-colonization, *C. l. baileyi* were geographically widespread throughout numerous populations across the southwestern United States and Mexico. Although we do not have definitive estimates of historical abundance, we can deduce from gray wolf population estimates (Leonard *et al.* 2005, p. 15), trapping records, and anecdotal information that *C. l. baileyi* numbered in the thousands across its range in the United States and Mexico. We therefore recognize that the current size and geographic distribution of *C. l. baileyi* (approximately 75 wolves in a single population occurring in a fraction of its historical range) represents a substantial contraction in size and range from its historical (pre-1900's) abundance and distribution.

Scientific theory and practice generally agree that a species represented by a small population faces a higher risk of extinction than a species that is widely and abundantly distributed (Goodman 1987, pp.11-31; Pimm *et al.* 1988, p.757). One of the primary

causes of this susceptibility to extinction is the sensitivity of small populations to random demographic events (Shaffer 1987, pp. 69-86, Caughley 1994, p. 217). In small populations, including those that are growing, it is more likely that random changes in average birth or survival rates could cause a population decline that would result in extinction; this is referred to as demographic stochasticity. As a population grows larger and individual events tend to average out, the population becomes less susceptible to extinction from demographic stochasticity.

At its current size of a minimum of 75 wolves, and even at the current population target of at least 100 wild wolves, the BRWRA population is, by demographic measures, considered small (Shaffer 1987, p. 73; Boyce 1992, p. 487; Mills 2007, p. 101; USFWS 2010, pp. 63-68) and has a high risk of extinction. The viability (likelihood of extinction over a given time period) of the population when it reaches its target of at least 100 wolves remains unquantified, although qualitatively this target is significantly below estimates of viability appearing in the scientific literature or in other gray wolf recovery plans that suggest hundreds to over a thousand wolves are necessary for long-term existence in the wild (see USFWS 2010, p. 63-68).

Two *C. l. baileyi* population viability analyses were conducted subsequent to the development of the 1982 Mexican Wolf Recovery Plan but prior to the BRWRA reintroduction, although neither was completed after being subject to peer review (Seal 1990 entire, IUCN 1996 entire, USFWS 2010, p. 66). Population viability modeling is being conducted by the current Mexican Wolf Recovery Team as they develop draft recovery criteria; these results will be available to the public when the draft recovery plan is published. However, initial results continue to strongly support our understanding that

the wild population currently faces a high degree of extinction risk simply due to its current size. Absent the protection of the Act, the demographic extinction risk of the BRWRA population at its current size would remain high. Given our understanding of the high extinction risk of the current size of the population and our awareness that this rarity is not the typical abundance and distribution pattern for *C. l. baileyi*, we consider the small population size of the BRWRA to be significantly affecting *C. l. baileyi*.

Absent the protection of the Act, the extinction risks associated with small population size would remain, and may increase if States or other parties did not actively support the reintroduced population through appropriate management measures.

The vulnerability of a small population to extinction can also be driven by the population's vulnerability to decline or extinction due to stochastic environmental or catastrophic events (Goodman 1987, pp.11-31; Pimm *et al.* 1988, p.757). While we consider these types of events to be critically important considerations in our recovery efforts for the species, we have not identified any single environmental event (i.e., disease, climate change (below)) or catastrophic event (wildfire) to be a threat to the population based on our current information and management practices (i.e., vaccinations, monitoring). However, we reconsider the concept of vulnerability to these events below, in Combination of Factors/Focus on Cumulative Effects.

*Climate Change*—Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be

used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Throughout their circumpolar distribution, gray wolves persist in a variety of ecosystems with temperatures ranging from -70 to 120 degrees Farenheit (-56 to 48 degree Celcius) with wide ranging prey type and availability (Mech and Boitani 2003, p. xv). *C. l. baileyi* historically inhabited and still inhabit a range of southwestern ecotypes subsisting on large ungulate prey as well as small mammals. Due to this plasticity and lack of reliance on microhabit, we do not consider *C. l. baileyi* to be highly vulnerable or sensitive to climate change (Dawson ***et. al*** 2011, p. 53). Similarly, elk, the primary prey of *C. l. baileyi* in the BRWRA, are known to be habitat generalists due to their association with wide variation in environmental conditions (Kuck 1999, p.1). We recognize that climate change may have detectable impacts on the ecosystems of the Southwest that affect *C. l. baileyi.* For example, to the degree that warmer temperatures and increased aridity or decreased water availability (Dai 2011, p. 58) limit prey abundance, we would also expect decreased wolf densities. However, both wolves and

their prey are species that exhibit reasonable adaptive capacity (Dawson *et al.* 2011, p. 53) such that they could shift habitats in response to changing conditions or potentially persist in place. Therefore, based on the relatively low vulnerability and sensitivity of *C. l. baileyi* to changes in climate, and on the relatively high adaptive capacity of the subspecies to respond to changes, we do not consider climate change to be posing a threat to *C. l. baileyi* at the current time nor do we expect it to do so in the future. The effects of climate change on *C. l. baileyi* would not change if it was not protected by the Act.

Summary of Factor E

Inbreeding and small population size are two factors that currently threaten *C. l. baileyi*. Inbreeding has the potential to affect viability-related fitness traits in *C. l. baileyi* and therefore to affect the persistence of the subspecies in the wild. Although the captive population is actively managed to minimize inbreeding, our inability to control which wolves mate in the wild limits our ability to control inbreeding in the wild. Inbreeding in the wild population could pose a significant threat to the viability of *C. l. baileyi*. Absent the protection of the Act, the threat of inbreeding would increase unless the States or other parties undertook active promotion of genetic diversity. The small population size of the BRWRA population results in a high risk of extinction due to the susceptibility of the population to stochastic demographic events. Neither the current population (approximately 75 wolves), nor the population target of at least 100 wild wolves, is a sufficient size to ensure persistence into the future. We conclude that, absent the

protection of the Act, inbreeding and small population size would continue, and possibly increase, to significantly affect *C. l. baileyi*.

Combination of Factors/Focus on Cumulative Effects

In the preceding review of the five factors, we find that *C. l. baileyi* is most significantly affected by illegal killing, inbreeding, and small population size. We consider the protections provided by the Act to be necessary regulatory provisions to lessen or alleviate these threats; in absence of the Act's protections, these threats would remain or increase, potentially significantly. We also identify several potential sources of mortality or risk (disease, vehicular collision, wildfire, hybridization, etc.) that we do not currently consider to be significantly affecting *C. l. baileyi* due to their low occurrence and minimal impact on the population or lack of information to document the effect of the threat to the BRWRA population. However, we recognize that multiple sources of mortality or risk acting in combination have greater potential to affect *C. l. baileyi* than each factor alone. Thus, we consider how factors that by themselves may not have a significant effect on *C. l. baileyi*, may affect the subspecies when considered in combination.

The small population size of the BRWRA population exacerbates the potential for all other factors to disproportionately affect *C. l. baileyi*. The combined effects of demographic, genetic, environmental, and catastrophic events to a small population can create an extinction vortex—an unrecoverable population decline—that results in

extinction. Small population size directly and significantly increases the likelihood of inbreeding depression, which may decrease individual fitness, hinder population growth, and increase the population's extinction risk. Small population size also increases the likelihood that concurrent mortalities from multiple causes that individually may not be resulting in a population decline (e.g., vehicle collisions, natural sources of mortality) could collectively do so, depending on the population's productivity. Effects from disease, catastrophe, inbreeding, mortality, or hybridization events that normally could be sustained by a larger, more resilient population have the potential to rapidly affect the size, growth rate, and genetic integrity of the small BRWRA population when they act in combination. We consider the combination of factors B, C, D, and E to be significantly affecting *C. l. baileyi*.

*Summary of Five-Factor Analysis*

We do not find habitat destruction, curtailment, or modification to be significantly affecting *C. l. baileyi* now, or that it is likely to do so in the future or if the subspecies was not protected by the Act. The size and federally protected status of the Gila and Apache National Forests are adequate and appropriate for the reintroduction project. These National Forests provide secure habitat with an adequate prey base and habitat characteristics to support the current wolf population. We do not consider the Wallow Fire or the Whitewater-Baldy Complex Fire, while catastrophic, to be a source of habitat modification, destruction, or curtailment because there were no documented wolf mortalities during the fires, and prey populations are expected to increase in response to

post-fire vegetation effects. We will continue to observe the effects of the fire on ungulate distribution and wolf recruitment.

