

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**

[Docket No. FWS-HQ-ES-2018-0097;
FXES1113090000C2-189-FF09E32000]

RIN 1018-BD60

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

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service or USFWS), have 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. We propose this action because the best available scientific and commercial information indicates that the currently listed entities do not meet the definitions of a threatened species or endangered species under the Act due to recovery. The effect of this rulemaking action would be to remove the gray wolf from the Act's protections. This proposed rule does not have any effect on the separate listing of the Mexican wolf (*Canis lupus baileyi*) as endangered under the Act.

DATES: *Comment submission:* We will accept comments received or postmarked on or before May 14, 2019.

Public hearings: We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by April 29, 2019.

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 Docket No. FWS-HQ-ES-2018-0097, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on the blue "Comment Now!" box. If your comments will fit in the provided comment box, please use this feature of <http://www.regulations.gov>, as it is most compatible with our comment review procedures. If you attach your

comments as a separate document, our preferred file format is Microsoft Word. If you attach multiple comments (such as form letters), our preferred format is a spreadsheet in Microsoft Excel.

(2) By hard copy: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: Docket No. FWS-HQ-ES-2018-0097; U.S. Fish & Wildlife Service Headquarters, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see *Public Comments* below for more information).

FOR FURTHER INFORMATION CONTACT: Don Morgan, Chief, Branch of Delisting and Foreign Species, Ecological Services, U.S. Fish and Wildlife Service, Headquarters Office, MS: ES, 5275 Leesburg Pike, Falls Church, VA 22041-3803; telephone (703) 358-2444.

Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Purpose of the Regulatory Action

Why we need to publish a rule. Under the Act, if we determine that a species is no longer threatened or endangered throughout all or a significant portion of its range, we must publish in the **Federal Register** a proposed rule to remove the species from the Lists of Endangered and Threatened Wildlife and Plants in title 50 of the Code of Federal Regulations (50 CFR 17.11 and 17.12). We also must make a final determination on our proposal within 1 year thereafter. Removing a species from the List ("delisting" it) can only be completed by issuing a rule.

This document proposes delisting gray wolves in the lower 48 United States and Mexico. This proposed rule assesses the best available information regarding the status of and threats to the species, and replaces our June 13, 2013, proposed rule to delist the gray wolf in the lower 48 United States and Mexico (78 FR 35664). This proposed rule does not have any effect on the separate listing of the Mexican wolf as endangered under the Act (80 FR 2487, January 16, 2015).

The basis for our action. Under the Act, we determine whether a species is an endangered or threatened species based on any one or more of five factors or the cumulative effects thereof: (A) The present or threatened destruction, modification, or curtailment of its

habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence. We have determined that the gray wolf in the lower 48 United States and Mexico (except the Mexican wolf subspecies) no longer meets the definition of an endangered or threatened species under the Act.

Peer review. We will seek comments from independent specialists to ensure that our designation is based on scientifically sound data, assumptions, and analyses. We will invite these peer reviewers to comment on our listing proposal. Because we will consider all comments and information received during the comment period, our final determination may differ from this proposal.

Information Requested

Public Comments

We intend that any final action resulting from this proposal will be based on the best scientific and commercial data available and will be as accurate and as effective as possible. Therefore, we request comments or information from the public, concerned Tribal and governmental agencies, the scientific community, industry, or any other interested parties concerning this proposed rule. Comments should be as specific as possible.

As this proposal replaces our June 13, 2013, proposal to delist gray wolves in the lower 48 United States and Mexico (78 FR 35663), we ask that any comments previously submitted that are relevant to the status of wolves currently listed in the contiguous United States and Mexico, as analyzed in this rule, be resubmitted at this time. Comments must be submitted during the comment period for this proposed rule to be considered.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not meet the standard of best available scientific and commercial data. Section 4(b)(1)(A) of the Act directs that determinations as to whether any species is threatened or endangered must be made "solely on the basis of the best scientific and commercial data available."

You may submit your comments and materials by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via <http://www.regulations.gov>, your entire submission—including your personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, 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. We will post all hardcopy submissions on <http://www.regulations.gov>.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <http://www.regulations.gov> at Docket No. FWS-HQ-ES-2018-0097, or by appointment, during normal business hours at U.S. Fish and Wildlife Service Headquarters (see **FOR FURTHER INFORMATION CONTACT**).

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 peer 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 the public comment period on our proposed action; these comments will be available along with other public comments in the docket for this proposed rule.

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

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Previous Federal Actions

Gray wolves were originally listed as subspecies or as regional populations of subspecies in the contiguous United States and Mexico. Early listings were under legislative predecessors of the Act—the Endangered Species Preservation Act of 1966 and the Endangered Species Conservation Act of 1969. Later listings were under the Endangered Species Act of 1973. The **Federal Register** citations for all the rulemaking actions described in the following paragraphs are provided in table 1, below.

In 1978, we published a rule reclassifying the gray wolf as an endangered population at the taxonomic species level (*C. lupus*) throughout the contiguous United States and Mexico, except for the Minnesota gray wolf population, which was classified as threatened (table 1). At that time, we considered the gray wolves in Minnesota to be a listable entity under the Act, and we considered gray wolves 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 earlier 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.

The 1978 reclassification was undertaken to “most conveniently” address changes in our understanding of gray wolf taxonomy and protect all gray wolves in the lower 48 United States. In addition, we sought to clarify that the gray wolf was only listed south of the Canadian border.

The 1978 reclassification rule 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). Accordingly, we implemented three gray wolf recovery programs in three regions of the country—the northern Rocky Mountains, the southwestern United States, and the eastern United States—to establish and prioritize recovery criteria and actions appropriate to the unique local circumstances of the gray wolf (table 1). Recovery in two of these regions (northern Rocky Mountains and southwestern United States) required reintroduction of gray wolves in experimental populations (table 1),

while recovery in the third (eastern United States) relied on natural recolonization and population growth.

Between 2003 and 2015, we published several rules revising the 1978 contiguous United States and Mexico listings for *C. lupus* in an attempt to acknowledge taxonomy, comport with current policy and practices, and to recognize the biological recovery of gray wolves in the northern Rocky Mountains (NRM) and western Great Lakes (WGL) populations. Previous rules were challenged and subsequently invalidated or vacated by various courts based, in part, on their determinations that our distinct population segment (DPS) designations were legally flawed (table 1).

Of particular relevance to this proposed rule is our 2011 final rule, in which we recognized the expansion of the Minnesota wolf population by revising the entity to include all or portions of six surrounding States, identified the expanded population as the western Great Lakes DPS (WGL DPS), and revised the listings to remove the WGL DPS from the List due to recovery. Also in 2011, we published a final rule that implemented Section 1713 of Public Law 112–10, reinstating our 2009 delisting rule for the NRM DPS and, with the exception of Wyoming, removed gray wolves in that DPS from the List. In 2012, we finalized a rule removing gray wolves in Wyoming from the List. Subsequently, in 2013, we published a proposed rule to delist *C.*

lupus in the remaining listed portions of the United States and Mexico outside of the delisted NRM and WGL DPSs, and keep Mexican wolf listed as an endangered subspecies, *C. l. baileyi* (table 1).

However, in 2014 the United States District Court for the District of Columbia vacated the final rule at 76 FR 81666 (December 28, 2011) that removed protections of the Act from the gray wolf in the western Great Lakes (table 1). The court’s action was based, in part, on its conclusion that the Act does not allow the Service to use its authority to identify DPSs as “species” to remove the protections for part of an already listed species. The U.S. Court of Appeals disagreed, ruling in 2017 that the Service had the authority to designate a DPS from a larger listed entity and delist it in the same rule (table 1). That court nonetheless upheld the District Court’s vacatur, concluding that the Service failed to reasonably analyze or consider two significant aspects of the rule: The impacts of partial delisting and historical range loss on the remainder of the listed entity.

Our 2012 decision to delist gray wolves in Wyoming was also vacated by the U.S. District Court for the District of Columbia. Because the 2013 proposal to delist the remaining listed portions of the gray wolf in the United States and Mexico relied in part on two subsequently vacated final rules, the 2011 WGL DPS rule as well as our 2012

rule delisting gray wolves in Wyoming, in 2015 we only finalized the portion of the rule listing the Mexican wolf as an endangered subspecies (table 1). In 2017, the D.C. Circuit reversed the district court’s decision and reinstated the delisting of gray wolves in Wyoming. Thus, wolves are currently delisted in the entire northern Rocky Mountains area (figure 1).

As a result of the above actions, the *C. lupus* listings in 50 CFR 17.11 currently include: (1) *C. lupus* in Minnesota listed as threatened, and (2) *C. lupus* in all or portions of 44 U.S. States and Mexico, listed as endangered (figure 1). In the United States, this includes: all of Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Maryland, Maine, Michigan, Missouri, Mississippi, North Carolina, North Dakota, Nebraska, New Hampshire, New Jersey, Nevada, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Vermont, West Virginia, and Wisconsin; and portions of Arizona, New Mexico, Oregon, Utah, and Washington (figure 1).

For additional information on these Federal actions and their associated litigation history refer to the relevant associated rules or the Previous Federal Actions sections of our recent gray wolf actions (see table 1).

TABLE 1—KEY FEDERAL REGULATORY ACTIONS UNDER THE ACT AND PREDECESSOR LEGISLATION¹ PERTAINING TO GRAY WOLF AND, WHERE APPLICABLE, OUTCOMES OF COURT CHALLENGES TO THESE ACTIONS
[E = Endangered Species, T = Threatened Species, DPS = Distinct Population Segment, NRM = Northern Rocky Mountains, WGL = Western Great Lakes]

Entity	Year of action	Type of action	Federal Register citation	Litigation history
<i>C. l. lycaon</i>	1967 ¹	List	32 FR 4001, March 11, 1967	
<i>C. l. irremotus</i>	1973 ¹	List	38 FR 14678, June 4, 1973	
<i>C. l. lycaon</i>	1974	List	39 FR 1171, January 4, 1974	
<i>C. l. irremotus</i>	1974	List	39 FR 1171, January 4, 1974	
<i>C. l. baileyi</i>	1976	List (E)	41 FR 17736, April 28, 1976	
<i>C. l. monstabilis</i> ²	1976	List (E)	41 FR 24064, June 14, 1976	
<i>C. lupus</i> in lower 48 U.S. (except Minnesota) & Mexico.	1978	Reclassify (E)	43 FR 9607, March 9, 1978 ³	
<i>C. lupus</i> in Minnesota ..	1978	Reclassify (T)	43 FR 9607, March 9, 1978 ³	
<i>C. lupus</i>	1978 (revised 1992)	Recovery Plan for Eastern Timber Wolf (eastern gray wolf).	n.a.	
<i>C. lupus</i>	1980 (revised 1987)	Recovery Plan for NRM Gray Wolf	n.a.	
<i>C. lupus</i>	1982 (revised 2017)	Recovery Plan for Mexican Gray Wolf (<i>C. l. baileyi</i>).	n.a.	
<i>C. lupus</i>	1994	Establish experimental population (southeastern Idaho, southern Montana, and Wyoming).	59 FR 60266, November 22, 1994	
<i>C. lupus</i>	1994	Establish experimental population (central Idaho & southwest Montana).	59 FR 60252, November 22, 1994	
<i>C. lupus</i>	1998	Establish experimental population (Arizona & New Mexico).	63 FR 1752, January 12, 1998	

TABLE 1—KEY FEDERAL REGULATORY ACTIONS UNDER THE ACT AND PREDECESSOR LEGISLATION¹ PERTAINING TO GRAY WOLF AND, WHERE APPLICABLE, OUTCOMES OF COURT CHALLENGES TO THESE ACTIONS—Continued
 [E = Endangered Species, T = Threatened Species, DPS = Distinct Population Segment, NRM = Northern Rocky Mountains, WGL = Western Great Lakes]

Entity	Year of action	Type of action	Federal Register citation	Litigation history
<i>C. lupus</i> DPSs: —Eastern DPS —Western DPS —Southwestern U.S. & Mexico DPS.	2003	Designate DPS & classify/reclassify as: —Eastern DPS (T) —Western DPS (T) —Southwestern U.S. & Mexico DPS (E) Delist in unoccupied non-historical range.	68 FR 15804, April 1, 2003	Rule vacated (<i>Defenders of Wildlife v. Norton</i> , 354 F. Supp. 2d 1156 (D. Or. 2005); <i>National Wildlife Federation v. Norton</i> , 386 F. Supp. 2d 553 (D. Vt. 2005))
<i>C. lupus</i> WGL DPS	2007	Designate DPS & delist	72 FR 6052, February 8, 2007	Rule vacated (<i>Humane Society of the United States v. Kempthorne</i> , 579 F. Supp. 2d 7 (D.D.C. 2008))
<i>C. lupus</i> NRM DPS	2008	Designate DPS & delist	73 FR 10514, February 27, 2008	Rule vacated and remanded (<i>Defenders of Wildlife v. Hall</i> , 565 F. Supp. 2d 1160 (D. Mont. 2008))
<i>C. lupus</i> DPSs: —WGL DPS —NRM DPS	2008	Reinstatement of protections—NRM & WGL DPSs.	73 FR 75356, December 11, 2008	
<i>C. lupus</i> WGL DPS	2009	Designate DPS & delist	74 FR 15070, April 2, 2009	Rule vacated (<i>Humane Society of the United States v. Salazar</i> , 1:09-CV-1092-PLF (D.D.C. 2009))
<i>C. lupus</i> NRM DPS (except Wyoming).	2009	Designate DPS & delist (except in Wyoming).	74 FR 15123, April 2, 2009	Rule vacated (<i>Defenders of Wildlife v. Salazar</i> , 729 F. Supp. 2d 1207 (D. Mont. 2010))
<i>C. lupus</i> WGL DPS	2009	Reinstatement of protections—WGL.	74 FR 47483, September 16, 2009.	
<i>C. lupus</i> NRM DPS	2010	Reinstatement of protections—NRM DPS.	75 FR 65574, October 26, 2010 ..	
<i>C. lupus</i> NRM DPS	2011	Reissuance of 2009 NRM DPS delisting rule (as required by Public Law 112–10-The Department of Defense and Full-Year Continuing Appropriations Act, 2011).	76 FR 25590, May 5, 2011	
<i>C. lupus</i> WGL DPS	2011	Revise 1978 listing, designate DPS & delist.	76 FR 81666, December 28, 2011	Rule vacated (<i>Humane Society of the U.S. v. Jewell</i> , 76 F. Supp. 3d 69, 110 (D.D.C. 2014)) Vacatur upheld on appeal (<i>Humane Society of the U.S. v. Zinke</i> , 865 F.3d 585 (D.C. Cir. 2017))
<i>C. lupus</i> in Wyoming	2012	Delist in Wyoming	77 FR 55530, September 10, 2012.	Rule vacated (<i>Defenders of Wildlife v. Jewell</i> , 68 F. Supp. 3d 193 (D.D.C. 2014) Vacatur reversed on appeal (<i>Defenders of Wildlife v. Zinke</i> , 849 F.3d 1077 (D.C. Cir. 2017))
<i>C. lupus</i> in lower 48 U.S. (except NRM & WGL DPSs) and Mexico.	2013	Propose delist in lower 48 U.S. & list <i>C. l. baileyi</i> (E); status review of wolves in Pacific Northwest.	78 FR 35664, June 13, 2013	
<i>C. l. baileyi</i>	2015	List E	80 FR 2488, January 16, 2015	
<i>C. l. baileyi</i>	2015	Revised 1998 <i>C. lupus</i> experimental population and associated it with <i>C. l. baileyi</i> listing.	80 FR 2512, January 16, 2015	
<i>C. lupus</i> WGL DPS and <i>C. lupus</i> in Wyoming.	2015	Reinstatement of protections—WGL DPS & Wyoming.	80 FR 9218, February 20, 2015 ...	
<i>C. lupus</i> in Wyoming	2017	Reinstatement of 2012 delisting—Wyoming.	82 FR 20284, May 1, 2017	

¹ Action taken under the Endangered Species Preservation predecessor legislation (Endangered Species Act of 1966, Endangered Species Conservation Act of 1969).

