U.S. DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–HQ–ES–2013–0073]

[FXES11130900000C2–134–FF09E32000]

RIN 1018–AY00

Endangered and Threatened Wildlife and Plants; Removing the Gray Wolf (*Canis lupus*) from the List of Endangered and Threatened Wildlife and Maintaining 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) 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

Endangered and Threatened 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 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 recognized as a separate 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 FOR FURTHER INFORMATION CONTACT by [**INSERT DATE 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 Search box, enter FWS–HQ–ES–2013–0073, which is the docket number for this rulemaking. 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. Submissions of electronic comments on our Proposed Revision to the Nonessential Experimental Population of the Mexican Wolf, which also published in today's **Federal Register,** should be submitted to Docket No. FWS–R2–ES–2013–0056 using the method described above.

(2) By hard copy: Submit by U.S. mail or hand–delivery to: Public Comments Processing, Attn: FWS–HQ–ES–2013–0073; 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). Submissions of hard copy comments on our Proposed Revision to the Nonessential Experimental Population of the Mexican Wolf, which also published in today’s **Federal Register** should be addressed to Attn: Docket No. FWS–R2–ES–2013–0056 using the method described above.

FOR FURTHER INFORMATION CONTACT: Headquarters Office, Ecological Services; telephone (703) 358–2171. 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 Endangered Wildlife and Threatened (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. While later in this document we discuss our recognition of *Canis lycaon* as a separate species based on recent taxonomic information, we have not completed a status review on this species to date and, therefore, do not include it in this table.

Table 1. Summary of proposed rule analyses and results

Unit of Assessment	Description	Valid Listable Entity?	Determination
Canis lupus	current listed entity—all or portions of 42 States and Mexico	no	Delist
Canis lupus	species—rangewide	yes	Listing not warranted
Canis lupus nubilus	subspecies—rangewide	yes	Listing not warranted
Canis lupus occidentalis	subspecies—rangewide	yes	Listing not warranted
Canis lupus 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 entries for “Wolf, gray” under MAMMALS in the List of Endangered and Threatened Wildlife and adding entries 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.

Acronyms and Abbreviations Used

We use several acronyms and abbreviations throughout the preamble of this proposed rule. To assist the reader, we list them here:

Act	Endangered Species Act 0f 1973, as amended
ADFG	Alaska Department of Fish and Game
AGFD	Arizona Game and Fish Department
APA	Administrative Procedure Act

BRWRA	Blue Range Wolf Recovery Area
CDV	Canine distemper virus
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPV	Canine parvovirus
DPS	distinct population segment
ESA	Endangered Species Act
FR	Federal Register
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LEOs	Law Enforcement Officers
List	Federal List of Endangered and Threatened Wildlife
MWEPA	Mexican Wolf Experimental Population Area
NRM	Northern Rocky Mountain
ODFW	Oregon Department of Fish and Wildlife
OMB	Office of Management and Budget
ORS	Oregon Code of Regulations
PARC	Predator and Rodent Control
RCW	Revised Code of Washington
Service	U.S. Fish and Wildlife Service
SNP	single–nucleotide polymorphisms

SPR	significant portion of its range
SSP	Species Survival Plan
UBI	Ungulate Biomass Index
USDA	U.S. Department of Agriculture
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WGL	Western Great Lakes

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 Endangered and Threatened Wildlife and addition of *C. l. baileyi* as an endangered subspecies. We also seek comment on the following categories of information.

(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) Genetics and taxonomy;

(b) New information concerning range, distribution, population size, and population trends;

(c) New biological or other relevant data concerning any threat (or lack thereof) to these subspecies, their habitat, or both; and

(d) New information regarding 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 some of the supporting documentation we used in preparing this proposed rule, will be available for public inspection on *http://www.regulations.gov* at Docket No. FWS–HQ–ES–2013–0073, 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 any such hearings.

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 will invite 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 United 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; 70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008), Central Idaho Experimental Population Area (59 FR 60266, November 22, 1994; 70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008), 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 *C. 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 WGL population, (2) the NRM population, (3) the southwestern population of Mexican wolves, and (4) 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, we must reconsider listing the southwestern population as a subspecies or DPS, and we present our analysis and determination regarding that matter 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 reclassification, 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 (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 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 (lb)), 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. Wolf populations have been shown to increase rapidly if the source of mortality is reduced after severe declines (Fuller *et al.* 2003, pp. 181–183; Service *et al.* 2012, 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.* 2008, 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, pp. 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 14 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 (*C. l. nubilus*, *C. l. occidentalis*, and *C. l. baileyi*) and is not definitive with regard 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 summarizes and synthesizes 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 recognition of subspecies due to the often arbitrary nature of the division of intraspecific variation along lines across which entities may freely move and interbreed, the Act is explicit that threatened or endangered subspecies are to be protected. Given the available data, we accept the conclusions of Chambers *et al.* (2012) regarding taxonomic subdivisions, including species and subspecies, of North American wolves and approximate historical ranges, 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 of the Interior 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 debate noted above), we believe Chambers *et al.* (2012) 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 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 Contiguous United States and Mexico

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 postglacial 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: *C. lupus*, *C. lycaon*, and *C. rufus*.

Gray Wolf Subspecies of the Contiguous United States and Mexico

Within *C. lupus*, individuals are generally similar with some small differences in the details of morphology, average body mass, and genetic lineage, as might be expected in a widespread species with geographic barriers that restrict or temporarily inhibit 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 toward 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, pp. 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, with the following approximate historical ranges, in our analysis: (1) *C. lupus baileyi,* which occupies the southwestern United States and Mexico; (2) *C. lupus occidentalis,* which occurs throughout west-central Canada, Alaska (except coastal southeast Alaska), and the NRM region; and (3) *C. lupus nubilus,* which occurs throughout central Canada and into northern Ontario and Quebec, in the Pacific Northwest (including coastal British Columbia, and southeast Alaska), and in the WGL region and historically occurred in the Great Plains states of the United States.

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 America by *C. lupus* from Eurasia to account for the patterns of genetic variation seen in extant North American wolves. 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. 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. The hypothesized three wolf invasions that resulted in the current subspecific structure would have resulted in considerable movement of subspecies boundaries as newer invaders coopted territory once held by earlier invaders. We have no reason to believe that this process of geographic replacement had reached its conclusion prior to European contact, rather this process likely continued into the historic period. 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 are in constant (and continuing) flux."

We include details on the specific taxonomy of the three subspecies in our evaluations below.

Canis lupus nubilus

Say (1823) first defined *C. l. nubilus* based on wolves he observed in the central United States. 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 south-central Canada south to south-central United States. Earlier taxonomies had *C. l. nubilus* intergrading 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).

Goldman (1944, p. 414) recognized 23 subspecies of gray wolves in North America, with *C. l. fuscus*, or the Cascades Mountains wolf, occupying the Pacific Northwest. His recognition of *C. l. fuscus* was based on the examination of 28 specimens (skulls and skins) from the west coast of Canada south through the Pacific Northwest (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 those from the west coast of Canada and southeast Alaska, 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 approximate historical range of *C. l. nubilus* borders each of the other *C. lupus* subspecies' ranges, with *C. lycaon*, and probably that of *C. rufus*, creating ambiguous zones of admixture (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 western Canada 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 west-coastal Canada also occured in the central Great Plains of the United States, 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 west-coastal Canada and southeast Alaska wolves (and probably coastal wolves in the Pacific Northwest) being a northward extension of *C. l. nubilus*. Genetic study of wolf skins and bones collected from the historical wolf population in the Pacific Northwest has not yet been accomplished, but would be valuable in further evaluating the historical taxonomic placement of gray wolves from that region.

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* generally as interior western Canada including the Rocky Mountains.

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 approximate historical ranges indicate that, under his taxonomy, *C. l. occidentalis* ranged across Alaska except for the coastal Southeast, and from the Beaufort Sea in the north to the Rocky Mountains of the contiguous United States in the south and including much of the interior western Canada (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

Researchers have 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 nubilus 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 *C. n. baileyi* as a subspecies of *lupus* (*i.e., C. l. 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. Leonard *et al.* (2005, p. 10) examined mitochondrial DNA sequence data from 34 preextermination 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* presettlement 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. nubilus*, 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. nubilus*, 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* (Service 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) interpret this geographic distribution of haplotypes as indicating gene flow was extensive across the subspecies' limits during this historical period, and Chambers *et al.* (2012, p. 37) agree this may be a valid interpretation.

Statutory Background

The Act authorizes the Service to "determine whether any species is an endangered species or a threatened species" (16 U.S.C 1533(a)(1)). "Species" is a defined term under the Act (16 U.S.C. 1532(16)), and only "species" as so defined may be included on the lists of threatened and endangered species (see 16 U.S.C. 1533(a)(1), (c)(1)). The Act defines "species" to include "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature" (16 U.S.C. 1532(16)). The Act defines "endangered species" as a species which is in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6)) and threatened species as a species which is likely to become an endangered species within 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. Determinations as to the status of a species must be made solely on the basis of the best scientific and commercial data available (16 U.S.C. 1533(b)(1)).

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to, reclassifying species on, or removing species from the Federal List of Endangered and Threatened Wildlife (List). We may determine a species to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act. The five listing 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; and (E) other natural or manmade factors affecting its continued existence. We must consider these same five factors in reclassifications of species (changing the status from threatened to endangered or vice versa), and removing a species from the List because it is not endangered or threatened (50 CFR 424.11(c), (d)).

The Act's implementing regulations clarify that a species that is listed may only be delisted if it is neither endangered nor threatened for one of three reasons: The species is extinct, the species has recovered and is no longer endangered or threatened, and the original scientific data used at the time the species was classified were in error (50 CFR 424.11(d)). This language does not, however, address the circumstance in which the Service concludes based on the best available data that a group of organisms currently included on the List does not in fact qualify as a "species" under the Act. In that circumstance, the Service is not determining that a species is not endangered or threatened, the Service is determining that a group of organisms is not a "species." Although the implementing regulations do not expressly address this circumstance, the Service has the authority under section 4(c)(1) to remove a purported species from the List if the Service determines that it does not qualify as a "species" (16 U.S.C.