We do not find overutilization for commercial, recreational, scientific, or educational purposes to be significantly affecting *C. l. baileyi* because there is no evidence to indicate that legal killing or removal of wolves from the wild for commercial, recreational (i.e., hunting), scientific, or educational purposes is occurring. The killing of wolves for their pelts is not known to occur, and *C. l. baileyi* research-related mortalities are minimal or non-existent. Incidence of injuries and mortalities from trapping (for other animals) has been low. In absence of Federal protection, State regulations in Arizona and New Mexico, and Federal regulations in Mexico, would provide protection, regulation, and penalties against overutilization. Overutilization of *C. l. baileyi* would not likely increase if they were not listed under the Act due to the protected status they would be afforded by the States and Mexico.

Based on known disease occurrences in the current population and the active vaccination program, we do not consider disease to be a threat to *C. l. baileyi.* Absent the protection of the Act, a similar vaccination program would need to be implemented by the States or other parties, or the potential for disease to significantly affect *C. l. baileyi* could increase.

Predation (by non-human predators) is not significantly affecting *C. l. baileyi.* No wild predator regularly preys on wolves, and only a small number of predator-related wolf mortalities have been documented in the current *C. l. baileyi* population. We do not consider predation likely to significantly affect *C. l. baileyi* in the future or if the subspecies was not protected by the Act

Illegal shooting is identified as a current threat. Adequate regulatory protections are not available to protect *C. l. baileyi* from illegal shooting without the protection of the Act. We would expect shooting of *C. l. baileyi* to increase if they were not federally protected, as State penalties (assuming *C. l. baileyi* was maintained as a State-protected species) are less than Federal penalties.

Inbreeding and small population size significantly affect *C. l. baileyi*. We recognize the importance of the captive management program and the active reintroduction project and recovery program in addressing these issues. Absent the protection of the Act, the effect of inbreeding and small population size on *C. l. baileyi* would continue, or possibly increase if the reintroduction effort was not actively managed by the States or other parties.

Based on the limited number of occurrences of hybridization events over the course of the reintroduction, we conclude that hybridization is not significantly affecting *C. l. baileyi*, nor likely to do so in the future, and would not do so in the absence of the Act's protections.

Climate change is not significantly affecting the Mexican wolf nor would it do so in the absence of the Act's protections. The effects of climate change may become more pronounced in the future, but as s is the case with all stressors that we assess, even if we conclude that a species is currently affected or is likely to be affected in a negative way by one or more climate-related impacts, it does not necessarily follow that these effects are significant to the species. The generalist characteristics of the wolf and their primary prey, elk, lead us to conclude that climate change will not significantly affect *C. l. baileyi* in the future.

The cumulative effects of factors that increase mortality and decrease the genetic health of *C. l. baileyi* in the wild are critically important considerations, particularly in light of the small number of wolves in the BRWRA (a characteristic which significantly increases the vulnerability of the population to extinction). Cumulative effects significantly affect *C. l. baileyi* at the current time and likely will continue to do so in the future. Absent the protection of the Act, negative cumulative effects may increase due to the potential for more killing of wolves, increased risk of inbreeding, disease epidemics, and other sources of mortality, all exacerbated by the high risk of extinction of the small population.

*Conclusion*

We recently published a not warranted 12-month finding on petitions to list the Mexican wolf as a subspecies or DPS (77 FR 61375, October 9, 2012). Our finding was based on the fact that the population in question was already fully protected as endangered under the Act (77 FR 61375, October 9, 2012). However, our finding further stated that we could not, consistent with the requirements of the Act, take any action that would remove the protections accruing to the southwestern population under the existing *C. lupus* listing without first determining whether the Mexican wolf warranted listing separately as a subspecies or a DPS, and, if so, putting a separate listing in place (77 FR 61377, October 9, 2012). Therefore, because we are now proposing to remove

protections for the current *C. lupus* listed entity it is necessary for us to reconsider listing the Mexican wolf as a subspecies or DPS.

We have carefully assessed the best scientific and commercial data available regarding the past, present, and future threats to *C. l. baileyi* and have determined that the subspecies warrants listing as endangered throughout its range. As required by the Act, we considered the five potential threat factors to assess whether *C. l. baileyi* is endangered or threatened throughout its range. Based on our analysis, we find that *C. l. baileyi* is in danger of extinction throughout all of its range due to small population size, illegal killing, inbreeding, and the cumulative effect of all threats. Absent protection by the Act, regulatory protection, especially against shooting, poisoning, or other forms of killing, would not be adequate to ensure the survival of *C. l. baileyi.*

*C. l. baileyi* used to range throughout central and southern Arizona and New Mexico, a small portion of Texas, and much of Mexico. Its numbers were reduced to near extinction prior to protection by the Act in the 1970's, such that the captive breeding program was founded with only seven wolves. Although our recovery efforts for *C. l. baileyi*, which are still underway, have led to the re-establishment of a wild population in the United States, the single, small population of *C. l. baileyi* would face an imminent risk of extinction from the combined effects of small population size, inbreeding, and illegal shooting, without the protection of the Act.

*Is there a DPS of* C. lupus *in the contiguous United States or Mexico that warrants the protections of the Act?*

We now consider whether there are any DPSs of *C. lupus* that occur within the bounds of the current *C. lupus* listed entity (Figure 1) and warrant the protections of the Act. The gray wolf populations in the northern Rocky Mountains and the western Great Lakes are successfully recovered and delisted (76 FR 25590, 77 FR 55530, 76 FR 81666). These populations are not part of the current *C. lupus* listed entity and thus are not considered in this analysis. Further, because we have already determined that *C. l. bailey* is an endangered subspecies, it is not necessary to consider any gray wolves representative of that population in this analysis. Given these facts, only the gray wolves currently occupying the Pacific Northwest need be considered; we begin our evaluation with a description of the historical and current distribution of gray wolves in that region followed by a DPS analysis.

Pacific Northwest – Historical Distribution

Wolves were historically distributed across most of the Pacific Northwest, except in arid deserts and on mountaintops (Young and Goldman 1944, pp. 10, 18, 30, 44-45; Mech 1970, p. 31; Nowak 2003, p. 243). In western Oregon and Washington, wolves were historically common and widely distributed in the Coast Range, Cascade Mountains, Olympic Peninsula, and prior to major human settlement, were also regularly reported from the Willamette Valley and Puget Trough (Suckley 1859, pp. 75, 90;

Suckley and Gibbs 1859, pp. 110-111; Conard 1905, p. 393; Bailey 1936, pp. 272-275; Dalquest 1948, pp. 232-233). By the 1940s, wolves in Washington and Oregon were primarily confined to remote mountainous areas, mostly in the National Forests of the Cascade Mountains, although there were a couple of wolf records in eastern Oregon in the 1930s (1 in Grant County and 1 in Lake County) (Young and Goldman 1944, pp. 53-55). In Oregon, Service records indicate that by 1941, the only area west of the Cascades known to contain wolves was primarily in eastern Douglas County (Rowe 1941, entire).

Historical range maps show considerable variation in the gray wolf's former range in California (Shelton and Weckerly 2007, pp. 224-227). There are only two known recent museum records of gray wolves from California, both in the possession of the Museum of Vertebrate Zoology in Berkeley, California (Schmidt 1991, p. 82; Jurek 1994, p. 2): in 1922, an adult male gray wolf was trapped in the Providence Mountains, in eastern San Bernardino County (Jurek 1994, p. 2); and, in 1924, a gray wolf was trapped in the Cascade Mountains of Lassen County, 1 mile east of Litchfield, California (Jurek 1994, p. 2). In addition to these two records, in 1962, a gray wolf was shot in the southern Sierra Nevada Mountains at Woodlake, near Sequoia National Park (Ingles 1963, pp. 109-110); however, subsequent skull measurements indicate that this individual may have been an introduced Asiatic wolf (McCullough 1967, pp. 146-153)]. Despite limited preserved physical evidence for wolves in California, there were many reports of wolves from around the State in the 1800s and early 1900s (e.g., Sage 1846, entire, Price 1894, p. 331; Dunn 1904, pp. 48-50; Dixon 1916, pp. 125; Young and Goldman 1944, pp. 18-19, 56-57; Sumner and Dixon 1953, pp. 464-465; Schmidt 1991, pp. 79-85), with the earliest reports noting that they were "numerous and troublesome" and "a source of

great annoyance to the inhabitants by destroying their sheep, calves, colts, and even full-grown cattle and horses" (Sage 1846, p. 196). Cronise (1868, p. 439) described gray wolves in the mid-1800s as "common in the northern and higher districts of the State [of California]," with the skin being worth "one to two dollars." In 1904, Stephens (1906, p. 217) stated, "A very few Gray Wolves live in the high Sierras and in the mountains of northeastern California." Descriptions of early explorers were sometimes accompanied by little detail, and coyotes were sometimes called wolves (California Department of Fish and Game 2011, pp. 1-2); however, Schmidt (1991, entire) accounted for this in his analysis of anecdotal wolf records in California by only accepting records that differentiated between coyotes, foxes, and wolves.