² Later subsumed into *C. l. baileyi* due to taxonomic changes.

³ In this 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).

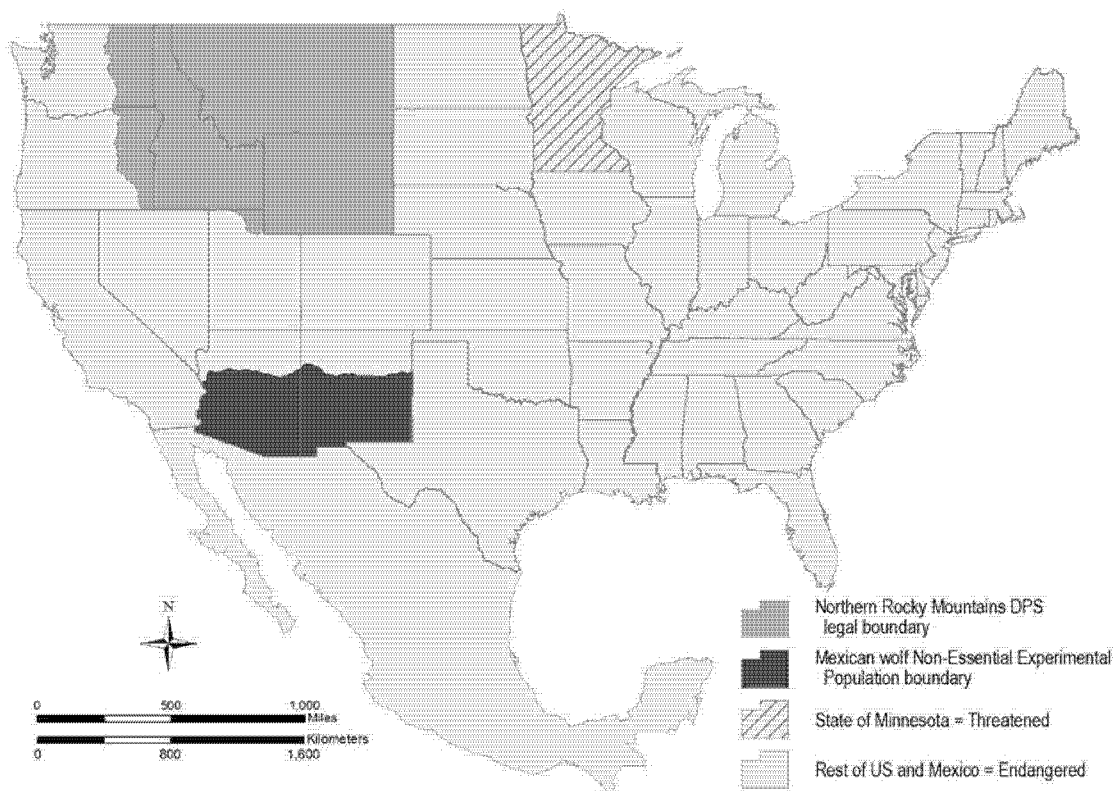


Figure 1: Current legal status of *C. lupus* under the Act. Northern Rocky Mountains DPS and Mexican wolf Non-Essential Experimental Population are not part of the listed entities. All map lines are approximations; see 50 CFR 17.11 and 17.84(k) for exact boundaries.

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General Background

The 1978 Reclassification

When the gray wolf (*C. lupus*) was reclassified in March 1978 (replacing multiple subspecies listings with two *C. lupus* population listings as described further in Previous Federal Actions), 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.

As indicated in Previous Federal Actions, the 1978 reclassification was employed as an approach of convenience to ensure the gray wolf was protected wherever it was found (as described in 47 FR 9607, March 9, 1978)

in the lower 48 States and Mexico, rather than an indication of where gray wolves actually 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* in the United States and Mexico and facilitated recovery of the northern Rocky Mountains and western Great Lakes populations, 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. In fact, as discussed below (see *National Wolf Strategy*), our recovery efforts have consistently focused on reestablishing

wolf populations in specific areas of the country.

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. Included in this strategy is the precept that, in order to qualify for any type of listing or delisting action, wolf entities must conform to the Act’s definition of “species,” whether as taxonomic species or subspecies or as distinct population segments.

Our May 5, 2011, proposed rule states that our strategy focuses on conservation of four extant gray wolf entities being considered for

classification actions: (1) The western Great Lakes population, (2) the northern Rocky Mountains population, (3) the southwestern population of Mexican wolves, and (4) 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), WGL DPS, and Wyoming portion of the NRM DPS in 2011 and 2012, and published a final rule listing the Mexican wolf (*C. l. baileyi*) separately as endangered in 2015. However, as indicated in Previous Federal Actions, our 2011 final rule designating and delisting the WGL DPS was subsequently vacated.

In addition to the rules described above, we completed a status review for gray wolves in the Pacific Northwest (western Washington and western Oregon) in 2013 (table 1). We determined that these wolves are not discrete, under our DPS policy, from wolves in the NRM DPS (see 78 FR 35707–35713) and, therefore, are not a valid listable entity under the Act. Wolves in the Pacific Northwest are a mix of individuals derived from wolves in the northern Rocky Mountains and Canada (or both) and represent the expanding fronts of these populations (78 FR 35707–35713, USFWS 2018, pp. 4, 14–15, 23). Since publication of our 2013 status review, wolves have also expanded into northern California. Wolves in northern California are not discrete from those in the Pacific Northwest based on documented movement of wolves between Oregon and California (USFWS 2018, pp. 14–15). Therefore, wolves in western Washington, western Oregon, and northern California are not a valid DPS because they are not discrete from the NRM DPS.

Approach for This Proposed Rule

The Entities Addressed in This Rule

In this proposed rule, we consider the status of the gray wolf within the geographic boundaries of the two currently listed *C. lupus* entities to determine whether these wolves should remain on the List in their current status, be reclassified, or be removed from the List. These two currently listed entities are: (1) *C. lupus* in Minnesota, and (2) *C. lupus* in the lower 48 United States and Mexico outside of Minnesota, the NRM DPS (Montana, Idaho, Wyoming, eastern third of Washington and Oregon, and north-central Utah), and the area covered by the experimental population area for *C. l. baileyi* (the designated area in which the

subspecies is being re-introduced; see 63 FR 1752, January 12, 1998). These two entities are currently listed as threatened and endangered, respectively.

While our past status reviews have focused on *C. lupus* DPSs and taxonomic units that align with our national wolf strategy (see table 1), this status review considers the current *C. lupus* listed entities described above. We do this:

(1) To address the Court of Appeals concerns with our 2011 final rule delisting the WGL DPS, specifically, concern pertaining to the impacts of partial delisting on the remainder of the already-listed species (see Previous Federal Actions);

(2) To avoid a rulemaking that conflicts with multiple court opinions regarding our prior attempts to designate and delist wolf DPSs (see table 1); and

(3) Because, with the exception of *C. l. baileyi*, which is listed separately as endangered wherever found (see Previous Federal Actions), the taxonomy of *C. lupus* is complex, controversial, and unresolved (USFWS 2018, pp. 1–4; also see *How We Address Taxonomic Uncertainties in this Rule*, below).

How We Address the C. lupus Entities in This Rule

The two currently listed gray wolf entities are vestiges of a 40-year-old action (the 1978 reclassification (see Background)). Our knowledge of wolf biology and taxonomy has vastly changed since then. Additionally, our previous efforts to revise the listed entities have not withstood judicial scrutiny (see Previous Federal Actions). Our policies and practices pertaining to listable entities have also changed since the 1978 reclassification. As a result, these entities do not conform with our current policies and standard practice. Specifically: (1) These two entities are not discrete from one another under our current policy on vertebrate distinct population segments (DPSs) (61 FR 4722, February 7, 1996); (2) the listing for the larger entity includes areas known to overlap with the range of the separately listed gray wolf subspecies *C. l. baileyi*; and (3) wolves currently listed in the western United States are not discrete from the recovered Northern Rocky Mountains population, which we removed from the List in 2009 (table 1).

(1) Lack of Discreteness of the Two *C. lupus* Listed Entities

Under the Act we can list a species, subspecies, or vertebrate DPS. Neither of the two entities currently on the List

represents an entire species or subspecies, thus to comply with the statute, these listings must be DPSs. Our 1996 DPS policy specifies that a vertebrate population must be both discrete and significant to qualify as a DPS (61 FR 4722–4725; February 7, 1996). To qualify as “discrete,” a population must be “markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors” (61 FR 4725). However, as indicated, the populations in these two entities are no longer discrete (U.S. Fish and Wildlife Service (USFWS) 2018, pp. 22–23). Therefore, because it is clear that neither entity would qualify as a DPS under our 1996 DPS policy (61 FR 4725), we consider the conservation status of the two listed wolf entities as one combined entity in this proposed rule. We refer to the combined entity simply as “the gray wolf entity” throughout this proposed rule.

(2) *C. l. baileyi* listing

As indicated above (see Previous Federal Actions), in 2015 we revised the listing for gray wolf by reclassifying the subspecies *C. l. baileyi* as a separately listed entity with the status of endangered, wherever found. Although the rulemaking does not include language expressly excluding *C. l. baileyi* from the previously listed *C. lupus* entity, we indicated in our 2015 final rule listing the subspecies that the effect of the regulation was to revise the List by making a separate entry for the Mexican wolf (80 FR 2488, 2511, January 16, 2015). Therefore, because we already assessed the status of, and listed, the Mexican wolf separately, we do not consider individuals or populations of *C. l. baileyi* in this proposed rule. In geographical terms, we do not consider wolves occurring in Mexico and within the experimental population area in this proposed rule. *Canis lupus baileyi* is the only subspecies known to occur in these areas, and we have no information suggesting that other gray wolves occur in these areas.

(3) Lack of Discreteness of Western Wolves Within and Outside the Gray Wolf Entity

In the coastal States of the western United States, wolves within the gray wolf entity occur in an area comprising western Oregon, western Washington, and northern California. These wolves are part of the expanding fronts (or edges) of the recovered and delisted wolf population in the NRM DPS and wolves crossing into the United States

from British Columbia, Canada (USFWS 2018, p. 22). While wolves in the west coast States may not be discrete from the NRM DPS and wolves in British Columbia, Canada, we do not combine wolves in the west coast States with those in the NRM DPS and British Columbia, Canada, for the purpose of our analysis (as we combined the two currently listed entities) because wolves in the NRM DPS and British Columbia, Canada, are not currently listed under the Act. Therefore, we do not consider wolves occurring in either of these locations in this proposed rule except to provide context, where appropriate, in our discussions of wolves comprising the gray wolf entity.

How We Address Taxonomic Uncertainties in This Rule

The taxonomy and evolutionary history of wolves in North America are complex and controversial, particularly with respect to the taxonomic assignment of wolves in the northeastern United States and portions of the Great Lakes region (eastern wolves) (see *Taxonomy of Gray Wolves in North America*). Available information indicates ongoing scientific debate and a lack of resolution on the taxonomy of eastern wolves. Some scientists consider eastern wolves to be a distinct species, *C. lycaon*; some consider them gray wolves (*C. lupus*); and some consider them the product of hybridization between gray wolves and coyotes (USFWS 2018, p. 1). Further, none of these viewpoints is more widely accepted by the scientific community.

For the purposes of this proposed rule, we consider eastern wolves to be members of the species *C. lupus* because there is not clear support for a recognizable and independent evolved eastern wolf species. Therefore, in our assessment of the status of the gray wolf entity, we include eastern wolves and eastern wolf range that occurs within the geographical boundaries of the gray wolf entity.

We note that in our 2013 proposed rule to delist wolves in the lower 48 United States and Mexico (table 1), we accepted the conclusions of Chambers *et al.* (2012, entire) on the taxonomy of eastern wolves and recognized eastern wolves as the distinct species *C. lycaon*. However, peer reviewers of our 2013 proposed rule indicated that Chambers *et al.* was not universally accepted and our rule did not represent the best available science (National Center for Ecological Analysis and Synthesis 2014, entire). Also, new information published on the topic since publication of our 2013 rule indicates the taxonomy of eastern wolves continues to be

controversial and unresolved (USFWS 2018, pp. 1–2). Finally, the uncertainty of the existence of a separate species is reflected in the fact that *C. lycaon* is not recognized by authoritative taxonomic organizations such as the American Society of Mammalogists or the International Commission on Zoological Nomenclature.

Scientists also disagree on the taxonomic assignment of wolves in the southeastern United States generally recognized as “red wolves.” However, we recognize the red wolf as the species *C. rufus*, and note that it is listed as endangered where found (32 FR 4001, March 11, 1967). We do not consider red wolves further in this rule, and the red wolf listing is not affected by this proposal.