1533(c)(1)). We note, however, that delisting on this basis is analogous to delisting upon a determination that a species is not threatened or endangered because the original data for classification were in error.

Evaluation of the Current *C. lupus* Listed Entity

Our analysis begins with an evaluation of the current *C. lupus* listing (Figure 1), which derives from the 1978 reclassification (43 FR 9607; March 9, 1978). 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?

As discussed above, 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, if the current listing is to be maintained, it must be as a DPS.

The concept of a DPS is unique to the Act—it does not have an independent scientific meaning. Unlike species and subspecies, a DPS is not a taxonomic term. Rather, the term "distinct population segment" refers to certain populations of vertebrates (i.e., less than the entire range of a taxonomic vertebrate species or subspecies) as explained in the DPS policy. The Act's implementing regulations define a "population" as a "group of fish or wildlife … in common spatial arrangement that interbreed when mature" (50 CFR 17.3). That group may consist of a single collection of organisms, or multiple loosely bounded, regionally distributed collections of organisms all of the same species or subspecies. Therefore, consistent with our standard practice (see 74 FR 15125 "Defining the Boundaries of the NRM DPS," April 2, 2009, and 76 FR 81670 "Geographical Area of the Western Great Lakes DPS," December 28, 2011), before applying the discreteness and significance tests laid out in the DPS Policy, we must first identify one or more populations and the spatial arrangement or range which they share. To meet the definition of a "population," for the purposes of the DPS Policy the group of vertebrate fish or wildlife identified must be in "common spatial arrangement": In other words, there must first be a reasonable correlation between the group and the geographic area used to describe its range.

To consider whether the currently listed entity describes a population of *C. lupus* in an appropriate range that should be evaluated against the standards of the 1996 DPS Policy, we first discuss how the history of gray wolf listing and recent scientific information relate to this question. Based on this information we conclude that neither the 1978 reclassification nor the current listing represent valid species under the Act. We then analyze the current data regarding wolves within the current listed entity, the degree to which that data confirms relevant populations of gray wolves, and the relationship any such populations bear to the geographic scope of the current listing. Based on this information, we further conclude that the "spatial arrangement" identified in the current listing does not correlate to the current population(s) of *C. lupus* found within that range.

History of the C. lupus listing as it relates to DPS—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, which revised the definition of "species" to include distinct population segments of vertebrate fish or wildlife, and our 1996 DPS Policy.

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 that is generally accepted not to be within the historical range of *C. lupus* (Young and Goldman 1944, pp. 413–416, 478; Nowak 1995, p. 395, Fig. 20). While this generalized approach to the listing appropriately protected dispersing wolves throughout the historical range of *C. lupus* and facilitated recovery in the NRM and WGL regions, it also erroneously included areas outside the species' historical range and was misread by some members of the public as an expression of a larger gray wolf recovery effort not required by the Act and never intended by the Service.

The Act does not require us to restore the gray wolf (or any other species) to all of its historical range or even to a majority of the currently suitable habitat. Instead, the Act requires that we recover listed species such that they no longer meet the definitions of "threatened species" or "endangered species.", *i.e.*, are no longer in danger of extinction now or in the foreseeable future. For some species, recovery may require expansion of their current distribution, but the amount of expansion is driven by a species' biological needs affecting viability and sustainability, and not by an arbitrary percent of a species' historical range or currently suitable habitat. Many other species may be recovered in portions of their historical range or currently suitable habitat by removing or addressing the threats to their continued existence. And some species may be recovered by a combination of range expansion and threats reduction. There is no set formula for how recovery must be achieved.

As stated previously, the 1978 reclassification stated that "biological subspecies would continue to be maintained and dealt with as separate entities" (43 FR 9607, March 9, 1978). Accordingly, regional recovery plans were developed and implemented in the Western Great Lakes in 1978 (revised in 1992) (Service 1978, entire; Service 1992, entire), the Northern Rocky Mountains in 1980 (revised in 1987) (Service 1980, entire; Service 1987, entire), and the Southwest in 1982 (this plan is currently being revised) (Service 1982, entire). This approach was an appropriate use of our discretion to determine how best to proceed with recovery actions. These recovery efforts covered all gray wolf populations confirmed in the contiguous United States since passage of the Act, and either these efforts have worked, or are working, to conserve all of the genetic diversity remaining in gray wolves south of Canada after their widespread extirpation (Leonard *et al*. 2005, entire). Thus, the goal of the Act has been achieved in the Northern Rocky Mountains (76 FR 25590, May 5, 2011 and 77 FR 55530, September 10, 2012) and Western Great Lakes (76 FR 81666, December 28, 2011) and is still a work in progress in the Southwest (see *C. l. baileyi* analysis below).

Recent scientific information relevant to the validity of the C. lupus listing—In addition to the issues identified above, recent scientific research further necessitates our revisiting the current listing for *C. lupus*. The most recent scientific information indicates that the eastern wolf, previously described as the subspecies *C. l. 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 species, *C. lycaon* (See **Taxonomy** section). These new data indicate that additional geographic areas contained within the current listed area were not historically occupied by gray wolves (specifically, the northeastern United States) and thus are erroneously included in the current gray wolf listing.

Synthesis—Combining the erroneous inclusion of the southeastern United States in the 1978 reclassification with the new data further restricting the historical range of *C. lupus*, we determine that essentially the entire eastern third of the contiguous United States was erroneously included in the 1978 listing, and is still included in the current listing. As a result, there was not a reasonable correlation between the group of gray wolves in the contiguous United States (minus Minnesota) and Mexico in 1978, nor is there today. Therefore, the 1978 listing did not describe, nor does the current listing describe, a valid "population," which is a prerequisite for a DPS. This determination alone requires that the current listed entity be delisted pursuant to section 4(c)(1) because it is not a "species" under the Act.

Distribution of gray wolves within the described boundary of the currently listed entity—Even if *C. lupus* historically had been found throughout the contiguous United States, 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 only 42 States, as opposed to the original 48 States, and Mexico (Figure 1). The gross mismatch between the group of wolves protected by the current listing (see below) provides an independent basis for determining that the current listed entity is not a DPS.

As stated above, 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 (Service 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.), cert. denied, 525 U.S. 1072 (1999)). Thus, the courts have upheld our interpretation that a "population" must include two or more breeding pairs.

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

A single wild gray wolf population (*C. l. baileyi*), of at least 75 wolves (as of December 31, 2012), inhabits the southwestern United States today in central Arizona and New Mexico (Figure 2). 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 (Service, 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 three confirmed gray wolf packs in the western two-thirds (where gray wolves are listed as endangered) of Washington State (Lookout pack, Teanaway pack, and Wenatchee pack). Reproduction was confirmed in the Teanaway pack in June 2012, has not been documented since 2009 in the Lookout pack, and has not yet been documented in the Wenatchee pack. To date, two radio-collared wolves from the Imnaha pack in northeast Oregon have dispersed west, across the NRM DPS boundary, and are currently in the portion of Oregon where they have endangered status. One of these wolves spent over 1 year in northern California before returning to Oregon in March of 2013. However, no packs or reproduction have been documented in those portions 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, pp. 171–173; 76 FR 26100, May 5, 2011; Jimenez *in litt.* 2012. 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 (Jimenez *in litt.* 2012). In addition, we have two records for individual wolves near Idaho Springs and Rifle, Colorado, in 2004 and 2009, respectively (Jimenez *in litt.* 2013). 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 area where gray wolves are currently listed, 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 the 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).