In 1939, the U.S. Forest Service estimated that wolves were present in small numbers on the Lassen (16 wolves), Tahoe (4), Eldorado (12), Stanislaus (6), Angeles (5), and Rogue River National Forests (5) in California, although the basis for these estimates is not given (Young and Goldman 1944, p. 55). Charles Poole of the Service confirmed five wolves from northern Modoc County on the Oregon-California border in the vicinity of Cow Head Lake in the 1920s, and one was shot in July 1922 in Modoc County (Young and Goldman 1944, p. 57). The paucity of physical evidence of wolves occupying California is likely an artifact of persecution prior to the era of collecting specimens for natural history museums due to the Spanish missions and their extensive livestock interests (Schmidt 1991, p. 83). Late Pleistocene remains of gray wolves have been uncovered in several regions of California (including at La Brea tarpits (Los Angeles County), Maricopa Brea (Kern County), McKittrick Tar Seeps (Kern County), Potter Creek Cave (Shasta County), Samwel Cave (Shasta County), and Shuiling Cave

(San Bernardino County) (Nowak 1979, pp. 99-100). Moreover, wolves were historically known to occupy every habitat containing large ungulates in the Northern Hemisphere from about 20 degrees latitude to the polar ice pack (Fuller *et al.* 2003, p. 163). The adaptability of wolves and the early first-hand accounts of wolves in California suggest that wolves likely occurred in northern California, the Sierra Nevada, and southern California mountains.

In Nevada, wolves may have always been scarce (Young and Goldman 1944, p. 30), but probably occurred in the forested regions of the state (Young and Goldman 1944, p. 10, 455). During 20 years of predator control campaigns of the early 1900s, six wolves were taken, only one of which was from the western half of the State, near the ghost town of Leadville, NV (Young and Goldman 1944, p. 30; Hall 1946, p. 266-269). In addition to this record, there is one record of early-recent gray wolf bone remains, near Fallon, Nevada (Churchill County) (Morrison 1964, p. 73; Nowak 1979, p. 101). Several wolf observations from western Nevada were also reported in 1852 from around the Humboldt River, Humboldt Sink, and Carson Valley (Turnbull 1913, pp. 164, 195, 200, 208; Young and Goldman 1944, p. 30).

Pacific Northwest - Causes of Decline

Extensive unregulated trapping of wolves for their pelts began with the arrival of the Hudson's Bay Company in the Pacific Northwest and the establishment of a system of trade for wolf pelts in 1820s (Laufer and Jenkins 1989, p. 323). From1827 to 1859, over 7,700 wolf pelts were traded from in or near the Cascades Mountain area in

Washington and British Columbia alone (Laufer and Jenkins 1989, p. 323). This was followed by an influx of settlers to the region in the mid-1800s who used strychnine to poison wolves in an effort to protect livestock (e.g., Putnam 1928, p. 256). As the first provisional governments in the region were formed, they enacted wolf bounties, which spawned an industry of bounty hunters, or "wolfers," who used strychnine to kill large numbers of wolves to collect bounties and to sell wolf pelts (Hampton 1997, pp. 107-108). Eradication of wolves continued into the twentieth century, when government forest rangers were encouraged to kill wolves on public lands to destroy the remaining "breeding grounds" of wolves (Hampton 1997, pp. 131-132). In 1915, Congress appropriated money to the federal Bureau of Biological Survey and its Division of Predator and Rodent Control (PARC) to fund the extirpation of wolves and other animals injurious to agriculture and animal husbandry (Hampton, p. 134). Ultimately, the combination of poisoning, unregulated trapping, and shooting-spurred by Federal, state, and local government bounties, and the public funding of wolf extermination efforts resulted in the elimination of the gray wolf from the Pacific Northwest and many other areas.

Pacific Northwest - Current Distribution

At the time of the passage of the Federal Endangered Species Act of 1973, wolves were presumed to be extirpated from the Pacific Northwest; however, a wolf (OSUFW 8727) was killed in eastern Douglas County, Oregon in 1978 (Verts and Carraway 1998, p. 363). As a result of colonization from core wolf habitats in Yellowstone and central

Idaho where wolves were reintroduced in the mid-1990s, breeding wolf packs became reestablished in northeastern Oregon and eastern Washington (U.S. Fish and Wildlife Service *et al.* 2011, p.5). Because of their connectivity to core habitats in central Idaho, wolves in the eastern third of Oregon and Washington are now considered part of the NRM DPS (76 FR 25590).

In Oregon, there have been several recent credible reports of wolves west of the NRM DPS, in the western Blue Mountains, central Cascades and Klamath Basin, including a lone wolf that was photographed along Highway 20 near the Three Sisters Wilderness in 2009, and a radio-collared wolf (OR-3) from the Imnaha Pack (one of four known packs located within the NRM DPS) that was photographed by a trail camera on July 5, 2011 on the western edge of the Umatilla National Forest in Wheeler County. The last telemetry location for this dispersing wolf was recorded on September 30, 2011, in Crook County, Oregon, over 250 km (156 mi) from its natal area (ODFW 2011). In addition, another dispersing wolf (OR-7), also from the Imnaha pack, has travelled over 600 km (373 mi) straight-line distance from its natal area and ventured as far as northern California. Evidence of wolves breeding west of the NRM DPS in Oregon has not been documented in recent times (personal communication T. Hiller, ODFW, 2011).

In the North Cascades of Washington, near the Canadian Border, numerous wolf sightings were reported in the 1980s and 1990s, including at least three separate groups of adult wolves with pups (Laufer and Jenkins 1989, p. 323; North Cascades National Park 2004, pp. 2-3). Multiple wolf reports from Okanogan County in 2008 led to confirmation of the first fully documented (through photographs, howling responses, and genetic testing) breeding by a wolf pack in Washington since the 1930s. A pack (named

the Lookout Pack) with at least four adults/yearlings and six pups was confirmed in the western part of the county and adjacent northern Chelan County (west of the NRM DPS) in the summer of 2008, when the breeding male and female were captured and radio-collared, and other pack members were photographed. Preliminary genetic testing of the breeding male and female suggested they were descended from wolves occurring in (1) coastal British Columbia and (2) northeastern British Columbia, northwestern Alberta, or the reintroduced populations in central Idaho and the greater Yellowstone area (J. Pollinger 2008, pers. comm.).

The pack produced another litter of at least four pups in 2009, as well as a probable litter in 2007 based on a sighting report of six to eight animals in nearby northern Chelan County in September 2007 (R. Kuntz, pers. comm.) and a report of seven to nine animals in Okanogan County in the winter of 2007-2008. The pack appears to have suffered significant human-caused mortality from illegal killing. In June, 2011, a Federal grand jury indictment included the alleged killing of up to five wolves in 2008 and 2009, believed to be members of the Lookout pack. In May 2010, the Lookout breeding female disappeared several weeks after the suspected birth of a litter. This appeared to cause a breakdown in pack structure, with the breeding male ranging more widely and spending most of the summer alone. The status of this pack was unknown at the end of 2011. However, sightings of multiple wolves (including the breeding male) traveling together in the winter of 2011/2012 indicate there are still two wolves inhabiting the Lookout pack's territory. The pack occupied an area totaling about 350 square miles from 2008 to 2010 (Wiles *et al.* 2011, p. 23).

In the spring of 2011, numerous sightings of wolves were reported from the Cle Elum Ranger District in central Washington and the subsequent deployment of remotely activated field cameras documented four different wolf-like canids in the area, with one photo showing an adult and a subadult. A lactating female from this group of canids (named the Teanaway pack) was subsequently captured, and genetic testing confirmed that this individual was a gray wolf that was closely related to (consistent with being an offspring of) the Lookout pack breeding pair (Robinson *et al.* 2011, *in litt.*, pp. 1-2). In December 2011, it was determined that this pack consisted of three adults and four pups occupying an area of approximately 300 square miles (Frame and Allen, 2012, p. 8).