Summary of Our Approach

In this proposed rule, we assess the status of gray wolves occurring within the geographic area outlined by the two currently listed gray wolf (*C. lupus*) entities combined (figure 1), but we do not include in our assessment individuals or populations of the Mexican gray wolf (*C. l. baileyi*) (wolves that occur in Mexico and the nonessential experimental population area in the southwestern United States) as these wolves are separately listed as an endangered subspecies (80 FR 2488, January 16, 2015). Further, for the purposes of this proposed rule, we consider any eastern wolves within the geographic boundaries of the two currently listed gray wolf entities to be members of the species *C. lupus*. As stated previously, this proposed rule supersedes the June 13, 2013, proposed rule to delist *C. lupus* in the remaining listed portions of the United States and Mexico outside of the delisted NRM and WGL (78 FR 35663).

Species Information

We provide detailed background information on gray wolves in the United States in a separate Gray Wolf Biological Report (see USFWS 2018, entire). This document can be found along with this proposed rule at <http://regulations.gov> in Docket No. FWS–HW–ES–2018–0097 (see *Supplemental Documents*). We summarize relevant information from this report below. For additional information, including sources of the information presented below, see USFWS (2018, entire) and references therein.

Biology and Ecology

Gray wolves are the largest wild members of the dog family and have a broad circumpolar range. They are highly territorial, social animals that

live and hunt in packs. They are well adapted to traveling fast and far in search of food, and catching and eating large mammals. In North America they are primarily predators of medium to large mammals, including deer, elk, and other species.

Gray wolves are habitat generalists. They can successfully occupy a wide range of habitats and are not dependent on wilderness for their survival. An inadequate prey density and a high level of human persecution appear to be the only factors that limit habitat suitability and gray wolf distribution. Thus, virtually any area that has sufficient prey and adequate protection from persecution can be suitable habitat for gray wolves.

Wolf populations are remarkably resilient as long as food supply and regulation of human-caused mortality are adequate. In the absence of high levels of anthropogenic influences, wolf populations are generally believed to be regulated by the distribution and abundance of prey on the landscape, though density-dependent, intrinsic mechanisms (*e.g.*, social strife, territoriality, disease) may limit populations when ungulate densities are high. Where harvest occurs, high levels of reproduction and immigration can compensate for high mortality rates. Pack social structure is very adaptable—breeding members can be quickly replaced from within or outside the pack, and pups can be reared by another pack member should their parents die. Consequently, wolf populations can rapidly overcome severe disruptions, such as pervasive human-caused mortality or disease. Wolf populations can increase rapidly after severe declines if the source of mortality is reduced. Also, the species' dispersal capabilities allow a wolf population to quickly expand and colonize nearby areas, even areas separated by broad expanses of unsuitable habitat.

Taxonomy of Gray Wolves in North America

The taxonomy of the genus *Canis* in North America has a complex and contentious history, particularly with respect to two generally recognized phenotypes (morphological forms) that occur in eastern North America: the “red wolf” and “eastern wolf.” As indicated above (see *How We Address Taxonomic Uncertainties in this Rule*), we continue to recognize the red wolf as the species *C. rufus* and do not discuss the taxonomy of the species further in this rule (for more information, see our 2018 Red Wolf Species Status Assessment). We discuss the eastern wolf further below.

The “eastern wolf” has been the source of perhaps the most significant disagreement on North American canid taxonomy among scientists. The “eastern wolf” has been variously described as a species, a subspecies of gray wolf, an ecotype of gray wolf, or the product of hybridization between gray wolves and coyotes. Hybridization is widely recognized to have played, and to continue to play, an important role among “eastern wolves,” with varying views on the role of hybridization between “eastern wolves” and coyotes, “eastern wolves” and gray wolves, and gray wolves and coyotes. Minnesota appears to be the western edge of a hybrid zone between western gray wolves and eastern wolves—wolves in western Minnesota appear to be gray wolves both morphologically and genetically while wolves in eastern Minnesota and much of the Great Lakes area appear to be “eastern wolf,” introgressed with western gray wolf to varying degrees.

No controversy exists regarding the number of wolf species in western North America—all are widely recognized as gray wolves (*C. lupus*). However, the science pertaining to gray wolf subspecies designations, unique evolutionary lineages, ecotypes, and admixture of formerly isolated populations continues to develop and remains unresolved. Even so, genetic studies indicate that wolves in Washington include individuals from the northern Rocky Mountains, individuals from British Columbia, and individuals of mixed ancestry. Wolves currently occupying Oregon and California are derived from dispersers from the northern Rocky Mountains.

Range and Population Trends Prior to 1978 Reclassification

Historical Range of the Gray Wolf Entity

We view the historical range to be the range of gray wolves within the gray wolf entity at the time of European settlement. We determined that this timeframe is appropriate because it precedes the major changes in range in response to excessive human-caused mortality (USFWS 2018, pp. 7–11).

At the time of the 1978 reclassification, the historical range of the gray wolf was generally believed to include most of North America and, consequently, most of the gray wolf entity. In the lower 48 United States, they were reportedly absent from parts of California, the arid deserts and mountaintops of the western United States, and parts of the eastern United States. However, some authorities question the species’ historical absence

in parts of California. In addition, long-held differences of opinion exist among scientists regarding the precise boundary of the gray wolf’s historical range in the eastern United States. Some believe the range of gray wolves extended as far south as southern Georgia while others believe it did not extend into the southeast at all. The southeastern and mid-Atlantic States are generally recognized as being within the historical range of the red wolf, but it is not known how much range overlap historically occurred between these two species. Because of the various scientific positions on gray wolf species and range, the historical extent of gray wolf range for much of the gray wolf entity in the eastern United States remains uncertain.

Based on our review of the best available information, we view the historical range of the gray wolf within the gray wolf entity to follow that presented in Nowak (1995) and depicted in figure 2. This includes all areas within the gray wolf entity except western California, a small portion of southwestern Arizona, and the southeastern United States (see figure 2 and USFWS 2018, pp. 7–11).

While some authorities question the absence of gray wolves in parts of California, limited preserved physical evidence of wolves in California exists. Therefore, we rely on early reports of wolves in the State that describe the species as occurring in the northern and Sierra Mountain regions of California. Further, while recognizing that the extent of overlap of *C. rufus* and *C. lupus* ranges is unknown, because the southeastern United States are generally recognized as within the range of *C. rufus*, we consider it to be generally outside the range of *C. lupus*. However, we acknowledge that the historical range of *C. lupus* is uncertain and the topic of continued debate among scientists.

Historical Abundance of the Gray Wolf Entity

Historical abundance of gray wolves within the gray wolf entity is largely unknown. Based on the reports of European settlers, gray wolves were common in much of the West. While historical (at the time of European settlement) estimates are notoriously difficult to verify, one study estimates that hundreds of thousands of wolves occurred in the western United States and Mexico. In the Great Lakes area, there were an estimated 4,000 to 8,000 in Minnesota, 3,000 to 5,000 in Wisconsin, and fewer than 6,000 in Michigan. No estimates are available for historical abundance in the Northeast.

Historical Trends in Range and Abundance for the Gray Wolf Entity

Gray wolf range and numbers throughout the gray wolf entity declined significantly during the 19th and 20th centuries as a result of the killing of wolves by humans through poisoning, unregulated trapping and shooting, and government-funded wolf-extermination efforts. By the time subspecies were first listed under the Act in 1974 (table 1), the gray wolf had been eliminated from most of its historical range within the lower 48 United States, including within most of the gray wolf entity.

Distribution, and Abundance of the Gray Wolf Entity at the Time of the 1978 Reclassification

By the time gray wolf subspecies were listed under the Act in 1974 (table 1), the species occurred in only a small fraction of its historical range. Aside from a few scattered individuals, wolves occurred in only two places within the gray wolf entity (and the entire lower 48 United States). A population persisted in northeastern Minnesota, and a small, isolated group of about 40 wolves occurred on Isle Royale, Michigan. The Minnesota wolf population was the only major U.S. population in existence outside Alaska at this time and numbered about 1,000 individuals. While the Minnesota population was small compared to historical numbers and range within the lower 48 United States, it had not undergone a significant decline since about 1900. By 1978, when several gray wolf subspecies were consolidated into a single lower 48 United States/Mexico listing and a separate Minnesota listing under the Act, the gray wolf population in Minnesota had increased to an estimated 1,235 wolves in 138 packs (in the winter of 1978–79) and had an estimated range of 14,038 square miles (mi²) (36,500 square kilometers (km²)) (figure 2). Although it was suspected that wolves inhabited Wisconsin at this time, it was not until 1979 that wolf presence was confirmed in the State.

Current Distribution and Abundance of the Gray Wolf Entity

The vast majority of wolves within the gray wolf entity now exist as a large, stable or growing metapopulation (partially isolated set of subpopulations) of more than 4,400 individuals that is broadly distributed across the northern portions of three States in the Great Lakes area. This metapopulation is also connected, via documented dispersals, to the large and expansive population of about 12,000–14,000 wolves in eastern Canada. As a result, gray wolves in the

Great Lakes area do not function as an isolated metapopulation of 4,400 individuals across three States, but rather as part of a much larger metapopulation that spans across three States of the United States and two Provinces of Canada.

In addition to the metapopulation in the Great Lakes area, as of 2017, three breeding pairs and four packs with no documented reproduction occur within the gray wolf entity in Oregon, Washington, and California. These wolves originated from large populations of approximately 15,000

wolves in western Canada and about 1,700 wolves in the northern Rocky Mountains. Effective dispersal has been documented among California, Oregon, and Washington as well as between these States and other northern Rocky Mountains States and Canada. Thus, wolves in the Pacific coast States are an extension of the metapopulation of wolves in western Canada and the northern Rocky Mountains.

Finally, a number of lone long-distance dispersing wolves have been documented outside core populations of the Great Lakes area and western United

States since the early 2000s. Confirmed records of individual wolves have been reported from North Dakota, South Dakota, Utah, Colorado, Nevada, Missouri, Indiana, Illinois, Nebraska, and Kansas. The total number of confirmed records in each of these States, since the early 2000s, ranges from one in Nevada to at least 27 in North Dakota, with the latter also having an additional 45 probable but unverified reports.

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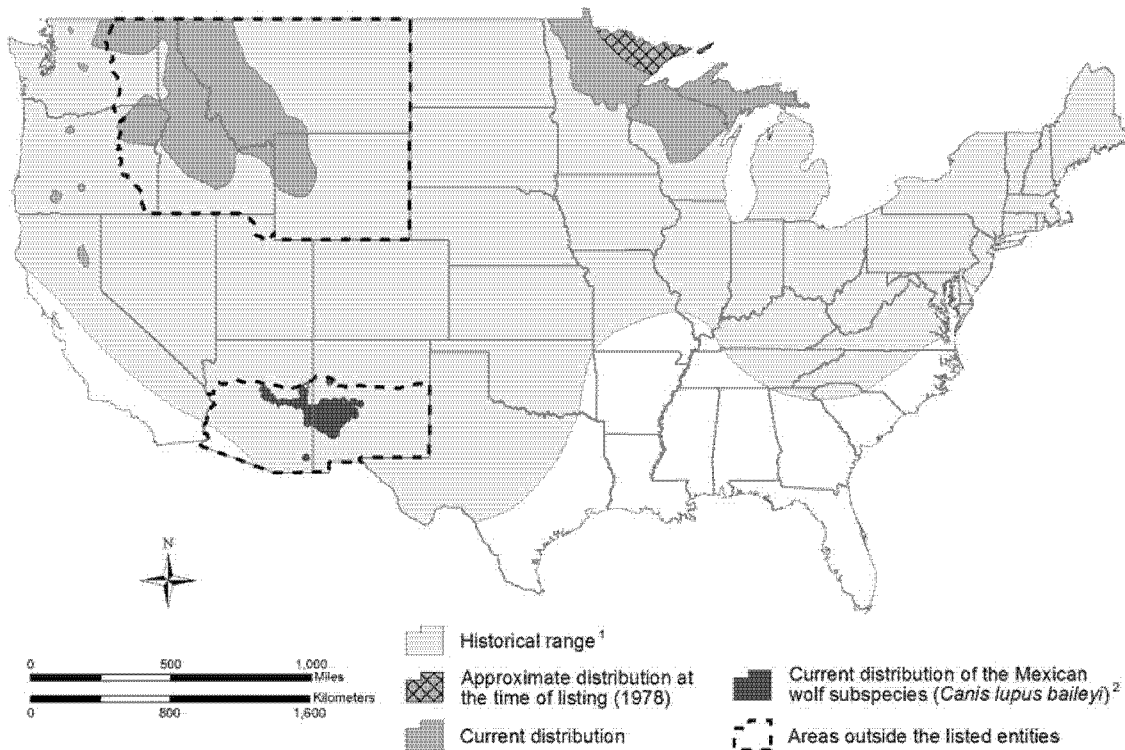


Figure 2. Historical range and current distribution of the gray wolf (*Canis lupus*) within the gray wolf entity. ¹Based on Nowak (1995)—recognizing that the exact extent of historical range is uncertain, we chose Nowak (1995) as the historical range boundary in the east to encompass the largest reasonable historical distribution in the lower 48 United States. ²U.S. portion of range only.

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Gray Wolf Recovery Plans and Recovery Implementation

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Recovery plans are non-regulatory documents that identify site-specific management actions that may be necessary to achieve conservation

and survival of the species. They also identify objective, measurable criteria (recovery criteria) which, when met, would result in a determination that the species should be removed from the List. Methods for monitoring recovery progress may also be included in recovery plans.

The Act does not describe recovery in terms of the proportion of historical range that must be occupied by a species, nor does it ever allude to restoration throughout the entire

historical range as a conservation purpose. In fact, the Act itself does not contain the phrase “historical range.” Thus, the Act does not require us to restore the gray wolf (or any other species) to all of its historical range or any specific percentage of currently suitable habitat. For some species, expansion of their distribution or abundance may be necessary to achieve recovery, but the amount of expansion is driven by a species’ biological needs affecting viability (ability to sustain

populations in the wild over time) and sustainability, 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 uniform definition for recovery and how recovery must be achieved.