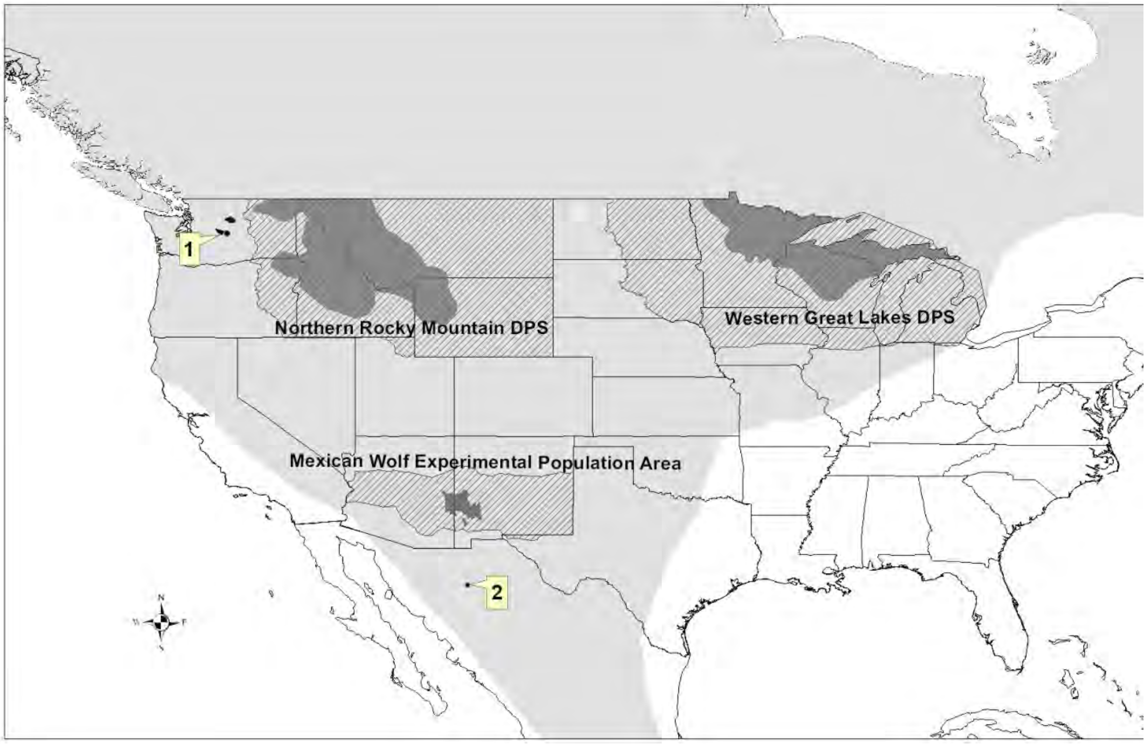

Figure 2: Current distribution of gray wolves (*C. lupus*), including the recovered and delisted populations, in the contiguous United States and Mexico. Light-gray areas represent the approximate historical distribution of gray wolves. Cross-hatched areas represent the boundaries of the Northern Rocky Mountain (NRM) Distinct Population Segment (DPS), Western Great Lakes (WGL) DPS, and Mexican Wolf Experimental Population Area (MWEPA). Both the NRM DPS and WGLDPS 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 MWEPA. 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 (*C. l. baileyi*) in the southwestern United States (see *C. l. baileyi* analysis below for a detailed discussion of the wolves occupying that region) and possibly the gray wolves currently occupying the Pacific Northwest (specifically, those wolves outside of the NRM DPS's western boundary and south of the Canadian border). As we explain in detail below (see Pacific Northwest—Do Wolves in This Area Constitute a Population?), although the gray wolves in the Pacific Northwest do not yet constitute a population according to our 1994 definition, it is possible that additional breeding pairs have gone undetected or that the documented breeding pairs have successfully bred in consecutive years without detection.

Synthesis—Instead of identifying an appropriate geographic area from scratch for the purpose of analyzing a potential new DPS listing, as is our standard practice, we have an existing listing. Therefore, we must compare the geographic scope of the existing listing with the population identified.

It is evident that the listed entity as it is currently described in the CFR (Figure 1) does not correlate with the existing *C. lupus* population, which includes the population inhabiting the southwestern United States and the possible existing (or future) population inhabiting the Pacific Northwest United States (Figure 2). The current *C. lupus* listing includes large areas of the contiguous United States that the best available information indicates are outside of the historical range of the species. Additionally, 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 listable *C. lupus* entity. Therefore, we conclude that the current listed *C. lupus* entity does not appropriately describe the existing gray wolf population, and is therefore not a valid DPS. Furthermore, the current listing does not reflect what is necessary or appropriate for wolf recovery under the Act for the existing gray wolf population.

For these reasons we also conclude that it would not be appropriate to conduct a DPS analysis on the extant population of gray wolves occurring in the southwestern United States combined with the possible *C. lupus* population occurring in the Pacific Northwest 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 the gray wolves that make up the current *C. lupus* listed entity are part of the *C. lupus* species, or a subspecies, or DPSs of *C. lupus* 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. It was listed prior to the November 1978 amendments to the Act and 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 1978 listing erroneously included 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). Therefore, based on the best scientific information available we find that the 1978 listing did not represent a valid "species" under the Act. The *C. lupus* listed entity as it is currently described on the List derives from the 1978 listing and shares the same deficiency. In addition, the current listing suffers from the additional problem that there is not a reasonable correlation between the remaining population and the geographic scope of the listing. Therefore, the current *C. lupus* listed entity is not a "species" as defined by the Act, and we propose to remove it from the List in accordance with 16 U.S.C. 1533(c)(1).

Nonetheless, 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 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, the population must be separately listed concurrent with any final decision to remove the current *C. lupus* listed entity from the List. Therefore, currently listed gray wolves that warrant listing under the Act 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 intention to remove the current *C. lupus* entity from the List, we now consider whether and to what extent any subspecies or populations of *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

As stated previously (see **Statutory Background** section above), Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to, reclassifying species on, or removing species from the Federal List of Endangered and Threatened Wildlife (List). We may determine a species to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act. The five listing 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; and (E) other natural or manmade factors affecting its continued existence. We must consider these same five factors in reclassifications of species (changing the status from threatened to endangered or vice versa), and removing a species from the List because it is not endangered or threatened (50 CFR 424.11(c), (d)).

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 affect 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 targeted elimination (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 North Africa (Mech and Boitani 2004, pp. 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 (pp. 48, and 63–67). Available population data for North America are 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, pp. 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, pp. 322–323).

Current Status of C. lupus

The most recent global assessment by the International Union for Conservation of Nature (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).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments aimed to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES works by subjecting international trade in specimens of selected species to certain controls. The species covered by CITES are listed in three Appendices according to the protection they need. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. *Canis lupus* is listed as Appendix II (except the populations of Bhutan, India, Nepal, and Pakistan; which are included in Appendix I). These listings exclude the domesticated form and the dingo which are referenced as *Canis lupus familiaris* and *Canis lupus dingo* (www.cites.org, accessed on July 13, 2012).

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 are at risk of extinction throughout their global range now or are 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. See the Significant Portion of the Range Analysis section below for our evaluation as to whether *C. lupus* may or may not be in danger of extinction in a significant portion of its range.

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) generally as coastal southeastern Alaska, western Canada, the contiguous United States from the Pacific to the Great Lakes region, and eastern Canada except the extreme southeast, and occasionally west central Greenland.

C. l. nubilus—Current Distribution

For purposes of this review we will discuss the current distribution of *C. l. 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—Canis lupus nubilus does not occupy its historical range in the United States with the exception of the western Great Lakes region (delisted due to recovery, 76 FR 81666, December 28, 2011), southeastern Alaska, and a small number of wolves in the Pacific Northwest that appear to be an admixture with *C. l. occidentalis* (Figure 2). 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 (the Teanaway 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). In the spring of 2013, a group of two wolves, the Wenatchee pack, was documented in the listed area. It is unknown whether these wolves will remain resident in the area. 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 are 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,*in litt.*; 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), the boundary was likely not impermeable by dispersers. Additionally, 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 instead, as the result of dynamic processes, boundaries can shift over time.

We expect dispersal from both sources (western British Columbia and the NRM DPS) to continue, but the recolonization of this area is in its infancy, and the ultimate recolonization pattern of wolves in historical *C. l. nubilus* range is unpredictable.

British Columbia—Wolves currently range throughout most of British Columbia, with *C. l. nubilus* occupying the western and coastal regions and *C. l. 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). More recent information suggests that wolf populations are increasing in some areas as a result of natural range expansion following control efforts in the 1950s and 1960s, and stable in other areas. Overall, the province–wide wolf population is thought to have increased since the 1990s, but not substantially (British Columbia Ministry of Forests, Lands and Natural Resource Operations 2012). 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 the historical range of *C. l. nubilus*.

Northwest Territories and Nunavut—An estimated 10,000 gray wolves inhabited the Northwest Territories and Nunavut in 2001 (COSEWIC 2001, p. 22). The COSEWIC report does not differentiate among subspecies; however, many of these wolves were likely to be *C. l. nubilus* due to their geographic location, including those wolves found in most of mainland Nunavut and a portion of mainland Northwest Territories.

Manitoba—*Canis lupus nubilus* occupies boreal forests and tundra in northern Manitoba. 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 *C. l. nubilus* and *C. lycaon.* Wolves currently occupy approximately 85 percent of their historical range in this province, and although current ranges of the two taxa 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 (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 province–wide (Ontario Ministry of Natural Resources 2005, pp. 7–9).

Quebec—Wolves (*C. l. nubilus* and *C. 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 purported boundaries between the two subspecies have always been approximate and vary among studies. *Canis lupus 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 (Jolicoeur and Henault 2010, p.3). 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 *C. lupus* in 2001 (COSEWIC 2001, entire). The assessment evaluates the status and protection level of wolves across jurisdictions. Assessments are complete for *C. l. nubilus*, *C. l. occidentalis*, and *C. 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 nondetrimental to the survival of *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 *C. l. 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 that occur in the historical range of *C. l. nubilus* in the contiguous United States, outside of the WGL DPS, are currently listed as endangered 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. Within the likely historical range of *C. l. nubilus* in the central United States, the Southern Rocky Mountains and Colorado Plateau, and the Pacific Northwest of the United States, wolves were extirpated soon after colonization and establishment of European-style agriculture and livestock growing. This range contraction appears to be permanent (with the exception of the Pacific Northwest, which is actively being recolonized) and does not appear to be contracting further at this time. The analysis of the Five Factors below does not consider the potential for affects to *C. l. nubilus* in areas where the subspecies has been extirpated, rather effects are considered in the context of the present population. We do not consider historical range contraction, by itself, to represent a threat to a species, but loss of range is reflected in the current status of a species. In all cases, threat factors are evaluated in the context of the current species status, therefore in some cases, historical range contraction can affect the outcome of the Five Factor analysis.

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 United States and Canada. However, much of the historical range of *C. l. nubilus* (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), regardless of subspecies. 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 due primarily to 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, large portions of the central United States that have been irreversibly modified for human use, and 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.

Sufficient suitable habitat exists in the area occupied by *C. l. nubilus* 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 areas as needed 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 and, therefore, 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 *C. l. 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 *C. l. 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 sustained deliberate human targeted elimination (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); and (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. 387–388). Wolf populations persist in many areas of the world that are far more developed than the range of *C. l. 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 *C. l. nubilus* 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 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 *C. l. 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 *C. l. 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 FR 81693) 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, where the vast majority of *C. l. nubilus* exist, overutilization for commercial, recreational, scientific, or educational purposes has not had a significant effect on the subspecies. 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 *C. l. 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 Department of Fish and Wildlife Code, Sections 2050–2085). While in candidacy status, wolves in California will be treated 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 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 *C. l. 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 *C. 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). Estimated wolf harvest has increased to nearly 1,400 wolves in 2009 and 2010 as a result of higher wolf populations (British Columbia Ministry of Forests, Lands and Natural Resource Operations 2012, pp. 17–18).