During the winter of 2010-2011, remote cameras recorded images of what appeared to be wolves near Hozemeen, Washington in the Ross Lake National Recreation Area, near the Canadian border. In May 2011, biologists from the Washington Department of Fish and Wildlife (WDFW) conducted an effort to trap and radio-collar potential wolves at this location. Abundant canine scat and several sets of canine tracks were observed during the 3-week effort, but no animals were captured. At this time the genetic status (wolf, dog, or wolf-dog hybrid) and denning location of these animals has not been determined.

In California, the only wolf confirmed since their extirpation has been the dispersing wolf (OR-7) from northeastern Oregon. In Nevada, there have been no confirmed reports of wolves since their extirpation, which likely occurred in the 1940s (Young and Goldman 1944, p. 56).

Pacific Northwest - Do Wolves in this Area Constitute a Population?

Fundamental to identification of a possible DPS is the existence of a population. As stated previously, our regulations define a "population" as a "group of fish or wildlife in the same taxon below the subspecific level, in common spatial arrangement that interbreed when mature'' (50 CFR 17.3). We have refined that definition in other wolf rulemakings to mean "at least 2 breeding pairs of wild wolves successfully raising at least 2 young each year (until December 31 of the year of their birth), for 2 consecutive years" (USFWS 1994, Appendix 8; 59 FR 60252, 60266; November 22, 1994). The determination justifying this definition found that these standards were "the minimum standards for a wolf population" and that a "group of wolves [meeting this standard] would cease to be a population if one or both pairs do not survive, do not maintain their pair-bond, do not breed, or do not produce offspring, or if both pups do not survive for the specified period" (Service 1994, Appendix 8).

To date, this standard has not been documented in the Pacific Northwest (specifically, for those wolves outside of the Northern Rocky Mountain DPS's western boundary and south of the Canadian border). While two breeding pairs have been documented in listed portions of the Pacific Northwest (both in Washington), 2 consecutive years of raising 2 young has been documented only for one breeding pair. The Teanaway pack was documented successfully raising at least two young until December 31 in 2011 and 2012 (Frame and Allen 2012, p. 8; WDFW 2013). Breeding-pair status in the Lookout pack has not been confirmed since 2009. Otherwise, only lone dispersing animals have been documented in this area.

Even though wolves in the Pacific Northwest, when viewed in isolation, do not yet constitute a population according to our 1994 definition, we decided to undertake a DPS analysis for two reasons. First, given the rugged terrain in the North Cascades and the limited search effort, and the fact that the Lookout pack has not had any radio-collared individuals since 2010, it is possible that additional breeding pairs have gone undetected or that the documented breeding pairs have successfully bred in consecutive years without detection. Over the last 2 years, WDFW has collected evidence suggesting that a pack may be located on the Canadian border, but radio collaring efforts have not yet been successful. Public observations also support the possibility of other wolves in the area, but as of the date of this publication, only two breeding pairs have been confirmed in Washington's North Cascades in recent times.

Second, wolf recolonization patterns (Frame and Allen 2012, p. 6; Morgan 2011, pp. 2-6) indicate that even if wolves do not currently meet our technical definition of a population in the Pacific Northwest, we expect dispersing wolves from the Northern Rocky Mountains, and British Columbia to occupy the area in the near future. Three new packs were documented in eastern Washington (four additional packs are suspected; three in eastern Washington and one in northwestern Washington) in 2012. Wolves in the NRM DPS and in British Columbia are expanding in number and distribution. (USFWS 2012, p.1, 2; British Columbia Ministry of Forests, Lands, and Natural Resource Operations 2012, p.4). Expansion of wolves into these surrounding areas increases the chance that dispersing wolves will move into unoccupied areas or areas with low wolf densities (Fuller *et al.* 2003, p. 181, Jimenez *et al.* In review, entire) such as the Pacific Northwest. Therefore, while the best available information indicates our standard for a

population has not yet been satisfied, this standard will likely be met in the next few years.

It is worth noting that this situation is fundamentally different than past situations where wolves were evaluated against our "wolf population standard." In 1994, we determined that neither the Greater Yellowstone Area nor the central Idaho region were "even close to having a separate population" (USFWS 1994, Appendix 8). In this evaluation, Idaho was noted as having the most wolf activity, but even this was described as only "occasional immigration of single wolves from a breeding population(s) elsewhere, possible with intermittent reproduction in some years" (USFWS 1994, Appendix 8). Similarly, in 2010, we concluded that a petition to list a northeastern U.S. wolf DPS "did not present substantial scientific or commercial information indicating that the petitioned action may be warranted" primarily because the petition and other readily available information failed to show anything more than occasional dispersers and no reproduction (75 FR 32869, June 10, 2010). These situations contrast with the Pacific Northwest where the region appears to be approaching our standards for a population. Given the above, we evaluate the discreteness of wolves in this area relative to other wolf populations.

Pacific Northwest - Distinct Vertebrate Population Segment Analysis Introduction

The DPS evaluation that follows concerns gray wolves occurring in the Pacific Northwest (i.e., wolves to the west of the Northern Rocky Mountain DPS within the contiguous United States).

Pacific Northwest - Discreteness Analysis

Adjacent to our analysis area there are two wolf population sources, including wolves to the east in the NRM DPS and wolves to the north, in British Columbia. We will analyze discreteness in relation to the NRM DPS first. If we determine that wolves in the Pacific Northwest are not discrete from NRM wolves, an evaluation with respect to British Columbia is not needed. If, however, Pacific NW wolves are discrete from NRM wolves, we will then analyze discreteness from the wolves in British Columbia.

*Marked Separation - Physical Factors*—In our 2009 rule designating and delisting the NRM DPS (vacated *(Defenders of Wildlife et al.* v. *Salazar et al.*, (729 F. Supp. 2d 1207 (D. Mont.), but later reinstated by act of Congress (§ 1713 of Public Law 112–10)) we found that wolves in the NRM were physically discrete from any wolves that might eventually occupy the area to the west of the NRM boundary (74 FR 15123). At that time, there was only one wolf pack west of the NRM boundary, and genetic evidence suggested that at least one member of that pack came from British Columbia. The boundary for the NRM DPS, finalized in 2008 (73 FR 10518, February 27, 2008), was determined largely by identifying a breakpoint (three times the average dispersal distance) for unusually long-distance dispersal out from existing pack territories in 2004. Since that time, wolves have expanded in number and distribution (Service 2012), and the outer edge of the NRM wolf population is now very close to the western boundary of

the NRM DPS in northeast Washington and Oregon. Wolves, which likely originated from the NRM DPS, currently occupy territories within 40 km (25 mi) of the DPS boundary in Oregon and within 80 km (50 mi) of the DPS boundary in Washington (suspected packs in Washington; confirmed packs are 135 km (85mi)). Furthermore, the Lookout Pack (which is outside the NRM DPS boundary in listed portions of Washington) are within approximately 89 km (55 mi) from the nearest pack in the NRM DPS (Strawberry pack, on the Colville Indian Reservation in north central Washington). Similarly, the Teanaway pack (also outside the NRM DPS boundary in listed portions of Washington, in the Cascade Mountains) is approximately 177 km (110 mi) from the Strawberry pack. In our rule delisting the NRM DPS of gray wolf we defined likely dispersal distances of from 97 to 300 km (60 to 190 mi) from a core wolf population. Distances between wolves currently occupying territories on either side of the NRM DPS boundary fall well within our defined range of likely dispersal distances, suggesting that physical distance does not separate these wolves long-term.

To further understand physical separation in the Pacific Northwest, we reviewed several wolf habitat models (Houts 2003, p. 7; Ratti *et al.* 2004, p. 30, Larsen and Ripple 2006, pp. 48, 52, 56; Carroll *et al.* 2001, p. 36; Carroll *et al.* 2006, p. 27, Carroll, *in litt.* 2008, p.2) and an analysis of wolf-movement habitat linkages and fracture zones in Washington (Singleton *et al.* 2002, Fig. 12). We also reviewed a modeling effort by Washington Department of Fish and Wildlife that combined habitat models with movement data (Wiles *et al.* 2011, p. 55). Because none of these models covered the entire area of interest, we also projected Oakleaf *et al.* 's (2006) wolf habitat model across Washington, Oregon, and northern California using local data (USFWS,

unpublished data). Based this new review of wolf habitat models, there is little separation of occupied wolf habitat in the NRM DPS and suitable habitat in the analysis area. Furthermore, because most wolf habitat models are developed based on the location of wolf territories (rather than dispersing wolves), geographic gaps in suitable habitat may not be reflective of long-term barriers to population interchange (Mladenoff *et al.* 1999), as we previously implied (74 CFR 15123), especially as wolf occupancy continues to increase on both sides of the NRM DPS' western boundary.