As indicated in Previous Federal Actions, following our 1978 reclassification, we drafted recovery plans and implemented recovery programs for gray wolves in three regions of the contiguous United States (table 1). Wolves in one of these regions—*C. l. baileyi*, in the southwestern United States and Mexico—were recently listed separately as an endangered subspecies and are not considered in this rule (see Approach for this Proposed Rule). Wolves in another of these regions—the northern Rocky Mountains—have recovered and were delisted (table 1). We discuss recovery of wolves in the third region—the eastern United States—as it relates to the status of the gray wolf entity, below. We did not develop a recovery plan for wolves in the U.S. west coast States because we did not identify this area as necessary to the recovery of the species following our 1978 reclassification. We have not since developed a recovery plan for these wolves because we determined in our 2013 status review that they are biologically part of (although outside the legal boundary of) an already recovered and delisted population (see *National Wolf Strategy*).

Recovery Criteria

There are many paths to accomplish recovery of a species, and recovery may be achieved without all recovery criteria being fully met. We use recovery criteria in concert with evidence that threats have been minimized sufficiently and populations have achieved long-term viability to determine when a species can be reclassified from endangered to threatened or delisted. Recovery of a species is a dynamic process requiring adaptive management that may, or may not, fully follow the guidance provided in a recovery plan. Recovery plans, including recovery criteria, are subject to change based upon new information and are revised accordingly and when practicable. In a similar sense, implementation of planned actions is subject to changing information and availability of resources. We have taken

these considerations into account in the following discussion.

The 1978 Recovery Plan (hereafter Recovery Plan) and the 1992 Revised Recovery Plan for the Eastern Timber Wolf (hereafter Revised Recovery Plan) were developed to guide recovery of the eastern timber wolf subspecies. Those recovery plans contain the same two recovery criteria, which are meant to indicate when recovery of the eastern timber wolf throughout its historical range in the eastern United States has been achieved. The first recovery criterion states that the survival of the wolf in Minnesota must be assured. We, and the Eastern Timber Wolf Recovery Team (Peterson *in litt.* 1997, 1998, 1999a, 1999b), have concluded that this recovery criterion remains valid. It addresses a need for reasonable assurances that future State, tribal, and Federal wolf management and protection will maintain a viable recovered population of wolves within the borders of Minnesota for the foreseeable future.

Although the recovery criteria identified in the Recovery Plan predate identification of the conservation biology principles of representation (conserving the adaptive genetic diversity of a taxon), resiliency (ability to withstand demographic and environmental variation), and redundancy (sufficient populations to provide a margin of safety), those principles were incorporated into the recovery criteria. The Recovery Team insisted that the remnant Minnesota wolf population be maintained and protected to achieve wolf recovery in the eastern United States. Maintenance of the Minnesota wolf population is vital in terms of representation because these wolves include both western gray wolves and wolves that are admixtures of western gray wolves and eastern wolves. In other words, they contain the genetic components of both western gray wolves and eastern wolves. The successful growth of the remnant Minnesota population has maintained and maximized the representation of that genetic diversity among wolves in the Great Lakes area.

Maintenance of the Minnesota wolf population is also vital in terms of resiliency. Although the Revised Recovery Plan did not establish a specific numerical criterion for the Minnesota wolf population, it did identify, for planning purposes only, a population goal of 1,251–1,400 animals for that Minnesota population (USFWS 1992, p. 28). A population of this size not only increases the likelihood of maintaining its genetic diversity over the long term, but also reduces the

adverse impacts of unpredictable demographic and environmental events. Furthermore, the Revised Recovery Plan recommends a wolf population that is spread across about 40 percent of Minnesota (Zones 1 through 4) (USFWS 1992, p. 28), adding a geographic component to the resiliency of the Minnesota wolf population.

The second recovery criterion in the Recovery Plan states that at least one viable wolf population should be reestablished within the historical range of the eastern timber wolf outside of Minnesota and Isle Royale, Michigan (USFWS 1992, pp. 24–26). The reestablished population enhances both the resiliency and redundancy of the Great Lakes metapopulation.

The Recovery Plan provides two options for reestablishing this second population. If it is an isolated population, that is, located more than 100 miles (mi) (160 kilometers (km)) from the Minnesota wolf population, the second population should consist of at least 200 wolves for at least 5 years, based upon late-winter population estimates, to be considered viable. Late-winter estimates are made at a time when most winter mortality has already occurred and before the birth of pups, thus, the count is made at the annual low point of the population. Alternatively, if the second population is located within 100 mi (160 km) of a self-sustaining wolf population (for example, the Minnesota wolf population), it should be maintained at a minimum of 100 wolves for at least 5 years, based on late-winter population estimates, to be considered viable. A nearby second population would be considered viable at a smaller size because it would be geographically close enough to exchange wolves with the Minnesota population (that is, they would function as a metapopulation), thereby bolstering the smaller second population both genetically and numerically.

The original Recovery Plan did not specify where in the eastern United States the second population should be reestablished. Therefore, the second population could have been established anywhere within the triangular Minnesota-Maine-Florida area covered by the Recovery Plan and the Revised Recovery Plan, except on Isle Royale (Michigan) or within Minnesota. The Revised Recovery Plan identified potential gray wolf reestablishment areas in northern Wisconsin, the Upper Peninsula of Michigan, the Adirondack Forest Preserve of New York, a small area in eastern Maine, and a larger area of northwestern Maine and adjacent northern New Hampshire (USFWS

1992, pp. 56–58). Neither the 1978 nor the 1992 recovery criteria suggest that the establishment of gray wolves throughout all or most of what was thought to be its historical range in the eastern United States, or to all of the identified potential reestablishment areas, is necessary to achieve recovery under the Act.

In 1998, the Eastern Timber Wolf Recovery Team clarified the application of the recovery criterion for the second population to the wolf population that had developed in northern Wisconsin and the adjacent Upper Peninsula of Michigan. This second population is less than 100 mi (160 km) from the Minnesota wolf population. The Recovery Team recommended that the numerical recovery criterion for the Wisconsin-Michigan population be considered met when consecutive late-winter wolf surveys document that the population equals or exceeds 100 wolves (excluding Isle Royale wolves) for the 5 consecutive years between the first and last surveys (Peterson *in litt.* 1998).

Recovery Progress

Wolves in the Great Lakes area greatly exceed the recovery criteria (USFWS 1992, pp. 24–26) for (1) a secure wolf population in Minnesota, and (2) a second population outside Minnesota and Isle Royale consisting of 100 wolves for 5 successive years. Based on the eight surveys conducted since 1998, the wolf population in Minnesota has exceeded 2,000 individuals over the past 20 years, and populations in Michigan and Wisconsin have exceeded 100 individuals every year since 1996 (USFWS 2018, appendix 1). Based on the criteria set by the Eastern Wolf Recovery Team in 1992 and reaffirmed in 1997 and 1998 (Peterson *in litt.* 1997, *in litt.* 1998), this region contains sufficient wolf numbers and distribution to ensure the long-term survival of the gray wolf entity.

The maintenance and expansion of the Minnesota wolf population has allowed for the preservation of the genetic diversity that remained in the Great Lakes area when its wolves were first protected in 1974. Furthermore, the Wisconsin-Michigan wolf population far exceeds the numerical recovery criterion even for a completely isolated second population. Therefore, even in the unlikely event that this two-State population were to become totally isolated and wolf immigration from Minnesota and Ontario completely ceased, it would still remain a viable wolf population for the foreseeable future, as defined by the Revised Recovery Plan (USFWS 1992, pp. 25–

26). Finally, each of the wolf populations in Wisconsin and Michigan has exceeded 200 animals for about 20 years, so if either were somehow to become isolated, they would remain viable, and each State has committed to manage its wolf population at or above viable population levels. The wolf's numeric and distributional recovery criteria in the Great Lakes area have been met.

Historical Context of Our Analysis

When reviewing the current status of a species, it is important to understand and evaluate the effects of lost historical range on the viability of the species in its current range. In fact, when we consider the status of a species in its current range, we are considering whether, without the species' lost historical range, the species is endangered or threatened. Range reduction may result in: Reduced numbers of individuals and populations; changes in available resources (such as food) and, consequently, range carrying capacity; changes in demographic characteristics (survival, reproductive rate, metapopulation structure, etc.); and changes in genetic diversity and gene flow. These in turn can increase a species' vulnerability to a wide variety of threats, such as habitat loss, restricted gene flow, or having all or most of its populations affected by a catastrophic event such as a hurricane, fire, or disease outbreak. In other words, past range reduction can reduce the redundancy, resiliency, and representation of a species in its remaining range, such that a species may meet the definition of an "endangered species" or "threatened species" under the Act. Thus, loss of historical range is not necessarily determinative of a species' status, but must be considered in the context of all factors affecting a species. In addition to considering the effects that loss of historical range has had on the current and future viability of the species, we must also consider the causes of that loss of historical range. If the causes of the loss are still continuing, then that loss is also relevant as evidence of the effects of an ongoing threat.

As indicated above, gray wolves historically occupied most of the range of the gray wolf entity (see Historical Range). The gray wolf range of the gray wolf entity began receding after the arrival of Europeans as a result of deliberate killing of wolves by humans and government funded bounty programs aimed at eradication (USFWS 2018, pp. 7–11). Further, many historical habitats were converted into

agricultural land (Paquet and Carbyn 2003, p. 483), and natural food sources such as deer and elk were reduced, eliminated, or replaced with domestic livestock, which can become anthropogenic food sources for gray wolves (Young 1944 *in* Fritts *et al.* 1997, p. 8). The resulting reduction in range and population were dramatic—by the 1970s gray wolves occupied only a small fraction of their historical range (figure 2). Although the range of the gray wolf in the gray wolf entity has significantly expanded since 1978, its size and distribution remain below historical levels. Today, gray wolves within the gray wolf entity exist as a metapopulation spread across northern Minnesota, Michigan, and Wisconsin, and a small number of colonizing wolves in the west coast United States (USFWS 2018, pp. 22–23) (figure 2).

The alterations to gray wolf historical numbers and populations within the gray wolf entity increased the vulnerability of the gray wolf entity to a wide variety of threats that would not be at issue without such massive range reduction. Some of these threats were identified in the 1978 reclassification (43 FR 9607, March 9, 1978), including reduction in available food (prey) resources, and direct killing by humans. In addition to these considerations, in this proposed rule we also consider availability of suitable habitat, disease and parasites, and climate change. We analyze these potential threats to the gray wolf entity below under Summary of Factors Affecting the Species.

While range reduction may also result in changes in genetic diversity and gene flow, or cause changes in population demographics, we do not address genetic diversity or demographics of the gray wolf entity below because we are not aware of any information indicating that these are potential threats to wolves in the gray wolf entity. Wolves in the entity appear to be genetically and demographically healthy. Not only do they include wolves of differing and mixed genetic origin, but they exist as part of larger metapopulations—adverse effects resulting from genetic drift, demographic shifts, and local environmental fluctuations can be countered by influxes of individuals and their genetic diversity from other subpopulations of the metapopulation.

Summary of Factors Affecting the Species

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 species or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (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. Listing actions may be warranted based on any of these five factors, singly or in combination. 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 (delisting) because it is no longer endangered or threatened (50 CFR 424.11(c), (d)). For species that are already listed as endangered or threatened, this analysis of threats is an evaluation of threats that existed at the time of listing, threats currently facing the species, and the threats that are reasonably likely to affect the species in the foreseeable future, and the impact of the removal or reduction of the Act's protections following a delisting or downlisting (*i.e.*, reclassification from endangered to threatened).

For the purposes of this proposed rule, we define the “foreseeable future” to be the extent to which, given the amount and substance of available data, we can anticipate events or effects, or reliably extrapolate threat trends that relate to the status of the gray wolf entity. It took a considerable length of time for public attitudes and regulations to result in a social climate that promoted and allowed for wolf recovery within the gray wolf entity. The length of time over which this shift occurred, and the ensuing stability in those attitudes, gives us confidence that this social climate will persist. Also, the Great Lakes States, which contain the vast majority of wolves within the gray wolf entity, have had a solid history of cooperating with and assisting in wolf recovery and have made a commitment, through legislative actions, to continue these activities. Washington, Oregon, and California are also committed to conserving wolves as demonstrated by development of management plans and laws and regulations that protect wolves. We are not aware of any information indicating that the commitment of the Great Lakes States and west coast States to gray wolf conservation will change and conclude that this commitment will continue.

When evaluating the available information, with respect to foreseeable future, we take into account reduced confidence as we forecast further into the future. Finally, we note that there is a proposed revision to 50 CFR part 424 that creates a regulatory framework for the phrase “foreseeable future.” This proposal is not a departure from how we have implemented the phrase, but rather is meant to codify the framework we have been implementing. Thus, while we are not bound to the proposed revised regulations because they are not final, our interpretation of “foreseeable future” in this rule is consistent with them.

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 mere 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 an endangered species or threatened species under the Act.

Gray wolves that occur in the gray wolf entity are currently listed as endangered under the Act, except those wolves in Minnesota, which are listed as threatened. In this analysis we evaluate threat factors currently facing the gray wolf entity and those that are reasonably likely to have a negative effect on the viability of wolf populations in the gray wolf entity if the protections of the Act were not in place. Our analysis of threat factors below does not consider the potential for effects to *C. lupus* in areas where the species has been extirpated—rather, effects are considered in the context of the present population. As explained in our significant portion of the range (SPR) final policy (79 FR 37578; July 1, 2014), we take into account the effect lost historical range may have on the current and future viability of a species in the range it currently occupies, and also

whether the causes of that loss are evidence of ongoing or future threats to the species. We do this through our analysis of factors affecting the species. A species' current condition reflects the effects of historical range loss and, because threat factors are evaluated in the context of the species' current condition, historical range contraction may affect the outcome of our analysis.

Based on our review of the best available scientific and commercial information, we have identified several factors that could potentially be significant threats to the gray wolf entity. We summarize our analysis of these factors, and factors identified at the time of listing, below. We considered and evaluated the best available scientific and commercial data for our analyses.

Human-Caused Mortality

Human-caused mortality was identified as the main factor causing the decline of gray wolves at the time of listing (43 FR 9611, March 9, 1978), and an active eradication program is the sole reason that wolves were extirpated from their historical range in the United States (Weaver 1978, p. i). European settlers attempted to eliminate the wolf entirely, primarily due to the threat or reality of attacks on livestock, and the U.S. Congress passed a wolf bounty that covered the Northwest Territories in 1817. Bounties on wolves subsequently became the norm for States across the species' range. For example, in Michigan, an 1838 wolf bounty became the ninth law passed by the First Michigan Legislature; this bounty remained in place until 1960. A Wisconsin bounty was instituted in 1865 and was repealed about the time wolves were extirpated from the State in 1957. Minnesota maintained a wolf bounty until 1965. As the first provisional governments in the Pacific Northwest region were formed, they too enacted wolf bounties (Hampton 1997, pp. 107–108).