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 2 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 from 1986 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). Most recent available data estimate the average annual number of wolves killed in Manitoba by hunting, trapping, and control for livestock protection, from 1986 to 1991 at 295 wolves, totaling 7 to 10 percent of the population (Hayes and Gunson 1995, p. 23). We have no information that there has been a significant change in harvest since this report.

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 2005, pp. 21–22). Annual wolf harvest by hunters is likely in the range of 110 to 260 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 (Ontario Ministry of Natural Resources 2005, pp. 21–22). The combined harvest equates to approximately 6 percent (range: 4 to 17 percent) of the provincewide population of *C. lupus* in Ontario. Numbers of wolves killed for livestock protection is unknown, but Ontario Ministry of Natural Resources (2005, p. 23) estimates that the numbers are likely small.

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. Most recent available data estimate the average annual number of wolves killed in Quebec by hunting, trapping, and control for livestock protection from 1986 to 1991 at 945 wolves, totaling 11 percent of the population (Hayes and Gunson 1995, p. 23). We have no information that there has been a significant change in harvest since this report.

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) (Creel and Rotella 2010, p. 6), but substantial debate on this issue remains (Gude *et al.* 2012, pp. 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 *C. l. 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 *C. l. 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 *C. l. 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 *C. l. 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 United States (Brand *et al.* 1995, p. 419; Wisconsin Department of Natural Resources 1999, p. 61, Kreeger 2003, pp. 202–214). We fully anticipate that, in the range of *C. l. 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, pp. 1–7; Smith and Almberg 2007, pp. 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), Yellowstone National Park (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, 1993, p. 331-332). 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 2003, 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 2003 (Wydeven and Wiedenhoeft 2003 pp. 23–24 Table 7) and 2004 (Wydeven and Wiedenhoeft 2004, pp. 23–24, Table 7), and similar levels in Yellowstone National Park (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 *C. l. 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.* 2010; 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.* 2010); 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 through 2005 (Paul *in litt.* 2005), but their infestations were not severe. Dog-biting-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 1995b, pp. 431, 436–438; Mech and Kurtz 1999, pp. 305–306; Thomas *in litt.* 1998, Thomas *in litt.* 2006, Wisconsin Department of Natural Resources 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*) (Service 2005, p. 3), or even large prey, such as deer, elk, and moose (Mech and Nelson 1989, pp. 676; 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 *C. l. nubilus*.

Human-Caused Mortality

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, 345–347). Occasionally, wolves are killed accidentally (*e.g.,* wolves are hit by vehicles, mistaken for coyotes and shot, or caught in traps set for other animals)

(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 *C. l. 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 *C. l. 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 *C. l. 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 (WAC 232–12–014 and 232–12–011; 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 (California Department of Fish and Wildlife 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 3 consecutive years in Oregon and four breeding pairs for 3 consecutive years in each of three geographic regions plus three breeding pairs 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 3 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 *C. l. 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 *C. l. nubilus* in Canada, wolf populations are managed as big game and as furbearers; 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, state, provincial, and Federal land-management regimes provide protection for wolves and wolf habitat throughout the range of *C. l. 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 recolonized by wolves. 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 *C. l. 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 repopulated 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 *C. 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 indiscriminate poisoning and trapping campaigns by the public and by government agencies, wolves were able to maintain viable populations in much of *C. l. 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 *C. l. 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 *C. l. nubilus* substantially. Typically, wolf-control areas are repopulated 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 precontrol 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 -70 °F to 120 °F (-57 °C to 49 °C) with wide-ranging prey type and availability (Mech and Boitani 2003, p. xv). *C. l. 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 FR 55597–55598, September 10, 2012).

Summary of Factor E

Natural or manmade factors are not affecting the viability of *C. l. 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 *C. l. nubilus*. Our analysis did not find any significant effects 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 *C. l. 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 *C. l. 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 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 *C. l. 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 and 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.

C. l. nubilus was extirpated from the central United States, the Southern Rocky Mountains and Colorado Plateau, and the Pacific Northwestern United States by the 1930s and, with the exception of the Pacific Northwest, which is actively being recolonized by *C. l. nubilus* and *C. l. occidentalis*, has not re-established populations in these areas. It is likely that land uses associated with agriculture and livestock make the majority of these areas unsuitable for wolf occupation in the future. Past range contraction can be evidence of threats that may still be acting on the species, and is therefore relevant in considering the status of the species in its remaining range. Thus, we considered whether the extirpation of *C. l. nubilus* from these areas suggests that the remaining range may likewise be subject to the threats that caused the past range contraction such that substantial additional range contraction is likely. We determined that it is not. The past range contraction was caused largely by conflict with man resulting from the introduction of intensive livestock growing and agriculture in suitable areas concurrent with European expansion across the continent; as discussed above most of the remaining range of *C. l. nubilus* is not suitable for conversion to intensive livestock growing and agriculture, nor has there been significant expansion of those activities or human population growth into occupied wolf habitat for many decades. This conclusion is consistent with the observed pattern of *C. l. nubilus* range over time: the contraction occurred as intensive human use of the land expanded; both that expansion and *C. l. nubilus* range contraction halted many decades ago; and *C. l. nubilus* range is now stable or expanding. This strongly supports the conclusion that the factors that were responsible for the *C. l. nubilus'* range contraction will not cause further range contraction, and will not result in the subspecies becoming endangered in the foreseeable future. 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, interior western Canada, and the northern Rocky Mountains of the contiguous United States. *C. l. occidentalis* range is bordered on the east and west by the subspecies *C. l. nubilus*, 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. Across the range of the subspecies, management 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 the northern Rocky Mountains and surrounding areas (delisted due to recovery 76 FR 25590, May 5, 2011). Recent expansion of populations of this subspecies in this region in response to recovery actions has resulted in a large recovered population and the recent delisting of gray wolves in the northern Rocky Mountains (76 FR 25590, May 5, 2011, and 77 FR 55530, September 10, 2012) recovered population. 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 (ADFG) to be 7,000 to 11,000 (ADFG 2007, p. 8). A small number of *C. l. nubilus* 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 the export of legally harvested *C. lupus* in Canada in 2008 (Environment Canada 2008, entire). Supporting information analyzed in this finding included biological characteristics, current status, harvest management, control of harvest, harvest trend, harvest monitoring, benefits of harvest, and protection from 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 nonresidents.

Northwest Territories and Nunavut—An estimated 10,000 wolves existed in the Northwest Territories and Nunavut in 2001 (COSEWIC 2001, p. 22); these wolves compose three subspecies: *C. l. occidentalis*, *C. l. nubilus*, 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. nubilus* 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. nubilus*. *C. l. nubilus* 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. nubilus* 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 subspecific reporting. An estimated 8,000 wolves were present in British Columbia in 1997 (COSEWIC 2001, p. 22). The COSEWIC report estimates that 2,200 wolves were in the "Pacific" region of British Columbia in 1999, and this estimate likely refers to *C. l. nubilus*, leaving the remaining 5,800 wolves in British Columbia referable to *C. l. occidenalis* (COSEWIC 2001, Table 7).

Alberta—C. l. occidentalis range across Alberta with the exception of the prairie area in the southeastern portion of the province where wolves 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 wolves 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. nubilus* 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. An estimated 4,000 to 6,000 wolves of either subspecies existed in Manitoba in 1997, and average harvest was 366 (COSEWIC 2001, p. 21).

Summary of Information Pertaining to the Five Factors

Gray wolves were recently delisted due to recovery in a portion of the range of *C. l. occidentalis* in the contiguous United States (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. Within the likely historical range of *C. l occidentalis* in the Great Plains portion of southern Canada and northern United States, wolves were extirpated soon after colonization and establishment of European-style agriculture and livestock growing. This range contraction appears to be permanent and is relatively small compared to the historical and current range of the subspecies, and the range does not appear to be contracting further at this time. The analysis of the Five Factors below does not consider the potential for effects to *C. l. occidentalis* in this area where the species has been extirpated, rather effects are considered in the context of the present population. We do not consider historical range contraction, by itself, to represent a threat to the species, but loss of historical range is reflected in the current status of the species. Threat factors are always evaluated in the context of the current species status, therefore in some cases, historical range contraction can affect the outcome of the Five Factor analysis.

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 intermountain 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. Wolf populations will likely remain viable in these areas, and 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, pp. 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 *C. l. 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 *C. l. 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, these potential developments and increased human presence are unlikely to 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 sustained deliberate human targeted elimination (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); and (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. 387–388). Wolf populations persist in many areas of the world that are far more developed than the range of *C. l. 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. We have not identified any occupied areas in Canada or the United States where lack of connectivity is affecting *C. l. 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 *C. l. 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 programs for legal take for commercial, recreational, scientific, or educational purposes for that population. For a full discussion of the management of wolves in 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*. We do not anticipate that mortality rates caused by commercial, recreational, scientific, or educational purposes will 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* conducts 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 and provincial laws and regulations under factor D). The regulated take of those wolves is not affecting the viability of 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 (ADFG 2011, entire), and also as a predator species that may be subject to control measures to increase big-game numbers (Titus 2007, entire; ADFG 2007, entire). The state of Alaska monitors wolf populations using a variety of methods including aerial surveys in winter and reports by trappers (ADFG 2007, p. 10). Alaska's wolf management is guided by the principle 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 ungulate 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 predetermined 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).