Data from habitat mapping efforts suggests that any gaps in suitable (breeding) habitat are not so wide as to preclude dispersing individuals. It is well known that wolves move long distances across a variety of habitat types including open grasslands and agricultural areas (Mech 1995, p. 272) and rivers are not effective barriers to movement (Young and Goldman 1944, pp. 79-80).

In Washington, the NRM DPS boundary runs along the Okanogan River, which occupies a narrow (15-25km (10 to 15 mi) strip of unsuitable habitat (open sagebrush, agriculture) between the Okanogan Highlands and the Cascade Mountains. Further south, the DPS boundary transects the Columbia Basin, an unforested agricultural region that likely limits wolf dispersal to a certain extent. Wolf habitat models by Larsen and Ripple (2006, entire) and Carroll (*in litt.* 2008, p.2) showed suitable habitat along the Oregon coast and the Cascade Range, with limited separation of suitable habitat across the NRM DPS boundary in northeast Oregon. The Blue Mountain range stretches from the extreme northeast corner of Oregon southwest to the NRM DPS boundary, where the Blue Mountains transition into the smaller Aldrich and Ochoco ranges. These public lands link together smaller tracts of suitable habitat, and arrive at the Middle Deschutes-

Crooked River basin about 175 km (108 mi) west of the NRM DPS, and 65 km (40 mi) east of the Cascade Mountains (a large tract of high quality wolf habitat). Although somewhat patchy, several juvenile wolves have successfully traveled through this habitat while dispersing from the NRM DPS (ODFW 2011, pp. 5-6).

Based on our analysis above, we find that there is no significant physical separation delimiting wolves in the analysis area from the NRM wolf population.

*Marked Separation - Physiological, Behavioral, or Ecological Factors*—Information on the current physiological, behavioral, or ecological separation of wolves in the analysis area and wolves in the NRM DPS is equivocal. Genetic analysis of a male and female wolf from the Lookout pack found that the male possessed a mitochondrial haplotype unique to coastal/southern British Columbia region and markedly different than haplotypes present in the NRM DPS (Pollinger *et al., in litt.* 2008, p. 2). However, the female possessed a mitochondrial haplotype that was broadly distributed throughout North America (Pollinger *et al., in litt.* 2008, p. 2). The fact that the female had a more broadly distributed mitochondrial haplotype means that she could have originated from coastal British Columbia, but the data cannot rule out the possibility that she may have originated elsewhere (i.e., NRM DPS). Analysis of microsatellites ruled out the possibility that the two wolves originated from the southern Alberta/northwest Montana population, but could not clearly determine whether they were more related to coastal/southern British Columbia wolves or wolves from the reintroduced population in Idaho and Yellowstone (Pollinger *et al., in litt.* 2008, p. 3). Genetic testing of a female wolf from the Teanaway pack in the southern Cascades of Washington State indicated

that she was closely related to the male and female of the Lookout pack (*i.e.*, probably a descendent of the Lookout pack's male and female) (Robinson *et al.*, *in litt.* 2011, p. 1-2). Therefore, contemporary genetic information does not lead us to conclude that wolves on either side of the NRM DPS line have marked genetic differences.

Historical subspecies delineations based on morphology suggest a biological boundary limiting dispersal or reproductive intermixing likely existed between eastern and western Oregon and Washington prior to the extirpation of wolves from the region (Bailey 1936, pp. 272-275; Young and Goldman 1944, p. 414; Hall and Kelson 1959, p. 849, Figure 6). Moreover, recent genetic, behavioral, and morphological data in British Columbia and Alaska show marked separation of coastal and inland wolves (Geffen *et al.* 2004, p. 2488-2489; Muñoz-Fuentes *et al.* 2009, pp. 10-12; Weckworth *et al.* 2010, pp. 371-372, vonHoldt *et al.* 2011, pp. 2-8), which is indicative of ecological processes that may extend into the Pacific Northwest of the United States where climatic and physiographic factors of coastal and inland ecosystems parallel those to the north (Commission for Environmental Cooperation 1997, p. 9, 21-22). If dispersing gray wolves select habitats similar to the one in which they were reared (as hypothesized by Muñoz-Fuentes *et al.* (2009, pp.10-11)) we would expect limited movement and interbreeding of wolves in coastal and inland areas, similar to the historical pattern of differentiation. However, the mechanisms for a subspecific divide in British Columbia is unknown and the ultimate recolonization pattern of wolves in the Pacific Northwest region of the United States and the extent of any future separation from the NRM DPS is unpredictable. Wolves can disperse long distances across a variety of habitats, as evidenced by OR-3 and OR-7, dispersing wolves from Oregon (Mech 1995, p. 272).

Thus, wolves may recolonize western Oregon and Washington and the rest of the region from coastal British Columbia, from eastern Oregon and eastern Washington, or from both areas. Whether wolves from one area will possess traits that allow them to outcompete or exclude wolves from the other area or whether they will regularly intermix is unknown. However, given their long-range dispersal capabilities, known long-distance dispersal events across the NRM boundary, and lack of major habitat barriers it is more likely that wolves on either side of the NRM boundary will not form discrete populations as defined in our DPS policy.

Summary for DPS analysis

Recovery of wolf populations in the NRM DPS and southern British Columbia (British Columbia Ministry of Forests, Lands and Natural Resource Operations (2012, p. 4) has contributed to recolonization of new areas in eastern Washington and Oregon. While we know of resident wolves occupying territories in the western two thirds of Washington (outside the NRM DPS), they do not currently constitute a "population," and therefore the area cannot be defined as a DPS. Nevertheless, given ongoing recolonization and the lack of substantial dispersal barriers into the Pacific Northwest from populations to the north and east, wolves in the area are likely to meet our standard for a population in the near future. Therefore, we moved forward with a DPS analysis to see if such a likely future population would be discrete from existing population in the Northern Rocky Mountains and British Columbia.

In the absence of identified barriers to intermixing, dispersal of wolves across the NRM DPS boundary is likely to continue such that a future wolf population in the Pacific Northwest is not likely to be discrete from wolves in the NRM DPS. Habitat linkages also connect occupied wolf habitat in British Columbia to available habitat in the Pacific Northwest (Carroll et al. 200, p. 8). It is reasonable to expect that the future population of wolves in the Pacific Northwest will be an extension, or part of, populations to the north and east, rather than a discrete population. Furthermore, the best available information does not indicate that wolves in the Pacific Northwest are likely to possess physiological, behavioral, or ecological traits that separate them from wolves in the Northern Rocky Mountains. Therefore, we find that wolves in the Pacific Northwest are not discrete from wolves in the Northern Rocky Mountains – rather they constitute the expanding front of large, robust, and recovered wolf populations to the north and east. Even if we considered a larger DPS, with a northern boundary extending into British Columbia, we would still find a lack of discreteness from the NRM DPS. Due to this lack of discreteness, wolves in the Pacific Northwest, whether considered in combination with wolves in British Columbia or alone, would not qualify as a distinct population segment under our 1996 DPS policy and are therefore not eligible for protection under the Act.

We are confident that wolves will continue to recolonize the Pacific Northwest regardless of Federal protection. Wolves are classified as endangered under both the Oregon and Washington Endangered Species Acts (Washington Administrative Code (WAC) 232-12-014 and 232-12-011; Oregon Code of Regulations (ORS) 496.171 to 496.192 and 498.026) and both States have conservation strategies for recovering wolves

(ODFW 2010, entire; Wiles *et al.* 2011, entire). In addition, California recently declared wolves as a candidate for listing under the California Endangered Species Act. While they review whether to add wolves to their list of threatened or endangered species California will treat wolves as a State-listed species.