Protection of the gray wolf under the Act and State endangered-species statutes prohibited the intentional killing of wolves except under very limited circumstances, such as in defense of human life, for scientific or conservation purposes, or under special regulations intended to reduce wolf depredations of livestock or other domestic animals. Aside from the reintroduction of wolves into portions of the northern Rocky Mountains, the regulation of human-caused wolf mortality is the primary reason wolf numbers have significantly increased and their range has expanded since the mid-to-late 1970s.

Two Minnesota studies provide some limited insight into the extent of human-caused wolf mortality before and after the species' listing. On the basis of bounty data from a period that predated wolf protection under the Act by 20 years, Stenlund (1955, p. 33) found an annual human-caused mortality rate of 41 percent. Fuller (1989, pp. 23–24) provided 1980–86 data from a north-central Minnesota study area and found an annual human-caused mortality rate of 29 percent, a figure that includes 2-percent mortality from legal depredation-control actions. Drawing conclusions from comparisons of these two studies, however, is difficult due to the confounding effects of habitat quality, exposure to humans, prey density, differing time periods, and vast differences in study design. Nonetheless, these figures provide clear support for the contention that human-caused mortality decreased significantly once the wolf became protected under the Act.

Humans kill wolves for a number of reasons. In locations where people, livestock, and wolves coexist, some wolves are killed to resolve conflicts with livestock and pets (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, caught in traps set for other animals, or subject to accidental capture-related mortality during conservation or research efforts) (Bangs *et al.* 2005, p. 346). A few wolves have been killed by people who stated that they believed their physical safety was being threatened. Many wolf killings, however, are intentional, illegal, and never reported to authorities.

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 northern Rocky Mountains population (Liberg *et al.* 2011, pp. 3–5). Liberg *et al.* (2011, pp. 3–5) suggest more than two-thirds of total poaching may go undetected, and that illegal killing may pose a threat to wolves; however, poaching has not prevented population resurgence in either the Great Lakes area or the northern Rocky Mountains, as evidenced by population growth in those areas.

Vehicle collisions contribute to wolf mortality rates throughout their range in the lower 48 United States. This type of mortality is 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; however, mortalities due to vehicle collisions will likely constitute a small proportion of total mortalities.

Each of the States in the current range of gray wolves in the contiguous United States conduct scientific research and monitoring of wolf populations. 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 during wolf monitoring, nonlethal control, and research activities will remain below three percent of the wolves captured, and will have an insignificant impact on population dynamics.

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 wildlife-management agencies through the requirement for State permits for protected species, and would not substantially increase human-caused wolf mortality rates.

Other sources of human-caused mortality include intentional and legal actions, such as lethal depredation control and killing wolves in defense of human life or property. Although most wolf-human conflicts are solved using nonlethal methods, in a few instances lethal control is warranted to control a wolf to protect human life and property. The number of wolves killed for this purpose is small. For example, from 2004 to 2014, State or Federal agents killed 26 wolves for these purposes in the State of Michigan (an average of around 0.5 percent of the population each year) (Roell *et al.* 2010, p. 9; Beyer *in litt.* 2018). In the western States, since the first pack was confirmed in Washington in 2008, one wolf has been killed by a private individual who claimed self-defense. Although the number of wolves killed in defense of human life and property may be slightly higher in areas with greater human density and may increase after delisting as authority for this action expands (see Post-delisting Management), overall this type of mortality is rare and is not

expected to have a significant impact on wolf populations.

Lethal control of depredating wolves was authorized in Minnesota while wolves have been listed (under the authority of a regulation (50 CFR 17.40(d)) under section 4(d) of the Act), but such control was not authorized in Michigan or Wisconsin, except for the several years when such control was authorized under a permit from the USFWS or while wolves were delisted under previous actions. Lethal control of depredating wolves is not authorized in the listed portion of Oregon, Washington, or in California. The Minnesota wolf-depredation-control program euthanized from 20 (in 1982) to 262 (in 2015) wolves annually, and averaged between 2.2 to 7.6 percent of the wolf population annually. During the times wolves were listed and depredation control was the primary means of management in the State, the Minnesota wolf population continued to grow or remain stable while experiencing these levels of lethal control. During the times that lethal control of depredating wolves was conducted in Wisconsin and Michigan, there was no evidence of resulting adverse impacts to the maintenance of a viable wolf population in those States. In Wisconsin, a total of 256 wolves were killed for depredation control in the State, including 46 legally shot by private landowners, during the 59 months that wolves were delisted in the State. A total of 50 wolves were killed by the Michigan Department of Natural Resources (MI DNR) and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA–APHIS), Wildlife Services in response to depredation events during that time period. Following delisting, wolf depredation control in Wisconsin and Michigan would again occur, and be carried out according to their State management plans. We anticipate the level of mortality due to depredation control that would take place would be similar to what was observed during those times. See the Post-delisting Management section for a more detailed discussion of legal control of problem wolves (primarily for depredation control).

Regulated public harvest is another form of human-caused mortality that has occurred in the Great Lakes area during periods when wolves were delisted and will likely occur in Minnesota, Wisconsin, and Michigan if wolves are delisted again. Using an adaptive-management approach that adjusts harvest based on population estimates and trends, the initial objectives of States may be to lower wolf

populations then manage for sustainable populations, similar to how States manage all other game species. See the Post-delisting Management section for a more detailed discussion of legal harvest.

Regulation of human-caused mortality has significantly reduced the number of wolf mortalities caused by humans, and although illegal and accidental killing of wolves is likely to continue with or without the protections of the Act, at current levels those mortalities have had little impact on wolf populations. Legal human-caused mortality, primarily in the form of lethal depredation control and regulated harvest, will increase if wolves are delisted, as these are the primary human-caused mortality factors that State agencies can manipulate to achieve management objectives. However, the high reproductive potential of wolves and the innate behavior of wolves to disperse and locate social openings allows wolf populations to withstand relatively high rates of human-caused mortality.

We note that the principle of compensatory mortality was previously believed to occur in wolf populations. This means that human-caused mortality is not simply added to “natural” mortality, but rather replaces a portion of it. Creel and Rotella (2010) reexamined this concept with regard to wolves and found that, contrary to the previously held belief, wolf population growth declined as human-caused mortality increased (Creel and Rotella 2010, p. 3). Their study concludes that wolves can be harvested within limits, but that human-caused mortality was strongly additive in total mortality (Creel and Rotella 2010, p. 6).

The wolf population in the northern Rocky Mountains States of Idaho, Montana, and Wyoming provides a good example of the effects of increased human-caused mortality on population growth rates. From 1995 to 2008, wolf populations increased an average of 23 percent annually (range: 9 percent to 50 percent; USFWS *et al.* 2016, table 6b), while from 1999 to 2008, human-caused mortality removed an average of approximately 12 percent of the minimum estimated population each year (range: 7 percent to 16 percent; see USFWS *et al.* 2000–2009). Between 2009 and 2015, some or all of the northern Rocky Mountains States (dependent upon the Federal status of wolves) instituted fair-chase wolf hunting seasons with the objective of slowing or reversing population growth while continuing to maintain wolf populations well above federal recovery requirements in their respective States. During those years when legal harvest

occurred, human-caused mortality increased to an average of 29 percent of the minimum estimated population (range: 23 percent to 36 percent; see USFWS *et al.* 2010, 2012–2016), while the annual growth rate declined to an average of approximately 1 percent annually (range: -7 percent to 4 percent; see USFWS *et al.* 2010, 2012–2016). Where harvest occurs, the species’ high levels of reproduction and immigration can compensate for mortality rates of 17 percent to 48 percent (USFWS 2018, p. 6). Thus, although 2009 to 2015 is a relatively short time period from which to draw inferences, the population trends observed in the Northern Rocky Mountains suggest that the northern Rocky Mountains wolf population may be able to sustain an approximate 30 percent annual human-caused mortality rate while continuing to maintain a stable to slightly increasing population.

The States of Minnesota, Michigan, and Wisconsin have committed to continue to regulate human-caused mortality so that it does not reduce the wolf population below recovery level and have adequate laws and regulations to fulfill those commitments and ensure that the wolf population in the Great Lakes area remains above recovery levels (See Post-delisting Management). Washington, Oregon, and California are also committed to conserving wolves as demonstrated by development of management plans and laws and regulations that protect wolves. Furthermore, each post-delisting management entity (State, Tribal, and Federal) has experienced and professional wildlife staff to ensure those commitments can be accomplished.

Effects on Wolf Social Structure

Human-caused mortality of reproductive gray wolves could negatively affect gray wolf populations because wolves have a complex social system in which usually only the dominant male and female in a pack breed. Consequently, the death of one or both of the breeders may negatively affect the pack (by leading to pack dissolution) and the population as a whole (by slowing or reducing population growth). However, studies indicate these effects are context-dependent and that the availability of replacement breeders and timing of mortality can moderate the consequences of breeder loss (Borg *et al.* 2014, entire; Brainerd *et al.* 2008, entire). In populations that are at or near carrying capacity, where breeder replacement and subsequent reproduction occurs relatively quickly, population growth rate is largely

unaffected by breeder loss (Borg *et al.* 2014, pp. 6–7). Large colonizing populations (> 75 wolves) have similar times to breeder replacement and subsequent reproduction as populations at or near carrying capacity, while small recolonizing populations (\leq 75 wolves) take about twice as long to replace breeders and subsequently reproduce (Brainerd *et al.* 2008, pp. 89, 93). Therefore, the effects of breeder loss may be greatest on small recolonizing gray wolf populations. Studies also indicate that mortality of breeding gray wolves is more likely to lead to pack dissolution and reduced reproduction when mortality occurs during the breeding season (Borg *et al.* 2014, p. 8) and when pack sizes are small (Borg *et al.* 2014, pp. 5–6; Brainerd *et al.* 2008, p. 94).

Gray wolf pack social structure is very adaptable and resilient. Breeding members can be quickly replaced from either within or outside the pack, and pups can be reared by another pack member should their parents die (USFWS 2018, p. 6). Consequently, wolf populations can rapidly overcome severe disruptions, such as pervasive human-caused mortality or disease. Although we acknowledge that breeder loss can and will occur in the future regardless of Federal status, we conclude that the effects of breeder loss on wolf populations (or the gray wolf entity) as a whole are likely to be minimal as long as adequate regulatory mechanisms are in place to ensure sufficient population size is maintained.

The Role of Public Attitudes

In our 1978 rule reclassifying wolves, we indicated that regulations prohibiting the killing of wolves, even wolves that may be attacking livestock and pets, such as the Federal regulations in place at that time in Minnesota, may work against gray wolves by creating an adverse public attitude toward the species. We acknowledge that public attitudes towards wolves vary with demographics, change over time, and can affect human behavior toward wolves, including poaching (illegal killing) of wolves (see the following studies and reviews: Kellert 1985, 1990, 1999; Nelson and Franson 1988; Kellert *et al.* 1996; Wilson 1999; Browne-Nuñez and Taylor 2002; Williams *et al.* 2002; Manfredo *et al.* 2003; Naughton-Treves *et al.* 2003; Schanning 2009; Mertig 2004; Chavez *et al.* 2005; Schanning and Vazquez 2005; Beyer *et al.* 2006; Hammill 2007; Treves *et al.* 2009; Wilson and Bruskotter 2009; Treves and Martin 2011; Treves *et al.* 2013; Madden and McQuinn 2014). However, the factors that affect people’s attitudes and

behaviors toward wolves are not well understood (Treves and Bruskotter 2014, entire; Treves *et al.* 2013, p. 316 and references therein; also see Olson *et al.* 2014, entire and Chapron and Treves 2016, entire). Thus, it is unclear how delisting and the changes in wolf management subsequent to delisting, such as implementation of wolf harvests, may affect attitudes, human behavior and, ultimately, wolf mortality.

We expect that some segments of the public will be more tolerant of wolf management at the State level because it may be perceived by some as more flexible than Federal regulation, whereas other segments may continue to prefer Federal management due to a perception that it is more protective. State wildlife agencies have professional staff dedicated to disseminating accurate, science-based information about wolves and wolf management within their respective States. In addition, several States have convened advisory committees to engage stakeholders in discussing and addressing conflicts related to wolves (for example, Washington (<https://wdfw.wa.gov/about/advisory/wag/>) and Wisconsin (<https://dnr.wi.gov/topic/WildlifeHabitat/wolf/committee.html>)). As the status and management of the gray wolf evolves, continued collaboration between managers and researchers to monitor public attitudes toward wolves and their management will be necessary.

Human-Caused Mortality Summary

Despite human-caused mortalities of wolves, wolf populations have continued to increase in both numbers and range. Wolf population growth will likely slow as densities increase in suitable habitat. Wolves are less likely to persist in more unfavorable habitats due to depredation management, illegal killing, incidental mortality (for example, vehicle collision), natural mortality (disease, starvation, and intraspecific aggression), and other means. Once wolf populations become established, we should expect to see populations fluctuate around an equilibrium resulting from fluctuations in birth and mortality rates.

Minnesota, Wisconsin, and Michigan will utilize adaptive management to respond to wolf population increases or decreases to maintain populations at sustainable levels well above management objectives. State management plans in these three states that would be implemented following delisting manage for a minimum wolf population of 1,600 in Minnesota, 250 in Wisconsin (with a management goal of 350), and 200 in Michigan. These

minimum population numbers are well above Federal recovery requirements defined in the Eastern Timber Wolf Recovery Plan. As wolf population numbers are currently much higher in each of these three States, we can expect to see some reduction in wolf populations in the Great Lakes areas if they are delisted as States implement lethal depredation control and begin to institute wolf hunting seasons with the objective of slowing or reversing population growth. However, the ultimate goal of these three States is to maintain wolf populations well above Federal recovery requirements in their respective States.