The Northwest Territories manage wolves as a harvestable species both through hunting and trapping with specific seasons for harvest for both aboriginal and nonaboriginal hunters (COSEWIC 2001, p. 23; Government of Northwest Territories 2011, pp. 7–12). There is no bag limit for aboriginal hunters but nonaboriginal 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 to 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 *C. l. 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 *C. l. nubilus* 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-caused mortality, 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 adequate regulatory mechanisms would be 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, state, provincial, and Federal land-management regimes are 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 repopulated 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*. The subspecies appears to maintain healthy populations and relatively high numbers across most of its historical range and is actively managed to provide for sustainable populations while at the same time address conflicts with humans. 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, we have determined that 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. We strive 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, this balance appears to have been achieved across the range of *C. l. occidentalis* through the many management actions employed in the many jurisdictions involved, and 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 rangewide 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 repopulated 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 precontrol 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 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 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 °F to 120 °F (-57 °C to 49 °C) 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. We have 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 affecting the viability of *C. l. occidentalis* nor are they likely to do so 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 *C. l. occidentalis*. Our analysis did not find any significant effects 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. nubilus* range in recent years. Given the current size of the *C. l. occidentalis* population in Canada and Alaska and the lack of identified effects, 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 and 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 effects to the subspecies that would rise to the level of threatening or endangering this subspecies. *C. l. occidentalis* was extirpated from the Great Plains of southern Canada and northern United States by the 1930s and have not re-established populations in these areas. It is likely that land uses associated with agriculture and livestock make these areas unsuitable for wolf occupation in the future. Past range contraction can be evidence of threats that may still be acting on the species, and is therefore relevant in considering the status of the species in its remaining range. Thus, we considered whether the extirpation of *C. l. occidentalis* from these areas suggests that the remaining range may likewise be subject to the threats that caused the past range contraction such that substantial additional range contraction is likely. We determined that it is not. The past range contraction was caused largely by conflict with man resulting from the introduction of intensive livestock growing and agriculture in suitable areas concurrent with European expansion across the continent; as discussed above most of the remaining range of *C. l. occidentalis* is not suitable for conversion to intensive livestock growing and agriculture, nor has there been significant expansion of those activities or human population growth into occupied wolf habitat for many decades. This conclusion is consistent with the observed pattern of *C. l. occidentalis* range over time: the contraction occurred as intensive human use of the land expanded; both that expansion and *C. l. occidentalis* range contraction halted many decades ago; and *C. l. occidentalis* range is now stable or expanding. This strongly supports the conclusion that the factors that were responsible for the *C. l. occidentlais'* range contraction will not cause further range contraction, and will not result in the subspecies becoming endangered in the foreseeable future. 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 lb) 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; Service 1982, p. 11; Service 2010, pp. 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. nubilus* 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 1988, 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 distribution (of 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 statewide 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 (Service 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 were known to remain in the United States or Mexico. McBride (1980, pp. 2–8) conducted a survey to determine the status and distribution of wolves in Mexico in 1977. 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 publicly available documented verification exists. Several individuals of *C. l. baileyi* captured in the wild in Mexico 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 U.S. 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 (Service 2001, p. 4). Information about the number and location of wolves on the reservation is not publicly 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 (Service 1982, p. 28, Service 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 (Service 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 (Service 2010) available at: www.fws.gov/southwest.es/mexicanwolf.

C. l. baileyi—Current Distribution—Mexico

Mexico initiated the reestablishment 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 U.S.–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 (Service, our files). In October 2012, a pair of wolves was released and both are alive as of March 3, 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 known *C. l. baileyi* in the wild in Mexico and subsequent addition of 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. Seven founder wolves represent three founding lineages (family groups): McBride (also known as the Certified lineage; three individuals), Ghost Ranch (two individuals), and Aragon (two 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 purpose of the SSP is to reestablish *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 reestablish 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 by the General del Vida Silvestre or by the Service in the United States.

Captive *C. l. baileyi* are routinely transferred among the zoos and other SSP holding facilities to facilitate genetic exchange (through breeding) and maintain the health and genetic diversity of the captive population. The SSP strives to house 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 prerelease 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 5,000 ft (1,219 to 1,524 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 semidesert 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, *C. l. baileyi* in Arizona and New Mexico inhabit evergreen pine–oak woodlands (i.e., Madrean woodlands), pinyon–juniper woodlands (i.e., Great Basin conifer forests), and mixed-conifer montane forests (i.e., Rocky Mountain, or petran, forests) that are inhabited by elk, mule deer, and white-tailed deer (Service 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 the contiguous United States and Mexico in 1978, the Service found that threats from habitat loss (factor A), sport hunting (factor B), and inadequate regulatory protection from human targeted elimination (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* (Service 2010, p. 60). The purpose of the Conservation Assessment, which was a nonregulatory 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 (Service 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, pp. 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, pp. 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 occupies the BRWRA and the adjacent Fort Apache Indian Reservation. The 17,775 km^2 (6,845 mi^2) 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 historical inhabitance by wolves (Johnson *et al.* 1992, pp. 28–42, 47–48; Service 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 (Service 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 the existing regulations of 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). Given our current regulations for the nonessential experimental population requiring wolf establishment to occur only within the BRWRA (63 FR 1771; January 12, 1998), we do not consider temporary occupation outside the BRWRA or Fort Apache Indian Reservation to be relevant to our analysis of habitat destruction, modification, or curtailment. Elsewhere in today's **Federal Register,** we propose revisions to our regulations for the nonessential experimental population.

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 the most 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 semidesert grasslands (Service 1996, pp. 3–5). Elevation in the BRWRA ranges from 1,219 to 3,353m (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, Service 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 (Service 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" (Service 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 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 multiprey 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 (Service 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 (Service 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 postfire assessment hypothesized that elk and deer abundance will respond favorably as vegetation recovers, with ungulate abundance exceeding prefire conditions within 5 years due to decreased competition of forage and browse with fire-killed conifers (Dorum 2011, p. 3). Based on this information, we recognize and will continue to monitor the potential for this fire to result in beneficial (increased prey) effects for *C. l. baileyi* over the next few years.

On May 16, 2012, the Whitewater–Baldy Complex fire was ignited by lightning strikes. It burned at least 297,845 acres (www.inciweb.org/incident/2870, July 23, 2012), including 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 significant 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* appears to have been extirpated from the wild in Mexico for more than 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 of two wolves is unknown, and two 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 publicly 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. 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 more than 30 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.

We have authorized, through a section 10(a)(1)(A) research-and-recovery permit under 50 CFR 17.32, 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. 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 noninvasive methods that do not entail direct handling of, or impact to, wolves (*e.g.*, Cariappa *et al.* 2008, Breck *et al.* 2011, Rinkevich 2012). Nonlethal 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, and gamete collection and preservation (see Service 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 incidents in which *C. l. baileyi* were captured in nongovernmental (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 relatively rare occurrences (18 known incidences in 15 years). We conclude that two mortalities over the course of the project have not affected the population's growth.

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. The Arizona Revised Statutes Title 17 gives the Arizona Game and Fish Commission (Commission) the 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; permits that in-turn require the permittee to secure all required federal permits). A hunting season could be opened if the agency documented a harvestable surplus or identified a need for population reduction in a specific area. The Arizona Game and Fish Department, the administrative, management, and enforcement arm of the Commission, is charged with carrying out the Commission's programs and enforcing its regulations.

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. In addition, we have no examples of these forms of take occurring in Mexico since the Mexican 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 nonexistent 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, little research has been done specific to disease in *C. l. baileyi,* and little documentation exists 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 the number of 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 (Arizona Department of Health Services 2012; New Mexico Department of Health 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 2005, 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 2005, 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, documented mortalities due to parvovirus are few; researchers hypothesize 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, pp. 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, which also may have been exposed to the disease in the wild, were transferred to, and died at, a prerelease 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.

Three 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 occurrence 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) (Service 2012, Mexican Wolf Blue Range Reintroduction Population Statistics). This may be an underestimate (*e.g.*, due to the number of 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 (Service 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 percent 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 percent 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 percent 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 (that is, these mortalities are in addition to other mortalities that occur, rather than compensatory mortality where the deaths from illegal shooting would substitute for deaths that would occur naturally) (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 restricted and 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 (Service, 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 Mexico releases in the future will be necessary to document whether these initial events were by chance or are indicative 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, that 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 address regulatory mechanisms related to illegal shooting, as no regulatory mechanisms are available to address 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 has not been sufficient to deter all 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 Office of Law Enforcement Special Agents. On-the-ground personnel involved in preventing illegal take of *C. l. baileyi* and apprehending those who commit illegal take 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 4 positive convictions have been made.

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 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 nonregulatory. 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 apply only 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 9 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 U.S. $98 to U.S. $24,400) for the four 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, we believe that shooting of *C. l. baileyi* could 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 suggests 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. The adequacy of these penalties to address overutilization (factor B) is not an issue, as instances of overutilization do not occur or are exceedingly rare and, therefore, do not significantly affect *C. l. baileyi*.

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 will not act as an effective deterrent to the illegal taking of wolves, and this inadequacy will significantly affect *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 and predation). 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; similarly, 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 small population size.

Our category of “Natural” causes of mortality includes a number of mortality sources, such as predation, starvation, interspecific strife, lightning strikes, and disease. Because we have documented three or fewer natural mortalities 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) (Service 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, which also includes several sources 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 significantly affects *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) (Service 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 U.S. 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.

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 (Service 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, nonmotorized), 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 U.S 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 km^2) 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 (two or fewer mortalities per year, with the exception of 1 year in which four 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 conclude that vehicular collisions, considered in isolation of other sources of mortality, are not significantly affecting *C. l. baileyi*. We further consider the significance of these mortalities in Combination of Factors/Focus on Cumulative Effects.

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.

Public polling data in Arizona and New Mexico shows that most respondents have positive feelings about wolves and support 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, we are unable to confirm whether, or the degree to which, disregard for or opposition 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 opposition 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; at this time, however, 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 (Service 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 (Service 2012 Mexican Wolf Blue Range Project Statistics).

The Service, other state, federal, and tribal agencies, private parties, and livestock producers have increased proactive efforts (*e.g.*, hazing, fencing, fladry, range riders) to minimize depredations in recent years, resulting in fewer removals from 2008 to 2012 than in the first 10 years of the program. Since 2007, we have removed only one wolf from the BRWRA population due to confirmed livestock depredation, which occurred in 2012 (Service BRWRA Monthly Project Updates, October 2012, http://www.fws.gov/southwest/es/mexicanwolf/CEBRWRA.cfm).