**Significant Portion of its Range Analysis**

The Act defines "endangered species" as any species which is "in danger of extinction throughout all or a significant portion of its range," and "threatened species" as any species which is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The definition of "species" is also relevant to this discussion. The Act defines the term "species" as follows: "The term 'species' includes any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature." The phrase "significant portion of its range" (SPR) is not defined by the statute, and we have never addressed in our regulations: (1) The consequences of a determination that a species is either endangered or likely to become so throughout a significant portion of its range, but not throughout all of its range; or (2) what qualifies a portion of a range as "significant."

Two recent district court decisions have addressed whether the SPR language allows the Service to list or protect less than all members of a defined "species": *Defenders of Wildlife* v. *Salazar*, 729 F. Supp. 2d 1207 (D. Mont. 2010), *vacated on other grounds* (9th Cir. 2012), concerning the Service's delisting of the Northern Rocky

Mountain gray wolf (74 FR 15123, Apr. 12, 2009); and *WildEarth Guardians* v. *Salazar*, 2010 U.S. Dist. LEXIS 105253 (D. Ariz. Sept. 30, 2010), concerning the Service's 2008 finding on a petition to list the Gunnison's prairie dog (73 FR 6660, Feb. 5, 2008). The Service had asserted in both of these determinations that it had authority, in effect, to protect only some members of a "species," as defined by the Act (*i.e.*, species, subspecies, or DPS), under the Act. Both courts ruled that the determinations were arbitrary and capricious on the grounds that this approach violated the plain and unambiguous language of the Act. The courts concluded that reading the SPR language to allow protecting only a portion of a species' range is inconsistent with the Act's definition of "species." The courts concluded that once a determination is made that a species (i.e., species, subspecies, or DPS) meets the definition of "endangered species" or "threatened species," it must be placed on the list in its entirety and the Act's protections applied consistently to all members of that species (subject to modification of protections through special rules under sections 4(d) and 10(j) of the Act).

Consistent with that interpretation, and for the purposes of this finding, we interpret the phrase "significant portion of its range" in the Act's definitions of "endangered species" and "threatened species" to provide an independent basis for listing; thus there are two situations (or factual bases) under which a species would qualify for listing: a species may be endangered or threatened throughout all of its range; or a species may be endangered or threatened in only a significant portion of its range. If a species is in danger of extinction throughout an SPR, it, the species, is an "endangered species." The same analysis applies to "threatened species." Therefore, the consequence of finding that a species is endangered or threatened in only a significant portion of its

range is that the entire species shall be listed as endangered or threatened, respectively, and the Act's protections shall be applied across the species' entire range.

We conclude, for the purposes of this finding, that interpreting the SPR phrase as providing an independent basis for listing is the best interpretation of the Act because it is consistent with the purposes and the plain meaning of the key definitions of the Act; it does not conflict with established past agency practice, as no consistent, long-term agency practice has been established; and it is consistent with the judicial opinions that have most closely examined this issue. Having concluded that the phrase "significant portion of its range" provides an independent basis for listing and protecting the entire species, we next turn to the meaning of "significant" to determine the threshold for when such an independent basis for listing exists.

Although there are potentially many ways to determine whether a portion of a species' range is "significant," we conclude, for the purposes of this finding, that the significance of the portion of the range should be determined based on its biological contribution to the conservation of the species. For this reason, we describe the threshold for "significant" in terms of an increase in the risk of extinction for the species. We conclude that a biologically based definition of "significant" best conforms to the purposes of the Act, is consistent with judicial interpretations, and best ensures species' conservation. Thus, for the purposes of this finding, a portion of the range of a species is "significant" if its contribution to the viability of the species is so important that, without that portion, the species would be in danger of extinction.

We evaluate biological significance based on the principles of conservation biology using the concepts of redundancy, resiliency, and representation. *Resiliency*

describes the characteristics of a species that allow it to recover from periodic disturbance. *Redundancy* (having multiple populations distributed across the landscape) may be needed to provide a margin of safety for the species to withstand catastrophic events. *Representation* (the range of variation found in a species) ensures that the species' adaptive capabilities are conserved. Redundancy, resiliency, and representation are not independent of each other, and some characteristic of a species or area may contribute to all three. For example, distribution across a wide variety of habitats is an indicator of representation, but it may also indicate a broad geographic distribution contributing to redundancy (decreasing the chance that any one event affects the entire species), and the likelihood that some habitat types are less susceptible to certain threats, contributing to resiliency (the ability of the species to recover from disturbance). None of these concepts is intended to be mutually exclusive, and a portion of a species' range may be determined to be "significant" due to its contributions under any one of these concepts.

For the purposes of this finding, we determine whether a portion's biological contribution is so important that the portion qualifies as "significant" by asking whether, *without that portion*, the representation, redundancy, or resiliency of the species would be so impaired that the species would have an increased vulnerability to threats to the point that the overall species would be in danger of extinction (i.e., would be "endangered"). Conversely, we would not consider the portion of the range at issue to be "significant" if there is sufficient resiliency, redundancy, and representation elsewhere in the species' range that the species would not be in danger of extinction throughout its range if the population in that portion of the range in question became extirpated (extinct locally).

We recognize that this definition of "significant" establishes a threshold that is relatively high. On the one hand, given that the consequences of finding a species to be endangered or threatened in an SPR would be listing the species throughout its entire range, it is important to use a threshold for "significant" that is robust. It would not be meaningful or appropriate to establish a very low threshold whereby a portion of the range can be considered "significant" even if only a negligible increase in extinction risk would result from its loss. Because nearly any portion of a species' range can be said to contribute some increment to a species' viability, use of such a low threshold would require us to impose restrictions and expend conservation resources disproportionately to conservation benefit: listing would be rangewide, even if only a portion of the range of minor conservation importance to the species is imperiled. On the other hand, it would be inappropriate to establish a threshold for "significant" that is too high. This would be the case if the standard were, for example, that a portion of the range can be considered "significant" only if threats in that portion result in the entire species' being currently endangered or threatened. Such a high bar would not give the SPR phrase independent meaning, as the Ninth Circuit held in *Defenders of Wildlife* v. *Norton*, 258 F.3d 1136 (9th Cir. 2001).

The definition of "significant" used in this finding carefully balances these concerns. By setting a relatively high threshold, we minimize the degree to which restrictions will be imposed or resources expended that do not contribute substantially to species conservation. But we have not set the threshold so high that the phrase "in a significant portion of its range" loses independent meaning. Specifically, we have not set the threshold as high as it was under the interpretation presented by the Service in the

*Defenders* litigation. Under that interpretation, the portion of the range would have to be so important that current imperilment there would mean that the species would be *currently* imperiled everywhere. Under the definition of "significant" used in this finding, the portion of the range need not rise to such an exceptionally high level of biological significance. (We recognize that if the species is imperiled in a portion that rises to that level of biological significance, then we should conclude that the species is in fact imperiled throughout all of its range, and that we would not need to rely on the SPR language for such a listing.) Rather, under this interpretation we ask whether the species would be endangered everywhere without that portion, *i.e.*, if that portion were completely extirpated. In other words, the portion of the range need not be so important that even being in danger of extinction in that portion would be sufficient to cause the remainder of the range to be endangered; rather, the *complete extirpation* (in a hypothetical future) of the species in that portion would be required to cause the remainder of the range to be endangered.

The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that have no reasonable potential to be significant *and* threatened or endangered. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that: (1) The portions may be "significant," and (2) the species may be in danger of extinction there or likely to become so within the foreseeable future. Depending on the biology of the species, its range, and the threats it faces, it might be more efficient for us to address the significance question first or the status question first. Thus, if we determine that a portion of the range is not "significant," we

do not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we do not need to determine if that portion is "significant." In practice, a key part of the portion status analysis is whether the threats are geographically concentrated in some way. If the threats to the species are essentially uniform throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the species' range that clearly would not meet the biologically based definition of "significant," such portions will not warrant further consideration.

*C. lupus, C. l. nubilus and C. l. occidentalis*

Having determined that *C. lupus, C. l. nubilus* and *C. l. occidentalis* are not endangered or threatened throughout their ranges, we next consider whether there are any significant portions of the range where *C. lupus, C. l. nubilus* or *C. l. occidentalis* is in danger of extinction or is likely to become endangered in the foreseeable future.

We consider the range of *C. lupus* to include portions of North America, Europe, North, Central and South Asia, the Middle East, and possibly North Africa (Mech and Boitani 2004, p 125-128; Linnell *et al.* 2008, p. 48; 77 FR 55539; 76 FR 81676; Rueness *et al.* 2011, pp. 1-5; Gaubert *et al.* 2012, pp. 3-7).