The 2010 State management plan for Oregon and the 2016 plan for California do not include population-management goals (Oregon Department of Fish and Wildlife (ODFW) 2010, p. 27; California Department of Fish and Wildlife (CDFW) 2016a, p. 12); however, this is likely to be addressed in the forthcoming Oregon plan revision as the draft plan revision currently suggests that 300 wolves are the “minimum population management threshold” for the State (ODFW 2017, p. 17). While the 2011 Washington State management plan does not include population-management goals, it includes recovery objectives intended to ensure the reestablishment of a self-sustaining population of wolves in Washington (Wiles *et al.* 2011, p. 9; also see *Post-delisting Management in the West*). In these States, wolf populations will likely be managed to ensure progress towards recovery objectives while also minimizing livestock losses caused by wolves.

Habitat and Prey Availability

Gray wolves are habitat generalists (Mech and Boitani 2003, p. 163) and once occupied or transited most of the United States, except the southeast. However, much of the historical range of gray wolves (Chambers *et al.* 2012, pp. 34–42) in the contiguous United States has been modified due to human use. While lone wolves can travel through, or temporarily live, almost anywhere (Jimenez *et al.* 2017, p. 1), large portions of gray wolf 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). Much of the area that wolves currently occupy corresponds to what is considered “suitable” wolf habitat in the lower 48 States as modeled by Oakleaf *et al.* (2006, entire), Carroll *et al.* (2006, entire), Mladenoff (1995, entire), and Mladenoff *et al.* (1999, entire). It is also expected that wolves will continue to

recolonize areas of the Pacific Northwest where suitable habitat has been identified (Maletzke *et al.* 2015, entire; ODFW 2015, entire). We consider suitable habitat as forested 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.

Great Lakes Area: Suitable Habitat

Various researchers have investigated habitat suitability for wolves in the central and eastern portions of the United States. Most of these efforts have focused on using a combination of human density, density of agricultural lands, deer density or deer biomass, and road density, or have used road density alone to identify areas where wolf populations are likely to persist or become established (Mladenoff *et al.* 1995, pp. 284–285; 1997, pp. 23–27; 1998, pp. 1–8, 1999, pp. 39–43; Harrison and Chapin 1997, p. 3; 1998, pp. 769–770; Wydeven *et al.* 2001, pp. 110–113; Erb and Benson 2004, p. 2; Potvin *et al.* 2005, pp. 1661–1668; Mladenoff *et al.* 2009, pp. 132–135).

To a large extent, road density has been adopted as the best predictor of habitat suitability in the Midwest due to the connection between roads and human-caused wolf mortality. Several studies demonstrated that wolves generally did not maintain breeding packs in areas with a road density greater than about 0.9 to 1.1 linear mi per mi² (0.6 to 0.7 km per km²) (Thiel 1985, pp. 404–406; Jensen *et al.* 1986, pp. 364–366; Mech *et al.* 1988, pp. 85–87; Fuller *et al.* 1992, pp. 48–51). Work by Mladenoff and associates indicated that colonizing wolves in Wisconsin preferred areas where road densities were less than 0.7 mi per mi² (0.45 km per km²) (Mladenoff *et al.* 1995, p. 289). However, research in the Upper Peninsula of Michigan indicates that, in some areas with low road densities, low deer density appears to limit wolf occupancy (Potvin *et al.* 2005, pp. 1667–1668) and may prevent recolonization of portions of the Upper Peninsula. In Minnesota, a combination of road density and human density is used by Minnesota Department of Resources (MN DNR) to model suitable habitat. Areas with a human density up to 20 people per mi² (8 people per km²) are suitable if they also have a road density less than 0.8 mi per mi² (0.5 km per km²). Areas with a human density of less than 10 people per mi² (4 people per km²) are suitable if they have road

densities up to 1.1 mi per mi² (0.7 km per km²) (Erb and Benson 2004, table 1).

Road density is a useful parameter because it is easily measured and mapped, and because it correlates directly and indirectly with various forms of other human-caused wolf mortality factors. A rural area with more roads generally has a greater human density, more vehicular traffic, greater access by hunters and trappers, more farms and residences, and more domestic animals. As a result, there is a greater likelihood that wolves in such an area will encounter humans, domestic animals, and various human activities. These encounters may result in wolves being hit by motor vehicles, being controlled by government agents after becoming involved in depredations on domestic animals, being shot intentionally by unauthorized individuals, being trapped or shot accidentally, or contracting diseases from domestic dogs (Mech *et al.* 1988, pp. 86–87; Mech and Goyal 1993, p. 332; Mladenoff *et al.* 1995, pp. 282, 291). Based on mortality data from radio-collared Wisconsin wolves from 1979 to 1999, natural causes of death predominate (57 percent of mortalities) in areas with road densities below 1.35 mi per mi² (0.84 km per km²), but human-related factors produced 71 percent of the wolf deaths in areas with higher road densities (Wydeven *et al.* 2001, pp. 112–113).

Some researchers have used a road density of 1 mi per mi² (0.6 km per km²) of land area as an upper threshold for suitable wolf habitat. However, the common practice in more recent studies is to use road density to predict probabilities of persistent wolf pack presence in an area. Areas with road densities less than 0.7 mi per mi² (0.45 km per km²) are estimated to have a greater than 50 percent probability of wolf pack colonization and persistent presence, and areas where road density exceeded 1 mi per mi² (0.6 km per km²) have less than a 10 percent probability of occupancy (Mladenoff *et al.* 1995, pp. 288–289; Mladenoff and Sickley 1998, p. 5; Mladenoff *et al.* 1999, pp. 40–41). Wisconsin researchers view areas with greater than 50 percent probability as “primary wolf habitat,” areas with 10 to 50 percent probability as “secondary wolf habitat,” and areas with less than 10 percent probability as unsuitable habitat (Wisconsin Department of Natural Resources (WI DNR) 1999, pp. 47–48).

The territories of packs that do occur in areas of high road density, and hence with low expected probabilities of occupancy, are generally near broad areas of more suitable habitat that are

likely serving as a source of wolves, thereby assisting in maintaining wolf presence in the higher road density areas and, therefore, less-suitable areas (Mech 1989, pp. 387–388; Wydeven *et al.* 2001, p. 112). The predictive ability of this model was questioned (Mech 2006a, 2006b) and responded to (Mladenoff *et al.* 2006), and an updated analysis of Wisconsin pack locations and habitat was completed (Mladenoff *et al.* 2009). This model maintains that road density is still an important indicator of suitable wolf habitat; however, lack of agricultural land is also a strong predictor of habitat that wolves occupy.

It appears that essentially all suitable habitat in Minnesota is now occupied, range expansion has slowed or possibly ceased, and the wolf population within the State has stabilized (Erb and Benson 2004, p. 7; Erb and Don Carlos 2009, pp. 57, 60). This suitable habitat closely matches the areas designated as Wolf Management Zones 1 through 4 in the Revised Recovery Plan (USFWS 1992, p. 72), which are identical in area to Minnesota Wolf Management Zone A (MN DNR 2001, appendix III).

Recent surveys for Wisconsin wolves and wolf packs show that wolves have now recolonized the areas predicted by habitat models to have low, moderate, and high probability of occupancy (primary and secondary wolf habitat). The late-winter 2017–18 Wisconsin wolf survey identified packs occurring throughout the central Wisconsin forest area (Wolf Management Zone 2) and across the northern forest zone (Zone 1), with highest pack densities in the northwest and north-central forest (WI DNR 2018, entire).

Michigan wolf surveys in winter 2017–18 continue to show wolf pairs or packs (defined by Michigan DNR as two or more wolves traveling together) in every Upper Peninsula county (Huntzinger *et al.* 2005, p. 6; MI DNR 2018, entire).

Habitat suitability studies in the Upper Midwest indicate that the only large areas of suitable or potentially suitable habitat areas that are currently unoccupied by wolves are located in the northern Lower Peninsula of Michigan (Mladenoff *et al.* 1997, p. 23; Mladenoff *et al.* 1999, p. 39; Potvin 2003, pp. 44–45; Gehring and Potter 2005, p. 1239). One published Michigan study (Gehring and Potter 2005, p. 1239) estimates that these areas could host 46 to 89 wolves; a graduate thesis estimates that 110–480 wolves could exist in the northern Lower Peninsula (Potvin 2003, p. 39). The northern Lower Peninsula is separated from the Upper Peninsula by the Straits of Mackinac, whose 4-mile

(6.4-km) width freezes during mid- and late-winter in some years. In recent years there have been several documented occurrences of wolves in the northern Lower Peninsula, but there has been no indication of persistence beyond several months. Prior to those occurrences, the last recorded wolf in the Lower Peninsula was in 1910.

These northern Lower Peninsula patches of potentially suitable habitat contain a great deal of private land, are small in comparison to the occupied habitat on the Upper Peninsula and in Minnesota and Wisconsin, and are intermixed with agricultural and higher-road-density areas (Gehring and Potter 2005, p. 1240). Therefore, continuing wolf immigration from the Upper Peninsula may be necessary to maintain a future northern Lower Peninsula population. The Gehring and Potter study (2005, p. 1239) predicted 850 mi² (2,198 km²) of suitable habitat (areas with greater than a 50 percent probability of wolf occupancy) in the northern Lower Peninsula. Potvin (2003, p. 21), using deer density in addition to road density, believes there are about 3,090 mi² (8,000 km²) of suitable habitat in the northern Lower Peninsula. Gehring and Potter (2005, p. 1239) exclude from their calculations those northern Lower Peninsula low-road-density patches that are less than 19 mi² (50 km²), while Potvin (2003, pp. 10–15) does not limit habitat patch size in his calculations. Both of these area estimates are well below the minimum area described in the Revised Recovery Plan, which states that 10,000 mi² (25,600 km²) of contiguous suitable habitat is needed for a viable isolated gray wolf population, and half that area (5,000 mi² or 12,800 km²) is needed to maintain a viable wolf population that is subject to wolf immigration from a nearby population (USFWS 1992, pp. 25–26).

Based on the above-described studies and the guidance of the 1992 Revised Recovery Plan, the Service has concluded that suitable habitat for wolves in the western Great Lakes area can be determined by considering four factors: road density, human density, prey base, and area. An adequate prey base is an absolute requirement, but in much of the western Great Lakes area the white-tailed deer density is well above adequate levels, causing the other factors to become the determinants of suitable habitat. Prey base is primarily of concern in the Upper Peninsula where severe winter conditions cause deer to move away from some lakeshore areas, making otherwise suitable areas locally and seasonally unsuitable. Road density and human density frequently

are highly correlated; therefore, road density is often used as a predictor of habitat suitability. However, areas with higher road density may still be suitable if the human density is very low, so a consideration of both factors is sometimes useful (Erb and Benson 2004, p. 2). Finally, although the territory of individual wolf packs can be relatively small, packs are not likely to establish territories in areas of small, isolated patches of suitable habitat.

Great Lakes Area: Prey Availability

Deer (prey) decline, due to succession of habitat and severe winter weather, was identified as a threat at the time of listing. Wolf density is heavily dependent on prey availability (for example, expressed as ungulate biomass, Fuller *et al.* 2003, pp. 170–171), and prey availability is high in the Great Lakes area. Conservation of primary wolf prey in the Great Lakes area, white-tailed deer and moose, is a high priority for State conservation agencies. As MN DNR points out in its wolf-management plan (MN DNR 2001, p. 25), it manages ungulates to ensure a harvestable surplus for hunters, nonconsumptive users, and to minimize conflicts with humans. To ensure a harvestable surplus for hunters, MN DNR must account for all sources of natural mortality, including loss to wolves, and adjust hunter harvest levels when necessary. For example, after severe winters in the 1990's, MN DNR modified hunter harvest levels to allow for the recovery of the local deer population (MN DNR 2001, p. 25). In addition to regulating the human harvest of deer and moose, MN DNR also plans to continue to monitor and improve habitat for these species.

Land management activities carried out by other public agencies and by private land owners in Minnesota's wolf range, including timber harvest and prescribed fire, incidentally and significantly improves habitat for deer, the primary prey for wolves in the State. Approximately one-half of the Minnesota deer harvest is in the Forest Zone, which encompasses most of the occupied wolf range in the State (Cornicelli 2008, pp. 208–209). There is no indication that harvest of deer and moose or management of their habitat will significantly depress abundance of these species in Minnesota's primary wolf range.

In Wisconsin, the statewide post-hunt white-tailed deer population estimate for 2017 was approximately 1,377,100 deer (Stenglein 2017, p. 1). In the Northern Forest Zone of the State, the post-hunt population estimate has ranged from approximately 250,000 deer

to more than 400,000 deer since 2002. The 2017 post-hunt deer population estimate in that zone was nearly as high as it was in 2002. Three consecutive mild winters and limited antlerless harvest may explain the population growth in the northern deer herd in 2017. The Central Forest Zone post-hunt population estimates have been largely stable since 2009 at 60,000–80,000 deer on average. The Central Farmland Zone deer population has increased since 2008, and the 2017 post-hunt deer population estimate was similar to the estimate in 2016. For a third year in a row, the 2017 post-hunt deer population estimate in the Southern Farmland Zone exceeded 250,000 deer (Stenglein 2017, pp. 2, 7).

Because of severe winter conditions (persistent, deep snow) in the Upper Peninsula, deer populations can fluctuate dramatically from year to year. In 2016, the MI DNR finalized a new deer-management plan to address ecological, social, and regulatory shifts. An objective of this plan is to manage deer at the appropriate scale, considering impacts of deer on the landscape and on other species, in addition to population size (MI DNR 2016, p. 16). Additionally, the Michigan wolf-management plan addresses maintaining a sustainable population of wolf prey (MI DNR 2015, pp. 29–31). Short of a major, and unlikely, shift in deer-management and harvest strategies, there will be no shortage of prey for Wisconsin and Michigan wolves for the foreseeable future.

West Coast States: Suitable Habitat

In Washington, wolves are expected to persist in habitats with similar characteristics to those identified by Oakleaf *et al.* (2006) (Wiles *et al.* 2011, p. 50) and as described above. Several modeling studies have estimated potentially suitable wolf habitat in Washington with most predicting suitable habitat in northeastern Washington, the Blue Mountains, the Cascade Mountains, and the Olympic Peninsula. Total area estimates in these studies range from approximately 16,900 mi² (43,770 km²) to 41,500 mi² (107,485 km²) (Wiles *et al.* 2011, pp. 51, 53; Maletzke *et al.* 2015). The Cascade Mountains and Olympic Peninsula are both located within the boundary of the gray wolf listed entities. Current wolf-pack habitat use in Washington based on the mean home ranges of 11 packs with known territories is approximately 359 mi² (930 km²), ranging from an estimated 121 mi² (314 km²) to 1,164 mi² (3,015 km²) (Washington Department of Fish and Wildlife (WDFW) *et al.* 2017, p. WA–6). (While

22 packs are known to occur in Washington, sufficient data is not available to estimate home ranges of the other 11.)