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 the presence of both wolves and livestock in the BRWRA. We are also working to establish a Mexican Wolf Livestock Interdiction Fund to generate long-term funding for prolonged financial support to livestock operators within the framework of cooperative conservation and recovery. Our depredation-response removals, proactive efforts to reduce conflict, and depredation-compensation funding are critical components of our overall management approach to establish a population of at least 100 wild wolves. Based on these efforts, we conclude that land-use conflicts are not significantly affecting *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 conclude that land-use conflicts are unlikely to 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) (Service 2007, pp. 10–11) because species in *Canis* can interbreed and produce viable offspring. In the BRWRA, hybridization is 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 (Service 2002, p. 17, Service 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 (BRWRA Monthly Project Updates, June 24, 2011, http://www.fws.gov/southwest/es/mexicanwolf/CEBRWRA.cfm). 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 response to hybridization events has negated any potential impact to the BRWRA population from these events (*e.g.*, effects to 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, hybridization events and effects would continue to be rare. Therefore, we conclude that hybridization is not significantly affecting the *C. l. baileyi* population now nor is it likely to do so or in the future.

Inbreeding, Loss of Heterozygosity, and Loss of Adaptive Potential—Canis lupus baileyi has pronounced genetic challenges resulting from an ongoing and severe genetic bottleneck (that is, a reduction in a population's size to a small number for at least one generation) caused by its near extirpation in the wild and the small number of founders upon which the captive population was established. These challenges include inbreeding (mating of close relatives), loss of heterozygosity (a decrease in the proportion of individuals in a population that have two different alleles for a specific gene), and loss of adaptive potential, three distinct but interrelated phenomena.

When a population enters a genetic bottleneck the strength of genetic drift (random changes in gene frequencies in a population) is increased and the effectiveness of natural selection is decreased. As a result, formerly uncommon alleles may drift to higher frequencies and become fixed (the only variant that exists), even if they have deleterious effects on the individuals that carry them. Conversely, beneficial alleles may become less common and even be lost entirely from the population. In general, rare alleles are lost quickly from populations experiencing bottlenecks. Heterozygosity is lost much more slowly, but the losses may continue until long after the population has grown to large size (Nei *et al.* 1975, entire). The extent of allele and heterozygosity loss is determined by the depth (the degree of population contraction) and duration of a bottleneck. Heterozygosity is important because it provides adaptive potential and can mask (prevent the negative effects of) deleterious alleles.

Inbreeding can occur in any population, but is most likely to occur in small populations due to limited choice of mates. The potential for inbreeding 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. 326–333; 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 is significant because it reduces heterozygosity and increases homozygosity (having two of the same alleles) throughout the genome.

Inbreeding depression is thought to be primarily a result of the full expression of deleterious alleles that have become homozygous as a result of inbreeding (Charlesworth and Willis 2009, entire). In other words, rare deleterious alleles, or gene variants that have deleterious effects such as deformities, are more likely to be inherited and expressed in an offspring of two related individuals than of unrelated individuals (that is, the offspring may be homozygous). Theory suggests that although lethal alleles (those that result in the death of individuals with two copies) may be purged or reduced in frequency in small populations (Hedrick 1994, pp. 363–372), many other mildly and moderately deleterious alleles are likely to become fixed in the population (homozygous in all individuals) with little or no reduction in the overall genetic load (amount of lethal alleles) (Whitlock *et al.* 2000, pp. 452–457). In addition, there is little empirical evidence in the scientific literature that purging reduces the genetic load in small populations.

As previously described, *C. l. baileyi* experienced a rapid population decline during the 1900s, as predator eradication programs sought to eliminate wolves from the landscape. Subsequently, a captive-breeding program was initiated. The McBride lineage was founded with three wolves in 1980. The Ghost Ranch and Aragon lineages were each founded by single pairs in 1961 and around 1976, respectively. These lineages were managed separately until the mid-1990s, by which time all three lineages had become strongly inbred. Inbreeding coefficients (*f*) (a measure of how genetically close two individuals are) for McBride pups born in the mid–1990s averaged about 0.23—similar to inbreeding levels for offspring from outbred full sibling or parent–offspring pairs (*f* = 0.25). Inbreeding coefficients for Aragon and Ghost Ranch lineage pups born in the mid–1990s were higher, averaging 0.33 for Aragon pups and 0.64 for Ghost Ranch pups (Hedrick *et al.* 1997, pp. 47–69).

Of the three lineages, only the McBride lineage was originally managed as a captive breeding program to aid in the conservation of *C. l. baileyi*. However, out of concern for the low number of founders and rapid inbreeding accumulation in the McBride lineage, the decision was made to merge the Aragon and Ghost Ranch lineages into the McBride lineage after genetic testing confirmed that this approach could improve the gene diversity of the captive population (Garcia–Moreno *et al.* 1996, pp. 376–389). Consequently, pairings (for mating) between McBride wolves and Aragon wolves and between McBride and Ghost Ranch wolves began in 1995 with the first generation (F_1) of these pups born in 1997. Although the parents of these (F_1) wolves were strongly inbred, the offspring were expected to be free of inbreeding and free of the inbreeding depression. Forty-seven F_1 wolves were produced from 1997 to 2002. Upon reaching maturity, the F_1 wolves were paired among themselves, backcrossed with pure McBride wolves, and paired with the descendants of F_1 wolves called "cross-lineage" wolves to maintain gene diversity and reduce inbreeding in the captive population.

Although there was slight statistical evidence of inbreeding depression among captive wolves of the McBride and Ghost Ranch lineages, the outbred F_1 wolves proved to have far greater reproductive fitness than contemporary McBride and Ghost Ranch wolves (which were strongly inbred) as well as minimally inbred wolves from early in the McBride and Ghost Ranch pedigrees. Pairings between F_1 wolves were 89 percent more likely to produce at least one live pup, and mean litter sizes for F_1 x F_1 pairs were more than twice as large as contemporary McBride pairings (7.5 vs 3.6 pups per litter; Fredrickson *et al.* 2007, pp. 2365–2371). The large increases in reproductive fitness among F_1 wolves suggested that the McBride and Ghost Ranch lineages were suffering from a large fixed genetic load of deleterious alleles. In other words, McBride and Ghost Ranch wolves had accumulated identical copies of gene variants that had negative effects on their health or reproductive success at many locations (loci) throughout their genome.

In addition, pups born to cross–lineage dams (mother wolves) had up to 21 percent higher survival rates to 180 days than contemporary McBride lineage pups (Fredrickson *et al.* 2007, pp. 2365–2371).

Although the F_1 wolves had high reproductive fitness, strong inbreeding depression among cross–lineage wolves in captivity has been documented. Inbreeding levels of both dams and sires (father wolves) were found to negatively affect the probability that a pair would produce at least one live pup. For example, the estimated probabilities of a pair producing at least one live pup dropped from 0.96 for F1 × F1 pairs (with no inbreeding in the dam and sire) to 0.40 for pairs with a mean inbreeding coefficient of 0.15 (Fredrickson *et al.* 2007, pp. 2365–2371). Consistent with the finding that inbreeding levels of sires affected the probability of producing at least one live pup, Asa *et al.* (2007, pp. 326–333) found that two measures of semen quality, sperm cell morphology and motility of sperm cells, declined significantly as inbreeding levels increased. Among pairs that produced at least one live pup, increases of 0.1 in the inbreeding coefficients of both the dam and pups was estimated to reduce litter size by 2.8 pups. Inbreeding levels of the pups were found to have about twice the detrimental effect as inbreeding in the dam, suggesting that inbreeding accumulation in pups was causing pups to die prior to being born (Fredrickson *et al.* 2007, pp. 2365–2371).

As of October 2012, the captive population of Mexican wolves consisted of 258 wolves, of which 33 are reproductively compromised or have very high inbreeding coefficients, leaving 225 wolves as the managed population (Siminski and Spevak 2012).

The age structure of the population, however, is heavily skewed, with wolves 7 years old and older comprising about 62 percent of the population—meaning that most of the population is comprised of old wolves who will die within a few years. This age structure has resulted from the high reproductive output of the F_1 wolves and their descendants in captivity, the combination of few releases of captive-born wolves to the wild in recent years, removal of wolves from the wild population to captivity, and limited pen space for pairings, and means that additional gene diversity will be lost as the captive population continues to age.

The SSP strives to minimize and slow the loss of gene diversity of the captive population but (due to the limited number of founders) cannot increase it. As of 2012, the gene diversity of the captive program was 83.37 percent of the founding population, which falls below the average mammal SSP (93 percent) and below the recognized SSP standard to maintain 90 percent of the founding population diversity. Below 90 percent, the SSP states that reproduction may be compromised by low birth weight, smaller litter sizes, and related issues.

Representation of the Aragon and Ghost Range lineages in 2012 was 18.80 percent and 17.65 percent, respectively (Siminski and Spevak 2012, p. 6). More specifically, the representation of the seven founders is very unequal in the captive population, ranging from about 30 percent for the McBride founding female to 4 percent for the Ghost Ranch founding male. Unequal founder contributions lead to faster inbreeding accumulation and loss of founder alleles. The captive population is estimated to retain only 3.01 founder genome equivalents, suggesting that more than half of the alleles (gene variants) from the seven founders have been lost from the population.

The genetically effective population size (N_e) of the captive population is estimated to be 20 wolves and the ratio of effective to census size (*N*e / *N;* that is, the number of breeding animals as a percentage of the overall population size) is estimated to be 0.0846 (Siminski and Spevak 2012, p. 7). The genetically effective population size is defined as the size of an ideal population that would result in the rate of inbreeding accumulation or heterozygosity loss as the population being considered. The effective sizes of populations are almost always smaller than census sizes of populations. A rule of thumb for conservation of small populations holds N_e should be maintained above 50 to prevent substantial inbreeding accumulation, and that small populations should be grown quickly to much larger sizes ($N_e \geq 500$) to maintain evolutionary potential (Franklin 1980, entire). The low ratio of effective to census population sizes in the captive population reflects the limitations on breeding (due to a lack of cage space) over the last several years, while the low effective population size is another indicator of the potential for inbreeding and loss of heterozygosity.