We consider the range of *C. l. nublilus* to include the western Great Lakes region, and portions of western Washington and western Oregon, and southeastern Alaska in the United States, the western and coastal regions of British Columbia, most of mainland

Nunavut, a portion of mainland Northwest Territories, northern Manitoba, northern Ontario, most of Quebec in Canada.

We consider the range of *C. l. occidentalis* to include Montana, Idaho, Wyoming, eastern Oregon and Washington, and most of Alaska in the United States and the Yukon Territories, Northwest Territories, the western edge of mainland Nunavut, British Columbia, most of Alberta and Saskatchewan, and western and southern Manitoba in Canada.

Applying the process described above, we evaluated the range of *C. lupus, C. l. nubilus* and *C. l. occidentalis* to determine if any portion of the ranges of these taxa warranted further consideration.

*Canis lupus* - As stated previously, populations of *C. lupus* occur in 46 countries and are distributed across several continents. Through our review we found evidence to indicate that at the regional level some populations are facing significant threats. For example *C. lupus* populations in the southwestern United States (see *C. l. baileyi* analysis above), on the Iberian Peninsula of Southern Spain, and in Central Europe (Linnell *et al.* 2008, p. 63), are threatened by illegal persecution, small population size and isolation. However, the species' large population levels elsewhere, high reproductive rate, dispersal capabilities, and expansive range relative to any of the threatened regional populations, along with the lack of an substantial information indicating otherwise, leads us to conclude that threats are not occurring across enough of the range for any of these portions to be considered a significant portion of the range of *C. lupus.*

*Canis lupus nubilus and Canis lupus occidentalis* - Based on our evaluations (see *C. l. nubilus* and *C. l. occidentalis* analyses above) it is evident that *C. l. nubilus and C. l.*

*occidentalis* populations are well distributed in Canada and currently represented in the WGL and NRM regions of the United States respectively. We evaluated the current ranges of *C. l. nubilus* or *C. l. occidentalis* to determine if there is any apparent geographic concentration of the primary stressors potentially affecting the subspecies including human-caused mortality, habitat alteration, public attitudes/tolerance, and predator control. We found that the stressors are not of sufficient imminence, intensity or magnitude or sufficiently geographically concentrated to indicate either subspecies is in danger of extinction in a portion of its range.

**Summary of Finding**

In summary, we find that the current *C. lupus* listed entity as it is described on the List does not represent a valid species under the Act. This conclusion is based on our assertion that (1) the current listed entity includes large areas erroneously includes the eastern United States; a region of the contiguous United States that the best scientific information indicates is outside of the historical range of *C. lupus*; (2) other portions of the listing lack sufficient suitable habitat to support persistent wolf pack occupancy; and (3) the listing is far more expansive than what we envision for gray wolf recovery, what is necessary for gray wolf recovery, and even what is possible for gray wolf recovery in the contiguous United States and Mexico. Given our current knowledge it would not make rational sense to consider listing the current *C. lupus* entity as a DPS; therefore, we propose to remove the current *C. lupus* listed entity from the List.

We considered whether the currently listed entity should be replaced with a valid listing for the *C. lupus* species, or a subspecies, or a DPS of *C. lupus* that is threatened or endangered in the contiguous United States and Mexico. As required by the Act, we considered the five factors in assessing whether *C. lupus*, *C. l. nubilus, C. l. occidentalis,* or *C. l. baileyi* are threatened or endangered throughout all of its range. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by these taxa. We reviewed the information available in our files, other available published and unpublished information, and we consulted with recognized experts and other Federal, State, and tribal agencies.

With respect to *C. lupus* we find that although the species has undergone significant range contraction in portions of its historical range, *C. lupus* continues to be widespread and, as a whole, is stable. We found no substantial evidence to suggest that *C. lupus* may be at risk of extinction throughout its global range now or may likely to become so in the foreseeable future.

With respect to the North American subspecies *C. l. nubilus* and *C. l. occidentalis*, we find that wolves occupying *C. l. nubilus'* and *C. l. occidentalis'* historical range are widespread, exist as large, stable populations, with no evidence of decline over the last 10 years despite liberal harvest. We did not identify any threats to these subspecies, indicating that *C. l. nubilus* and *C. l. occidentalis* are not danger of extinction throughout their range and, therefore, neither subspecies meets the definition of an endangered species. *C. l. nubilus* and *C. l. occidentalis* are also not likely to become endangered within the foreseeable future throughout all of their range.

With respect to *C. l. baileyi*, we find that the subspecies is in danger of extinction throughout all of its range due to small population size, illegal killing, inbreeding, and the cumulative effect of all threats. *C. l. baileyi* used to range throughout central and southern Arizona and New Mexico, a small portion of Texas, and much of Mexico. Its numbers were reduced to near extinction prior to protection by the Act in the 1970's, such that the captive breeding program was founded with only seven wolves. Although our recovery efforts for *C. l. baileyi*, which are still underway, have led to the re-establishment of a wild population in the United States, the single, small population of *C. l. baileyi* would face an imminent risk of extinction from the combined effects of small population size, inbreeding, and illegal shooting, without the protection of the Act. Absent protection by the Act, regulatory protection, especially against shooting, poisoning, or other forms of killing, would not be adequate to ensure the survival of *C. l. baileyi*.

With respect to gray wolves in the Pacific Northwest (outside of the NRM DPS), recovery of wolf populations in the NRM DPS and southern British Columbia (British Columbia Ministry of Forests, Lands and Natural Resource Operations (2012, p. 4) has contributed to recolonization of new areas in eastern Washington and Oregon. While we know of resident wolves occupying territories in the western two thirds of Washington (outside the NRM DPS), they do not currently constitute a "population," and therefore the area cannot be defined as a DPS. Nevertheless, given ongoing recolonization and the lack of substantial dispersal barriers into the Pacific Northwest from populations to the north and east, wolves in the area are likely to meet our standard for a population in the near future. Therefore, we moved forward with a DPS analysis to see if such a likely

future population would be discrete from existing population in the Northern Rocky Mountains and British Columbia.

In the absence of identified barriers to intermixing, dispersal of wolves across the NRM DPS boundary is likely to continue such that a future wolf population in the Pacific Northwest is not likely to be discrete from wolves in the NRM DPS. Habitat linkages also connect occupied wolf habitat in British Columbia to available habitat in the Pacific Northwest (Carroll et al. 200, p. 8). It is reasonable to expect that the future population of wolves in the Pacific Northwest will be an extension, or part of, populations to the north and east, rather than a discrete population. Furthermore, the best available information does not indicate that wolves in the Pacific Northwest are likely to possess physiological, behavioral, or ecological traits that separate them from wolves in the Northern Rocky Mountains. Therefore, we find that wolves in the Pacific Northwest are not discrete from wolves in the Northern Rocky Mountains – rather they constitute the expanding front of large, robust, and recovered wolf populations to the north and east. Even if we considered a larger DPS, with a northern boundary extending into British Columbia, we would still find a lack of discreteness from the NRM DPS. Due to this lack of discreteness, wolves in the Pacific Northwest, whether considered in combination with wolves in British Columbia or alone, would not qualify as a distinct population segment under our 1996 DPS policy and are therefore not eligible for protection under the Act.

With respect to significant portion of its range, we find that although some regional populations of *C. lupus* are facing significant threats, the species' large population levels elsewhere, high reproductive rate, dispersal capabilities, and expansive

range relative to any of the threatened regional populations, leads us to conclude that the existing threats are not geographically concentrated in an area large enough to be considered a significant portion of the range of *C. lupus*. In addition, we evaluated the current ranges of *C. l. nubilus* or *C. l. occidentalis* to determine if there is any apparent geographic concentration of the primary stressors potentially affecting the subspecies and found that the stressors are not of sufficient imminence, intensity or magnitude or sufficiently geographically concentrated to indicate either subspecies is in danger of extinction in a portion of its range.

Based on the best scientific and commercial information, we find that *C. lupus, C. l. nubilus* and *C. l. occidentalis* are not in danger of extinction now, and are not likely to become endangered within the foreseeable future, throughout all or a significant portion of their ranges. Therefore, listing *C. lupus, C. l. nubilus* or *C. l. occidentalis* as threatened or endangered under the Act is not warranted at this time.