The Oregon Department of Fish and Wildlife (ODFW) developed a map of “potential wolf range” as part of its recent status review of wolves in Oregon (ODFW 2015, entire). The model used predictors of wolf habitat including land-cover type, elk range, human population density, road density, and land types altered by humans; they chose to exclude land ownership because wolves will use forested cover on both public and private lands (ODFW 2015, p. 2). Approximately 41,256 mi² (106,853 km²) were identified as potential wolf range in Oregon. The resulting map coincides well with the current distribution of wolves in Oregon. The ODFW estimates that wolves occupy 31.6 percent of the potential wolf range in the east management zone (the majority of wolves here are under State management) and 2.7 percent of potential wolf range in the western management zone (all wolves here are under Federal management) (ODFW 2015, p. 9).

Habitat models developed for the northern Rocky Mountains (*e.g.*, Oakleaf *et al.* 2006; Larson and Ripple 2006; Carroll *et al.* 2006) may have limited applicability to California due to differences in geography, distribution of habitat types, distribution and abundance of prey, potential restrictions for movement, and human habitation (CDFW 2016b, pp. 154, 156). Despite these challenges, CDFW used these models to suggest that wolves are most likely to occupy three general areas: (1) The Klamath Mountains and portions of the northern California Coast Ranges; (2) the southern Cascades, the Modoc Plateau, and Warner Mountains; and (3) the Sierra Nevada Mountain Range (CDFW 2016b, p. 20). These areas were identified as having a higher potential for wolf occupancy based on prey abundance, amount of public land ownership, and forest cover, whereas other areas were less suitable due to human influences (CDFW 2016b, p. 156). As wolves continue to expand into California, models may be refined to better estimate habitat suitability and the potential for wolf occupancy.

West Coast States: Prey Availability

The Washington Department of Fish and Wildlife recently conducted a Wildlife Program 2015–2017 Ungulate Assessment to identify ungulate populations that are below management objectives or may be negatively affected by predators (WDFW 2016, entire). The

assessment covers white-tailed deer, mule deer, black-tailed deer, Rocky Mountain elk, Roosevelt elk, bighorn sheep, and moose (WDFW 2016, p. 12). Washington defines an at-risk ungulate population as one that falls 25 percent below its population objective for two consecutive years and/or one in which the harvest decreases by 25 percent below the 10-year-average harvest rate for two consecutive years (WDFW 2016, p. 13). Based on available information, the 2016 report concludes that no ungulate populations in Washington were considered to be at-risk (WDFW 2016, p. 13).

In Oregon, 20 percent of Roosevelt elk populations are below management objectives; however, the populations are generally stable within the listed gray wolf entity in western Oregon (ODFW 2017, p. 60). Rocky Mountain elk are above management objectives in 63 percent of populations and are considered to be stable or increasing across the State (ODFW 2017, p. 60). Mule deer and black-tailed deer populations peaked in the mid-1900s and have since declined, likely due to human development, changes in land use, predation, and disease (ODFW 2017, p. 61). White-tailed deer populations, including Columbia white-tailed deer, are small, but are increasing in distribution and abundance (ODFW 2017, p. 64). Deer are a secondary prey item when elk are present; areas that lack elk are only likely to support a low density of wolves (ODFW 2017, p. 56).

In California, declines of historical ungulate populations were the result of overexploitation by humans dating back to the 19th century (CDFW 2016b, p. 147). However, elk distribution and abundance have increased due to implementation of harvest regulations, reintroduction efforts, and natural expansion (CDFW 2016b, p. 147). Mule deer also experienced overexploitation, but were also more likely subject to fluctuations in habitat suitability as a result of logging, burning, and grazing. Across the West, including California, mule deer populations have been declining since the late 1960s due to multiple factors including loss of habitat, drought, predation, and competition with livestock, but, as noted above, deer are a secondary prey when elk are present (CDFW 2016b, p. 147).

Habitat and Prey Availability Summary

Sufficient suitable habitat exists for the gray wolf entity to continue to support wolves into the future. Wolf populations should remain strong in these areas with management activities that focus on wolf population reduction

as needed to maintain populations of wild ungulates and reduce conflicts with livestock. Traditional land-use practices throughout the vast majority of the species' current range in the United States do not appear to be affecting the viability of wolves. We do not anticipate overall habitat changes in wolf range for the gray wolf entity will occur at a magnitude that would affect wolves in the entity rangewide because wolf populations are broadly distributed across the current range in the Great Lakes area (where most wolves occur in the entity) and are able to withstand high levels of mortality due to their high reproductive rate and vagility (the ability of an organism to move about freely and migrate) (Fuller *et al.* 2003, p. 163; Boitani 2003, pp. 328–330). Further, much of the areas occupied by the gray wolf entity occurs on public land where wolf conservation is a priority and conservation plans have been adopted to ensure continued wolf persistence (see Federal Lands discussion under Post-delisting Management) (73 FR 10514, p. 10538, February 27, 2008).

An important factor in maintaining wolf populations is the native ungulate population. Primary wild ungulate prey within the range of gray wolves in the gray wolf entity include deer and elk. Each State within wolf-occupied range for the gray wolf entity manages its wild ungulate populations to maintain sustainable populations for harvest by hunters. States employ an adaptive-management approach that adjusts hunter harvest in response to changes in big-game population numbers and trends when necessary, and predation is one of many factors considered when setting seasons. We know of no future condition that would cause a decline in ungulate populations significant enough to affect the status of gray wolves in the gray wolf entity.

Disease and Parasites

Although disease and parasites were not identified as a threat at the time of listing, a wide range of diseases and parasites have been reported for the gray wolf, and several of them have had temporary impacts during the recovery of the species in the 48 contiguous United States (Brand *et al.* 1995, p. 419; WI DNR 1999, p. 61, Kreeger 2003, pp. 202–214). Although some diseases may be destructive to individuals, most of them seldom have long-term, population-level effects (Fuller *et al.* 2003, pp. 176–178; Kreeger 2003, pp. 202–214). All States that presently have wolf populations also have some sort of disease-monitoring program that may include direct observation of wolves to

assess potential disease indicators or biological sample collection with subsequent analysis at a laboratory. Although Washington has not submitted biological samples for analysis, samples have been collected and laboratory analysis is planned for the future (Roussin 2018, pers. comm.).

Canine parvovirus (CPV) infects wolves, domestic dogs (*Canis familiaris*), foxes (*Vulpes vulpes*), coyotes, skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*). 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; ODFW 2014, p. 7), 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), Minnesota (Mech and Goyal 1993, p. 331), and Oregon (ODFW 2017, p. 8) had blood antibodies indicating nonlethal exposure to CPV. Clinical CPV is characterized by severe hemorrhagic diarrhea and vomiting, which leads to dehydration, electrolyte imbalances, debility, and shock and may eventually lead to death.

Mech *et al.* (2008, p. 824) 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 (around 1979), the population developed immunity and was able to withstand severe effects from the disease (Mech and Goyal 1993, pp. 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 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 canids worldwide (Kreeger 2003, p. 209). This disease generally infects 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). Exposure to CDV was first documented in Oregon in 2016 (n=3; ODFW 2017, p. 8), but no mortalities or clinical signs of the disease were observed. The continued strong recruitment in Wisconsin and elsewhere in North American wolf populations, however, indicates that distemper is not likely a significant cause of mortality (Brand *et al.* 1995, p. 421).

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. Clinical symptoms have not been reported in wolves, but infected dogs can experience debilitating conditions, and abortion and fetal mortality have been reported in infected humans and horses. It is possible that individual wolves may be debilitated by Lyme disease, perhaps contributing to their mortality; however, Lyme disease is not believed to be a significant factor affecting wolf populations (Kreeger 2003, p. 212).

Mange has been detected in wolves throughout North America (Brand *et al.* 1995, pp. 427–428; Kreeger 2003, pp. 207–208). Mange mites (*Sarcoptes scabiei*) infest the skin of the host, causing irritation due to feeding and burrowing activities. This causes intense itching that results in scratching and hair loss. Mortality may occur due to exposure, primarily in cold weather, emaciation, or secondary infections (Kreeger 2003, pp. 207–208). Mange mites are spread from an infected individual through direct contact with others or through the use of common areas. 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 in some areas (Kreeger 2003, p. 208), but not others (Wydeven

et al. 2009b, pp. 96–97). In Montana and Wyoming, proportions of packs with mange fluctuated between 3 and 24 percent annually 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.

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 infestation levels, 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 may be possible. Dog-biting lice were confirmed on two wolves in Montana in 2005, on a wolf in southcentral 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.

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

Effects of Climate Change

Effects of climate change were not identified as threats at the time of listing. While it is possible that climate change could affect gray wolves to some extent, such as through impacts to prey

species (Hendricks *et al.* 2018, unpaginated), we are not aware of any information indicating that climate change is causing negative effects to the viability of gray wolf populations in the gray wolf entity, or that it is likely to do so in the future. 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) (Mech and Boitani 2003, p. xv). Gray wolves are highly adaptable animals that inhabit a range of ecotypes and are efficient at exploiting food resources available to them. Due to this plasticity, we do not consider gray wolves to be vulnerable to climate change. For a full discussion of potential impacts of climate change on wolves, see the final delisting rule for the gray wolf in Wyoming (77 FR 55597–55598, September 10, 2012).

Cumulative Effects

When threats occur together, one may exacerbate the effects of another, causing effects not accounted for when threats are analyzed individually. Many of the threats to the gray wolf entity and gray wolf habitat discussed above are interrelated and could be synergistic, and thus may cumulatively affect the gray wolf entity beyond the extent of each individual threat. For example, a decline in available wild prey could cause wolves to prey on more livestock resulting in a potential increase in human-caused mortality. Although the types, magnitude, or extent of cumulative impacts are difficult to predict, we are not aware of any information demonstrating that cumulative effects are occurring at a level sufficient to negatively affect gray wolf populations within the gray wolf entity. We are not aware of any combination of factors that have not already been, or would not be, addressed through ongoing management measures that are expected to continue post-delisting and into the future, as described above. The best scientific and commercial data available indicate that the vast majority of these wolves occur as a widespread, large, and resilient metapopulation and that threat factors are not currently resulting, nor are they anticipated to cumulatively result, in reductions in gray wolf numbers or habitat.

Post-Delisting Management

State Management

Post-Delisting Management in Minnesota, Wisconsin, and Michigan

During the 2000 legislative session, the Minnesota Legislature passed wolf-management provisions addressing wolf

protection, taking of wolves, and directing Minnesota Department of Natural Resources to prepare a wolf-management plan. The MN DNR revised a 1999 draft wolf-management plan to reflect the legislative action of 2000, and completed the Minnesota Wolf Management Plan in early 2001 (MN DNR 2001, entire).

The Wisconsin Natural Resources Board approved the Wisconsin Wolf Management Plan in October 1999. In 2004 and 2005 the Wisconsin Wolf Science Advisory Committee and the Wisconsin Wolf Stakeholders group reviewed the 1999 Plan, and the Science Advisory Committee subsequently developed updates and recommended modifications to the 1999 Plan. The updates were completed and received final Natural Resources Board approval on November 28, 2006 (WI DNR 2006a, entire).

In late 1997, the Michigan Wolf Recovery and Management Plan was completed and received the necessary State approvals. That plan focused on recovery of a small wolf population, rather than long-term management of a large wolf population and the conflicts that result as a consequence of successful wolf restoration. To address changes associated with the 2007 Federal delisting of wolves in Michigan, the MI DNR revised its original wolf plan and created the 2008 Michigan Wolf Management Plan. The 2008 plan addressed the biological, social, and regulatory situation of wolf management in Michigan at that time. Since then, the context of wolf management in Michigan has continued to change, and the MI DNR again updated its wolf-management plan in 2015 (MI DNR 2015, entire). The 2015 updates reflect the biological and social issues associated with the increased population size and distribution of wolves in the State, although the four principle goals of the 2008 plan remain the same. The complete text of the Wisconsin, Michigan, and Minnesota wolf-management plans can be found on our website (see **FOR FURTHER INFORMATION CONTACT**).

The Minnesota Wolf Management Plan—The Minnesota Plan is based, in part, on the recommendations of a State wolf-management roundtable (MN DNR 2001, appendix V) and on a State wolf-management law enacted in 2000 (MN DNR 2001, appendix I). This law and the Minnesota Game and Fish Laws constitute the basis of the State's authority to manage wolves. The Plan's stated goal is "to ensure the long-term survival of wolves in Minnesota while addressing wolf—human conflicts that inevitably result when wolves and

people live in the same vicinity" (MN DNR 2001, p. 2). It establishes a minimum goal of 1,600 wolves in the State. Key components of the plan are population monitoring and management, management of wolf depredation of domestic animals, management of wolf prey, enforcement of laws regulating take of wolves, public education, and increased staffing to accomplish these actions. Following Federal delisting, MN DNR's management of wolves would differ from their current management while wolves were listed as threatened under the Act. Most of these differences deal with two aspects of wolf management: The control of wolves that attack or threaten domestic animals and the implementation of a regulated wolf harvest season.

The Minnesota Plan divides the State into two wolf-management zones—Zones A and B (see map in MN DNR 2001, appendix 3). Zone A corresponds to Federal Wolf Management Zones 1 through 4 (approximately 30,000 mi² (77,700 km²) in northeastern Minnesota) in the Service's Recovery Plan for the Eastern Timber Wolf, whereas Zone B constitutes Zone 5 in that recovery plan (the rest of the State (approximately 57,000 mi² (147,600 km²) (MN DNR 2001, pp. 19–20 and appendix III; USFWS 1992, p. 72). Within Zone A, wolves would receive strong protection by the State, unless they were involved in attacks on domestic animals. The rules governing the take of wolves to protect domestic animals in Zone B would be less protective of wolves than in Zone A (see *Post-delisting Depredation Control in Minnesota* below).