The gene diversity of the reintroduced population of *C. l. baileyi* can only be as good as the diversity of the captive population from which it is established. Based on information available on July 11, 2012, the genetic diversity of the wild population was 74.99 percent of the founding population (Siminski and Spevak 2012, pp. 6–7), with 4.97 percent and 13.80 percent representation of Aragon and Ghost Range lineages, respectively. Although *C. l. baileyi* (in the reintroduced population) reached an all-time high population size in 2012 (minimum estimate of 75 wolves), it is currently a poor representation of the genetic variation remaining in the captive population. Founder representation in the reintroduced population is more strongly skewed than in the captive population. Mean inbreeding levels are 61 percent greater (0.1924 versus 0.1197), and founder genome equivalents are 33 percent lower (2 vs. 3.01) than in the captive population. In addition, the estimated relatedness of *C. l. baileyi* in the reintroduced population is on average 50 percent greater than that in the captive population (population mean kinship: 0.2501 vs. 0.1663; Siminski & Spevak 2012, p. 8). This suggests that *C. l. baileyi* in the reintroduced population are on average as related to one another as outbred full siblings are related to each other. Without substantial management action to improve the genetic composition of the population, inbreeding will accumulate and heterozygosity and alleles will be lost much faster than in the captive population.

There is evidence of strong inbreeding depression in the reintroduced population. Fredrickson et al. (2007, pp. 2365–2371) estimated that the mean observed litter size (4.8 pups for pairs producing pups with no inbreeding) was reduced on average by 0.8 pups for each 0.1 increase in the inbreeding coefficient of the pups. For pairs producing pups with inbreeding coefficients of 0.20, the mean litter size was estimated to be 3.2 pups. Computer simulations of the Blue Range population incorporating the Mexican wolf pedigree suggest that this level of inbreeding depression may substantially reduce the viability of the population (Carroll *et al. in prep*; Fredrickson *et al. in prep*).

The recent history of Mexican wolves can be characterized as a severe genetic bottleneck that began no later than the founding of the Ghost Ranch lineage in 1960. The founding of the three lineages along with their initial isolation likely resulted in the loss of most rare alleles and perhaps even some moderately common alleles. Heterozygosity loss was accelerated as a result of rapid inbreeding accumulation. The merging of the captive lineages likely slowed the loss of alleles and heterozygosity, but did not end it. The consequences to Mexican wolves of the current genetic bottleneck will be future populations that have reduced fitness (for example, smaller litter sizes, lower pup survival) due to inbreeding accumulation and the full expression of deleterious alleles. The loss of alleles will limit the ability of future Mexican wolf populations to adapt to environmental challenges.

Based on data from the SSP documenting loss of genetic variation, research documenting viability–related inbreeding effects in *C. l. baileyi,* and our awareness that the wild population is at risk of inbreeding due to its small size, we conclude that inbreeding, and loss of heterozygosity, and loss of adaptive potential are significantly affecting *C. l. baileyi* and are likely to continue to do so in the future. If *C. l. baileyi* was not protected by the Act, these risks 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 affect the viability (likelihood of extinction or persistence over a given time period) of a species depending on the species' biological characteristics and threats acting upon it. We consider several types of information to determine whether small population size is affecting *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. Prior to European colonization of North America, *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 from its historical (pre-1900s) abundance and distribution.

Scientific theory and practice generally agree that a species represented by a small population faces a higher risk of extinction (or a lower probability of population persistence) 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, even those that are growing, random changes in average birth or survival rates could cause a population decline that would result in extinction. This phenomenon 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 and is more likely to persist.

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; Service 2010, pp. 63–68) and has a low probability of persistence. The viability 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 and gray wolf recovery plans, which suggest hundreds to over a thousand wolves are necessary for long-term persistence in the wild (Service 2010, pp. 63–68).

Two *C. l. baileyi* population-viability analyses were initiated subsequent to the development of the 1982 Mexican Wolf Recovery Plan but prior to the BRWRA reintroduction (Seal 1990 entire, IUCN 1996 entire, Service 2010, p. 66), although neither was completed. Population-viability modeling is currently being conducted as part of the development of 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. 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 state(s) 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 significantly affecting *C. l. baileyi* 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 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 degrees 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 conclude that climate change is not significantly affecting *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, loss of adaptive potential, loss of heterozygosity, and small population size are significantly affecting *C. l. baileyi*. Inbreeding and loss of heterozygosity 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 in the near term; loss of genetic variation significantly affects the likelihood of persistence of *C. l. baileyi* over longer time frames. Absent the protection of the Act, inbreeding, loss of heterozygosity, and loss of adaptive potential would persist and possibly increase depending on whether the states or other parties undertook active promotion of the maintenance of gene 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. Absent the protection of the Act, small population size would continue to significantly affect *C. l. baileyi*, or may increase if states or other parties did not actively support the reintroduced population through appropriate management measures.

Vehicular collisions, human intolerance, land-use conflicts, hybridization, and climate change are not significantly affecting *C. l. baileyi*, nor are they expected to do so in the near future.

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, loss of heterozygosity, loss of adaptive potential, and small population size. In absence of the Act's protections, these issues would continue to affect *C. l. baileyi*, and would likely increase in frequency or severity. 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. 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 has been documented to decrease individual fitness, hinder population growth, and decrease the population's probability of persistence. 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.*, vehicular collisions, natural sources of mortality) could collectively do so, depending on the population's productivity, especially when additive to an already significant source of mortality such as illegal shooting. Effects from disease, catastrophe, environmental conditions, or loss of heterozygosity 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. Therefore we consider the combination of factors B, C, 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, nor do we find that these factors are likely to do so in the future regardless of whether the subspecies is 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. The Wallow Fire and the Whitewater–Baldy Complex Fire, while catastrophic, were not sources of habitat modification, destruction, or curtailment that affected *C. l. baileyi* because there were no documented wolf mortalities during the fires, and prey populations are expected to increase in response to postfire positive effects on vegetation.

We do not find overutilization for commercial, recreational, scientific, or educational purposes to be significantly affecting *C. l. baileyi* because we have 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 nonexistent. 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, could provide regulations to protect *C. l. baileyi* from 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 nonhuman 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, loss of heterozygosity, loss of adaptive potential, and small population size are significantly affecting *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, their effects on *C. l. baileyi* would continue, or possibly increase depending on the degree of active management provided by the states or other parties.

Vehicular collisions, human intolerance, land-use conflicts, hybridization, and climate change are not significantly affecting *C. l. baileyi*, nor are they expected to do so in the near future or if *C. l. baileyi* was not protected by the Act.

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 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 diversity health of *C. l. baileyi* are significantly affecting *C. l. baileyi*, particularly within the context of its small population size (a characteristic that significantly decreases the probability of a population's persistence). Cumulative effects are significantly affecting *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 *C. l. bailey's* small population size.

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, we must 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, loss of heterozygosity and adaptive potential, 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*.

Our finding that *C. l. baileyi* is in danger of extinction throughout all of its range is consistent with our administrative approach to determining which species are on the brink of extinction and, therefore, warrant listing as endangered. Prior to the early 1900s, *C. l. baileyi* was distributed over a large geographic area that included portions of the Southwest and much of Mexico. *C. l. baileyi* was nearly eliminated in the wild by the mid-1900's due to predator eradication efforts, which led to its listing as an endangered subspecies in 1976 and again as part of the species-level gray wolf listing in 1978. Therefore, *C. l. baileyi* is a subspecies that was formerly widespread but was reduced to such critically low numbers and restricted range (*i.e.*, eliminated in the wild) that it is at high risk of extinction due to threats that would not otherwise imperil it.

At the time of its initial listing, no robust populations of *C. l. baileyi* remained in the wild. The establishment and success of the captive-breeding program temporarily prevented immediate absolute extinction of *C. l. baileyi* and, by producing surplus animals, has enabled us to undertake the reestablishment of *C. l. baileyi* in the BRWRA by releasing captive animals to the wild. In the context of our current proposal to list *C. l. baileyi* as an endangered subspecies, we recognize that, even with these significant improvements in *C. l. baileyi*'s status, its current geographic distribution in the BRWRA is a very small portion of its former range. Moreover, within this reduced and restricted range, *C. l. baileyi* faces significant threats that are intensified by its small population size. *Canis lupus baileyi* is highly susceptible to inbreeding, loss of heterozygosity, and loss of adaptive potential due to the bottleneck created during its extreme population decline prior to protection by the Act, the limited number of and relatedness of the founders of the captive population, and the loss of some genetic material from the founders. The effects of inbreeding have been documented in *C. l. baileyi* and require active, ongoing management to minimize.

Mortality of *C. l. baileyi* from illegal killing, as well as all other sources of mortality or removal from the wild population, is occurring within the context of a small population. While all populations sustain some amount of mortality, including that caused by humans, the current small population has a low probability of persistence compared to a larger, more geographically widespread population. Absent the protection of the Act, illegal killing would likely increase dramatically, further reducing the population's size and increasing its vulnerability to genetic and demographic factors, putting *C. l. baileyi* at imminent risk of extinction. These factors are occurring throughout *C. l. baileyi*'s range in the wild, resulting in our determination that the subspecies warrants listing as endangered throughout its range.