**Canis lycaon**

*Canis lycaon* was proposed as the designation for the eastern wolf by Wilson *et al.* (2000), and Nowak (2009) provisionally stated that, if given species status, the name, *Canis lycaon*, would take precedence; see also Brewster and Fritts 1995 and Goldman 1944. Since Wilson *et al.* 's (2000) proposed species designation, *Canis lycaon* has been used by Wayne and Vila (2003), Grewal *et al.* (2004), Kyle *et al.* (2006), Chambers *et al.* (2012), Wilson *et al.* (2009), Rutledge *et al.* (2010a,b), Rutledge *et al.* (2012) and Mech *et al.* (In Prep).

Although the taxonomy of the eastern wolf is still being debated, we have considered the best information available to us at this time and concur with the recognition of *Canis lycaon*. We understand that different conclusions may be drawn by taxonomists and other scientists depending on whether morphological or genetic data are given precedence; however, we also agree with Thiel and Wydeven's (2012) observation that "Genetics taxonomy is still undergoing rapid advances, and is replacing morphological taxonomy as the prime determinant in designating species." In considering the different lines of evidence, we view the findings of the most recent analyses (Chambers *et al.* 2012 and Rutledge *et al.* 2012, both of which heavily rely on genetic data) to represent the best available information.

We are proposing to delist the current *C. lupus* entity due, in part, to our recognition of the eastern wolf taxon as *Canis lycaon*, rather than a subspecies of gray wolf, (see **Evaluation of the Current *C. lupus* Listed Entity**). We now also have information concerning the conservation status of *C. lycaon* within its current range– the status review conducted by Thiel and Wydevens (2012). Before we can determine whether *C. lycaon* warrants listing as endangered or threatened, we must first address outstanding science and policy questions. We must consider treatment of wolf-coyote hybrids in terms of how they affect both the identity of *C. lycaon* and do or do not contribute to its long-term status as a viable species. Also, we must assess how the threats identified in Thiel and Wydevens (2012) do or do not meet the definition of a "threatened species" or an "endangered species." In addition, we will be coordinating with COSEWIC regarding its status assessment for *C. lycaon*.

**Northeast Wolf Petition**

On October 9, 2012, the Service received a petition dated September 26, 2012, from Mr. John M. Glowa, Sr. acting on behalf of himself as President of the Maine Wolf Coalition and 397 petition signatories. The petition requested continued protection under the Act for all wolves in the Northeast and a Northeast wolf recovery plan. Section 4 of the Act authorizes petitions to list, reclassify, or delist a species, and to amend existing critical habitat designations. Section 553(e) of the Administrative Procedure Act (APA) provides interested parties the right to petition for the issuance, amendment, or repeal of a rule.

Because the wolf is currently listed in the Northeast and no rulemaking is necessary to provide protection under the Act, we find that the request for continued protection of wolves under the Act in the Northeast is not petitionable under the Act at this time. Also, because no rulemaking is necessary to provide the Act's protection of wolves in the Northeast at this time, we dismiss this request under the APA. If this proposed rule is made final, however, any wolves that were to disperse to the northeast United States would no longer be protected under the Act. As explained above, the Service is assessing the extent and status of *Canis lycaon*, the species native to the northeast United States; the outcome of this assessment will determine the need for the Act's protections.

With respect to the request for a Northeast recovery plan, development and implementation of a recovery plan are not identified as petitionable actions under the Act. Also, because these actions do not meet the definition of a rule or rulemaking, they are

not petitionable actions under the APA either. However, the outcome of our assessment of the extent and status of *Canis lycaon* will determine the need for a recovery plan.

**Proposed Determination**

After a thorough review of all available information and an evaluation of the five factors specified in section 4(a)(1) of the Act, as well as consideration of the definitions of "threatened" and "endangered" contained in the Act and the reasons for delisting as specified in 50 CFR 424.11(d), we propose to remove the current *C. lupus* entity from the List of Threatened and Endangered Wildlife (50 CFR 17.11) and replace it with a listing for *C. l. baileyi* (Mexican wolf) as endangered where found. The currently listed *C. lupus* entity does not represent a valid listable entity under the Act and *C. l. baileyi* is in danger of extinction throughout all of its range and thus warrants the protections of the Act.

We recognize recent taxonomic information indicating that the gray wolf subspecies *C. l. lycaon* should be elevated to the full species *C. lycaon*. However, as stated above, we are not prepared to make a determination on the conservation status of *C. lycaon* throughout its range in the United States and Canada at this time.

**Effects of the Rule**

This proposal, if made final, would remove the protections of the Act for the current *C. lupus* listing, by removing this entity from the List of Endangered and Threatened Wildlife.

This proposal, if made final, would list *C. l. baileyi* as an endangered subspecies.

This proposed rule has no effect on the existing nonessential experimental population designation for gray wolves in portions of Arizona, New Mexico, and Texas. However, as a matter of procedure, in a separate but concurrent rulemaking, we are also reproposing the nonessential experimental population to ensure appropriate association of the population with the new *C. l. baileyi* listing. In addition, that rule includes revisions to the regulations governing the management of the nonessential experimental population.

This proposed rule does not apply to the separate listing and protection of the red wolf *(C. rufus)*. Furthermore, the remaining protections of *C. l. baileyi* under the Act do not extend to *C. l. baileyi*–dog hybrids.

**Required Determinations**

*Clarity of the Rule*

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(a) Be logically organized;

(b) Use the active voice to address readers directly;

(c) Use clear language rather than jargon;

(d) Be divided into short sections and sentences; and

(e) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in the ADDRESSES section. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the names of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

*National Environmental Policy Act*

We determined that an environmental assessment or an environmental impact statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

*Paperwork Reduction Act of 1995*

Office of Management and Budget (OMB) regulations at 5 CFR part 1320, which implement provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*), require that Federal agencies obtain approval from OMB before collecting information from the public. This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

*Government-to-Government Relationship With Tribes*

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We intend to coordinate the proposed rule with the affected Tribes in order to both (1) provide them

with a complete understanding of the proposed changes, and (2) to understand their concerns with those changes. We will fully consider all of the comments on the proposed rule that are submitted by Tribes and Tribal members during the public comment period and will attempt to address those concerns, new data, and new information where appropriate.

**References Cited**

A complete list of all references cited in this document is available upon request from the Arlington, Virginia Headquarters Office and is posted on our web site (see **FOR FURTHER INFORMATION CONTACT**).

**Data Quality Act**

In developing this rule we did not conduct or use a study, experiment, or survey requiring peer review under the Data Quality Act (Pub. L. 106-554).

**Authors**

This proposed rule was a collaborative effort throughout, thus the primary authors of this rule are the staff members of the Services Endangered Species Program in the Idaho Fish and Wildlife Office, Boise, Idaho, the New Mexico Ecological Services Field Office, Albuquerque, New Mexico, the Midwest Regional Office, Ft. Snelling, Minnesota, the Northeast Regional Office, Hadley, Massachusetts, the Montana Field

Office, Helena, Montana, the Pacific Southwest Regional Office, Sacramento, California, and the Headquarters Office, Arlington, Virginia (see **FOR FURTHER INFORMATION CONTACT**).

**List of Subjects in 50 CFR Part 17**

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

**Proposed Regulation Promulgation**

Accordingly, we hereby propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17--[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

§ 17.11—[Amended]

2. Amend § 17.11(h) in the List of Endangered and Threatened Wildlife under Mammals by:

a. Removing the entry for “Wolf, gray”; and

b. Adding an entry for “Wolf, Mexican” in alphabetic order to read as follows:

**§ 17.11 Endangered and threatened wildlife.**

* * * * *

(h) * * *

| SPECIES | | Historic Range | Vertebrate Population Where Endangered Or Threatened | Status | When Listed | Critical Habitat | Special Rules |
|---|---|---|---|---|---|---|---|
| Common Name | Scientific Name | | | | | | |
| MAMMALS | | | | | | | |
| * * * * * * * | | | | | | | |
| Wolf, Mexican | *Canis lupus baileyi* | Southwestern United State and Mexico | Entire except where included in an experimental population as set forth in § 17.84(k) | E | | N/A | N/A |
| * * * * * * * | | | | | | | |

Date: _____

Signed: _____

Director, U.S. Fish and Wildlife Service

[**~~Endangered and Threatened Wildlife and Plants; Proposed Rule To Remove the Gray Wolf (*Canis lupus*) from the List of Threatened and Endangered Wildlife and Maintain Protections for the Mexican Wolf (*Canis lupus baileyi*) by Listing it as Endangered~~]**