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. baileyi* is an endangered subspecies, we do not need 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 settlement of the American west, 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 Wildlife 2011, pp. 1–2); however, Schmidt (1991, entire) accounted for this situation 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) in California, although the basis for these estimates is not given (Young and Goldman 1944, p. 55). Charles Poole of the Forest 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 targeted elimination associated with the Spanish missions and their extensive livestock interests (Schmidt 1991, p. 83) prior to the era of collecting specimens for natural-history museums. 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 firsthand 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, pp. 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, pp. 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). From 1827 to 1859, more than 7,700 wolf pelts were traded from in or near the Cascade Mountains area in Washington and British Columbia alone (Laufer and Jenkins 1989, p. 323). This trade 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 1997, p. 134). Spurred by Federal, state, and local government bounties, the combination of poisoning, unregulated trapping and shooting, and the public funding of wolf extermination efforts ultimately 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 (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, more than 250 km (156 mi) from its natal area (ODFW 2011). In addition, another dispersing wolf (OR–7), also from the Imnaha pack, has travelled more than 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, *in litt*.).

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, National Park Service, 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 two wolves still inhabit 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 wolflike 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, researchers 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 March 2013, WDFW remote cameras documented two wolves feeding on an elk carcass together southwest of Wenatchee, WA. The wolves were spotted in the area several days later, and were confirmed as the Wenatchee pack. One of the wolves is thought to be a dispersing animal from the Teanaway pack, and the other is unknown. It is unclear at this time whether these wolves will remain resident in the area.

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" (Service 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 NRM 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 two 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; Becker *et al.* 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 more 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. (Service 2012, pp. 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" (Service 1994, Appendix 8). In this evaluation, Idaho was noted as having the most wolf activity, but even this situation was described as only "occasional immigration of single wolves from a breeding population(s) elsewhere, possible with intermittent reproduction in some years" (Service 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

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.

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 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, only one wolf pack existed 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 (85 mi)). 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 will not separate these wolves in the 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 (Service, unpublished data). Based on 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 FR 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. Wolves are well known to 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- to 25-km (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 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, pp. 1–2). While we expect individuals of markedly different haplotypes to continue to recolonize the area from coastal British Columbia and from the NRM DPS, we also expect interbreeding to occur, as genetic evidence of the Lookout pack suggests. 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 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). Moreover, recent genetic, behavioral, and morphological data in British Columbia and Alaska show marked separation of coastal and inland wolves (Geffen *et al.* 2004, pp. 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, pp. 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 the 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 *in litt.*. 2008, p. 8, Appendix A). 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 (WAC 232–12–014 and 232–12–011; 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 it reviews whether to add wolves to its 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).

On December 9, 2011, the U. S. Fish and Wildlife Service and the National Marine Fisheries Service published a notice (76 FR 76987) of draft policy to establish a joint interpretation and application of SPR that reflects a permissible reading of the law and its legislative history, and minimizes undesirable policy outcomes, while fulfilling the conservation purposes of the Act. To date, the draft SPR policy has not been finalized. Although the following analyses does not implement the draft policy as a binding rule, and instead independently lay out the rational for the SPR analyses, if an SPR policy is finalized prior to the Service making a final determination on this proposed action we will ensure that our final determination is consistent with the final SPR policy.

Consistent with the district court decisions discussed above, 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,” those 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 North Africa (Mech and Boitani

2004, pp. 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. nubilus* 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, and 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 significantly affected by illegal targeted elimination, 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 any substantial information indicating otherwise, lead us to conclude that substantial 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* and *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 over the vast majority of the range of each subspecies, the stressors affecting the species are both diffuse and minor. The areas that might possibly qualify as significant for one of the subspecies (*e.g.*, all of the Canadian Rockies for *C. l. occidentalis* or coastal British Columbia for *C. l. nubilus*) clearly do not face stressors of sufficient imminence, intensity, or magnitude for the subspecies to possibly be threatened there. Further, given the robust nature of *C. l. occidentalis* populations in Alaska and of *C. l. nubilus* in eastern Canada, even the Canadian Rockies and coastal

British Columbia might not meet the threshold for "significant" described above even if substantial threats did exist there.

Conversely, any of the local areas in which there is a notable concentration of stressors (for example, intermountain valleys where human populations and agriculture are concentrated), are small and spread throughout the mountainous western part of the subspecies' ranges and generally surrounded by mountainous habitats with healthy wolf populations. The diffuse nature of these pockets where risk factors for wolves are concentrated reduce the importance of these areas on the conservation of the two subspecies. In addition, these pockets are individually so small that it is not possible for them to meet the threshold for significance set forth above. Further, even if there were no wolves in any of these pockets of increased risk, the much larger remaining areas of source populations would not be threatened, much less endangered, for all of the reasons discussed above. Wolf populations in North America have historically weathered large contractions in their geographic ranges without obvious adverse effects to populations in other areas.

Within the historical ranges of *C. l. nubilus* and *C. l. occidentalis*, plains populations from the contiguous United States and southern Canada were extirpated in the early 20th century and have not repopulated these areas. Despite the lack of wolf populations in the plains (where current agricultural practices are not compatible with wolf presence) both subspecies maintain secure populations over vast areas where effects from human activities have been less severe. Therefore, we find that there is not substantial information for either subspecies indicating that any portion may be both "significant" and in danger of extinction there or likely to become so within the foreseeable future.

Summary of Finding

In summary, we find that neither the 1978 listing nor the current *C. lupus* listed entity as it is described on the List represent valid "species" under the Act. We base this conclusion on the following: (1) The 1978 listing erroneously included 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); (2) the *C. lupus* listed entity as it is currently described on the List derives from the 1978 listing and shares the same deficiency; and (3) the current listing suffers from the additional problem that there is not a reasonable correlation between the remaining population and the geographic scope of the listing. Therefore, the current *C. lupus* listed entity is not a "species" as defined by the Act, and we propose to remove it from the List in accordance with 16 U.S.C. 1533(c)(1).

We considered whether the currently listed entity should be replaced with a valid listing for (1) the *C. lupus* species, (2) a subspecies of *C. lupus* that occurs within the contiguous United States and Mexico, or (3) a DPS of *C. lupus* that includes part of 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 data available regarding the past, present, and future threats faced by these taxa. We reviewed the information available in our files and 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* is at risk of extinction throughout its global range now or is 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's* and *C. l. occidentalis's* historical ranges are widespread and exist as large, stable populations, with no evidence of decline over the last 10 years despite being subject to harvest over much of their range and population reduction actions in local areas. We did not identify any significant effects to these subspecies indicating that *C. l. nubilus* and *C. l. occidentalis* are in danger of extinction throughout their ranges and, therefore, neither subspecies meets the definition of an endangered species. *Canis lupus nubilus* and *C. l. occidentalis* are also not likely to become endangered within the foreseeable future throughout all of their ranges.

With respect to *C. l. baileyi,* we find that the subspecies is in danger of extinction throughout all of its range due to illegal killing, inbreeding, loss of heterozygosity, loss of adaptive potential, small population size, and the combination of factors B, C, and E. *Canis lupus 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 under way, have led to the reestablishment 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 populations 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 *in litt.* 2008, p. 8, Appendix A). 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 whether any of the relevant taxa is threatened or endangered in a 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* and *C. l. occidentalis* to determine if there is any apparent geographic concentration of the primary stressors potentially affecting the subspecies. We found that, over the vast majority of the range of each subspecies, the stressors affecting the species are both diffuse and minor. The areas that might possibly qualify as significant for one of the subspecies clearly do not face stressors of sufficient imminence, intensity, or magnitude for the subspecies to possibly be threatened there. And any areas in which the local wolves might be threatened or endangered are so small and unimportant, individually or collectively, to qualify as significant portions of the range of the relevant taxa. Therefore, we find that there is not substantial information for either subspecies indicating that any portion may be both "significant" and in danger of extinction there or likely to become so within the foreseeable future.

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 over any alternative scientific name; see also Brewster and Fritts 1995 and Goldman 1944. Since Wilson *et al.*'s (2000) proposed species designation, *C. 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), and Rutledge *et al.* (2012).

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 *C. lycaon*. We understand that different conclusions may be drawn by taxonomists and other scientists depending on whether they give precedence to morphological or genetic data; 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 conclude that the findings of the most recent analyses (Chambers *et al.* 2012 and Rutledge *et al.* 2012, both of which heavily rely on genetic data) 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 *C. 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 Wydeven (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 the identity of *C. lycaon* and whether they contribute to the species' viability. Also, we must assess whether the threats identified in Thiel and Wydeven (2012) indicate that the species meets the definition of a "threatened species" or an "endangered species." In addition, we will coordinate 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 gray wolf, *C. lupus*, 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 *C. lycaon*, the species native to the northeastern United States; the outcome of this assessment will determine the need for the Act's protections.

With respect to the request for a Northeast wolf 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 *C. 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 species" and "endangered species" 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 Endangered and Threatened Wildlife (50 CFR 17.11) and replace it with a listing for *C. l. baileyi* (Mexican wolf) as endangered wherever 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 experimental population with the new *C. l. baileyi* listing. In addition, that proposed 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 posted on *http://www.regulations.gov* at Docket No. FWS–HQ–ES–2013–0073 and available upon request from the Arlington, Virginia, Headquarters Office (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

PART 17—[AMENDED]

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

Authority: 16 U.S.C. 1361–1407; 1531–1544; 4201–4245; unless otherwise noted.

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

a. Removing both entries for “Wolf, gray *(Canis lupus)”;* and

b. Adding two entries for “Wolf, Mexican *(Canis lupus baileyi)”* in alphabetic order to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species							
Common name	Scientific name	Historic Range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Mammals							
*	*	*	*	*	*	*	
Wolf, Mexican	*Canis lupus baileyi*	Southwestern United States and Mexico	Entire, except where included in an experimental population as set forth in 17.84(k)	E		NA	NA
Wolf, Mexican	*Canis lupus baileyi*	Southwestern United States and Mexico	U.S.A. (portions of AZ and NM)—see 17.84(k)	XN		NA	17.84(k)
*	*	*	*	*	*	*	

*   *   *   *   *

Dated: May 29, 2013

Daniel M. Ashe

Director, U.S. Fish and Wildlife Service

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