The Minnesota Department of Natural Resources plans to allow wolf numbers and distribution to naturally expand, with no maximum population goal, and if any winter population estimate is below 1,600 wolves, it would take actions to "assure recovery" to 1,600 wolves (MN DNR 2001 p. 19). The MN DNR plans to continue to monitor wolves in Minnesota to determine whether such intervention is necessary. After the WGL DPS was delisted in 2011, the MN DNR increased the frequency of population surveys from every 5 years to annually in 2013. Although the agency is evaluating wolf-monitoring methods and optimal frequencies, short-term plans are to continue annual population-size estimates. In addition to these statewide population surveys, MN DNR annually reviews data on depredation-incident frequency and locations provided by Wildlife Services and winter track-survey indices (see Erb 2008) to help

ascertain annual trends in wolf population or range (MN DNR 2001, pp. 18–19).

Minnesota (MN DNR 2001, pp. 21–24, 27–28) plans to reduce or control illegal mortality of wolves through education, increased enforcement of the State's wolf laws and regulations, discouraging new road access in some areas, and maintaining a depredation-control program that includes compensation for livestock losses. The MN DNR plans to use a variety of methods to encourage and support education of the public about the effects of wolves on livestock, wild ungulate populations, and human activities and the history and ecology of wolves in the State (MN DNR 2001, pp. 29–30). These are all measures that have been in effect for years in Minnesota, although increased enforcement of State laws against take of wolves would replace enforcement of the Act's take prohibitions. Financial compensation for livestock losses has increased to the full market value of the animal, replacing previous caps of \$400 and \$750 per animal (MN DNR 2001, p. 24). We do not expect the State's efforts to result in the reduction of illegal take of wolves from existing levels, but these measures would be crucial in ensuring that illegal mortality does not significantly increase after Federal delisting.

Under Minnesota law, the illegal killing of a wolf is a gross misdemeanor and is punishable by a maximum fine of \$3,000 and imprisonment for up to 1 year. The restitution value of an illegally killed wolf is \$2,000 (MN DNR 2001, p. 29). The MN DNR has designated three conservation officers who are stationed in the State's wolf range as the lead officers for implementing the wolf-management plan (MN DNR 2001, pp. 29, 32; Stark *in litt.* 2018).

Depredation Control in Minnesota—Although federally protected as a threatened species in Minnesota, wolves that have attacked domestic animals have been killed by designated government employees under the authority of a regulation (50 CFR 17.40(d)) under section 4(d) of the Act. However, no control of depredating wolves was allowed in Federal Wolf Management Zone 1, comprising about 4,500 mi² (7,200 km²) in extreme northeastern Minnesota (USFWS 1992, p. 72). In Federal Wolf Management Zones 2 through 5, employees or agents of the Service (including USDA–APHIS–Wildlife Services) have taken wolves in response to depredations of domestic animals within one-half mile (0.8 km) of the depredation site. Young-of-the-year (young produced in one reproductive year) captured on or before

August 1 must be released. The regulations that allow for this take (50 CFR 17.40(d)(2)(i)(C)) do not specify a maximum duration for depredation control, but Wildlife Services personnel have followed internal guidelines under which they trap for no more than 10–

15 days, except at sites with repeated or chronic depredation, where they may trap for up to 30 days (Paul 2004, pers. comm.).

During the period 1980–2017, the Federal Minnesota wolf-depredation-control program euthanized from 20 (in

1982) to 262 (in 2015) wolves annually. The annual averages and the percentage of the statewide wolf population for 5-year periods are presented in table 2.

TABLE 2—AVERAGE ANNUAL NUMBER OF WOLVES EUTHANIZED UNDER MINNESOTA WOLF DEPREDATION CONTROL AND THE PERCENTAGE OF THE STATEWIDE WOLF POPULATION FOR 5-YEAR PERIODS FROM 1980–2017

[Final time period represents 3, rather than 5 years) (Erb 2008; USDA–Wildlife Services 2010, p. 3; USDA–Wildlife Services 2011, p. 3; USDA–Wildlife Services 2017, p. 3]

	1980–1984	1985–1989	1990–1994	1995–1999	2000–2004	2005–2009	2010–2014	2015–2017
Average annual # wolves euthanized	30	49	115	152	128	157	194	195
Average annual % of wolf population	2.2	3.0	6.0	6.7	4.2	5.4	7.6	7.3

Since 1980, the lowest annual percentage of Minnesota wolves killed under this program was 1.5 percent in 1982; the highest percentage was 9.4 in both 1997 and 2015 (Paul 2004, pp. 2–7; Paul 2006, p. 1; USDA–Wildlife Services 2017, p. 3). The periods during which the depredation-control program was taking its highest percentages of wolves was during the 1990s and the 2010s. During the 1990s, when wolves euthanized for depredation control averaged around 6 percent of the wolf population, Minnesota wolf numbers continued to grow at an average annual rate of nearly 4 percent (Paul 2004, pp. 2–7). Wolf populations in the State fluctuated during the 2010s, when wolves euthanized for depredation control averaged around 7 percent of the wolf population. While wolf populations in the State did decline while wolves were delisted from 2011–2014, other management techniques in addition to depredation control were also implemented during that time (e.g., regulated harvest), and that management was expected to reduce wolf numbers while maintaining a minimum population level. The level of wolf removal for depredation control that has occurred has not interfered with wolf recovery in Minnesota.

Under a Minnesota statute, the Minnesota Department of Agriculture (MDA) compensates livestock owners for full market value of livestock that wolves have killed or severely injured. An authorized investigator must confirm that wolves were responsible for the depredation. The Minnesota statute also requires MDA to periodically update its Best Management Practices to incorporate new practices that it finds would reduce wolf depredation (Minnesota Statutes 2018, Section 3.737, subdivision 5).

Post-delisting Depredation Control in Minnesota—If wolves in Minnesota are delisted, depredation control would be authorized under Minnesota State law and conducted in conformance with the Minnesota Wolf Management Plan (MN DNR 2001). The Minnesota Plan divides the State into Wolf Management Zones A and B, as discussed above. The statewide survey conducted during the winter of 2003–04 estimated that there were approximately 2,570 wolves in Zone A and 450 in Zone B (Erb *in litt.* 2005). As discussed in Recovery Criteria above, the Federal planning goal is 1,251–1,400 wolves for Zones 1–4 and there is no minimum population goal for Zone 5 (USFWS 1992, p. 28).

In Zone A, wolf depredation control would be limited to situations of (1) immediate threat and (2) following verified loss of domestic animals. In this zone, if the DNR verifies that a wolf destroyed any livestock, domestic animal, or pet, and if the owner requests wolf control be implemented, trained and certified predator controllers may take wolves (specific number to be determined on a case-by-case basis) within a 1-mile (1.6-km) radius of the depredation site (depredation-control area) for up to 60 days. In contrast, in Zone B, predator controllers may take wolves (specific number to be determined on a case-by-case basis) for up to 214 days after MN DNR opens a depredation-control area, depending on the time of year. Under State law, the DNR may open a control area in Zone B anytime within 5 years of a verified depredation loss upon request of the landowner, thereby providing more of a preventative approach than is allowed in Zone A, in order to head off repeat depredation incidents (MN DNR 2001, p. 22).

Depredation control would be allowed throughout Zone A, which

includes an area (Federal Wolf Management Zone 1) where such control has not been permitted under the Act’s protection. Depredation by wolves in Zone 1, however, has been limited to 2 to 4 reported incidents per year, mostly of wolves killing dogs. In 2009, there was one probable and one verified depredation of a dog near Ely, Minnesota, and in 2010 Wildlife Services confirmed three dogs killed by wolves in Zone 1 (USDA–Wildlife Services 2009, p. 3; USDA–Wildlife Services 2010, p. 3). There are few livestock in Zone 1; therefore, the number of verified future depredation incidents in that Zone is expected to be low, resulting in a correspondingly low number of depredating wolves being killed there after delisting.

State law and the Minnesota Plan would also allow for private wolf depredation control throughout the State. Persons could shoot or destroy a wolf that poses “an immediate threat” to their livestock, guard animals, or domestic animals on lands that they own, lease, or occupy. Immediate threat is defined as “in the act of stalking, attacking, or killing.” This does not include trapping because traps cannot be placed in a manner such that they trap only wolves in the act of stalking, attacking, or killing. Owners of domestic pets could also kill wolves posing an immediate threat to pets under their supervision on lands that they do not own or lease, although such actions are subject to local ordinances, trespass law, and other applicable restrictions. To protect their domestic animals in Zone B, individuals do not have to wait for an immediate threat or a depredation incident in order to take wolves. At any time in Zone B, persons who own, lease, or manage lands may shoot wolves on those lands to protect livestock, domestic animals, or pets. They may

also employ a predator controller to trap a wolf on their land or within 1 mile (1.6 km) of their land (with permission of the landowner) to protect their livestock, domestic animals, or pets (MN DNR 2001, pp. 23–24). The MN DNR will investigate any private taking of wolves in Zone A (MN DNR 2001, p. 23). The Minnesota Plan would also allow persons to harass wolves anywhere in the State within 500 yards of “people, buildings, dogs, livestock, or other domestic pets or animals.” Harassment may not include physical injury to a wolf.

As discussed above, landowners or lessees would be allowed to respond to situations of immediate threat by shooting wolves in the act of stalking, attacking, or killing livestock or other domestic animals in Zone A. We conclude that this action is not likely to result in the killing of many additional wolves, as opportunities to shoot wolves “in the act” would likely be few and difficult to successfully accomplish, a conclusion shared by a highly experienced wolf-depredation agent (Paul *in litt.* 2006, p. 5). It is also possible that illegal killing of wolves in Minnesota will decrease, because the expanded options for legal control of problem wolves may lead to an increase in public tolerance for wolves (Paul *in litt.* 2006, p. 5).

State law and the Minnesota Plan would provide broad authority to landowners and land managers to shoot wolves at any time to protect their livestock, pets, or other domestic animals on land owned, leased, or managed by the individual in Zone B (as described above). Such takings can occur in the absence of wolf attacks on the domestic animals. Thus, the estimated 450 wolves in Zone B could be subject to substantial reduction in numbers. At the extreme, wolves could be eliminated from Zone B, but this is highly unlikely—the Minnesota Plan states that “Although depredation procedures will likely result in a larger number of wolves killed, as compared to previous ESA management, they will not result in the elimination of wolves from Zone B.” (MN DNR 2001, pp. 22–23). While wolves were under State management in 2007–08 and in 2011–14, landowners in Zone B shot six and eight wolves under this authority, respectively. Fourteen additional wolves were trapped and euthanized in Zone B by State-certified predator controllers, 1 in 2009 and 13 in 2013 (Stark *in litt.* 2009; Stark *in litt.* 2018).

The limitation of this broad take authority to Zone B is fully consistent with the advice in the Recovery Plan for the Eastern Timber Wolf that wolves

should be restored to the rest of Minnesota but not to Zone B (Federal Zone 5) because that area “is not suitable for wolves” (USFWS 1992, p. 20). The Recovery Plan for the Eastern Timber Wolf envisioned that the Minnesota numerical planning goal would be achieved solely in Zone A (Federal Zones 1–4) (USFWS 1992, p. 28), and that has occurred. Wolves outside of Zone A are not necessary to the establishment and long-term viability of a self-sustaining wolf population in the State, and, therefore, there is no need to establish or maintain a wolf population in Zone B. Accordingly, there is no need to maintain significant protection for wolves in Zone B in order to maintain a Minnesota wolf population that continues to satisfy the Federal recovery criteria after Federal delisting.

This expansion of depredation-control activities would not threaten the continued survival of wolves in the State or the long-term viability of the wolf population in Zone A, the large part of wolf range in Minnesota. Significant changes in wolf depredation control under State management will primarily be restricted to Zone B, which is outside of the area necessary for wolf recovery (USFWS 1992, pp. 20, 28). Furthermore, wolves may still persist in Zone B despite the likely increased take there. The Eastern Timber Wolf Recovery Team concluded that the changes in wolf management in the State’s Zone A would be “minor” and would not likely result in “significant change in overall wolf numbers in Zone A.” They found that, despite an expansion of the individual depredation-control areas and an extension of the control period to 60 days, depredation control would remain “very localized” in Zone A. The requirement that such depredation-control activities be conducted only in response to verified wolf depredation in Zone A played a key role in the team’s evaluation (Peterson *in litt.* 2001). While wolves were under State management in 2007 and 2008, the number of wolves killed for depredation control (133 wolves in 2007 and 143 wolves in 2008) remained consistent with those killed under the special regulation under section 4(d) of the Act while wolves were federally listed (105, in 2004; 134, in 2005; and 122, in 2006). The number of wolves killed for depredation control while wolves were under State management for the second time (2011–2014) was slightly higher (203 wolves in 2011, 262 in 2012, 114 in 2013, and 197 in 2014) than during 2007 and 2008, but was still consistent with those killed

under section 4(d) in the surrounding years (192 wolves in 2010 and 213 in 2015).

Minnesota would continue to monitor wolf populations throughout the State and would also monitor all depredation-control activities in Zone A (MN DNR 2001, p. 18). These and other activities contained in their plan would be essential in meeting their population goal of a minimum statewide winter population of 1,600 wolves, well above the planning goal of 1,251 to 1,400 wolves that the Revised Recovery Plan identifies as sufficient to ensure the wolf’s continued survival in Minnesota (USFWS 1992, p. 28).

Post-delisting Regulated Harvest in Minnesota—Minnesota Department of Natural Resources will consider wolf population-management measures, including public hunting and trapping seasons and other methods, if wolves are federally delisted. In 2011, the Minnesota Legislature authorized the MN DNR to implement a wolf season following the Federal delisting and classified wolves as small game in State statute (Minnesota Statutes 2018 97B.645 Subd. 9). Following Federal delisting, the 2012 Legislature established wolf hunting and trapping licenses, clarified the authority for the MN DNR to implement a wolf season, and required the start of the season to be no later than the start of firearms deer season each year. Three regulated harvest seasons (in 2012, 2013, and 2014) were subsequently implemented in the State while wolves were federally delisted. The harvest was divided into three segments: An early hunting season that coincided with the firearms deer season, a late hunting season, and a concurrent late trapping season. In 2012, the MN DNR established a total target harvest of 400 wolves (the close of the harvest season is to be initiated when that target is met) (Stark and Erb 2013, pp. 1–2). During that first regulated season, 413 wolves were harvested. Based on the results of the 2012 harvest season, the MN DNR revised the target to 220 wolves for 2013; that year 238 wolves were harvested. The 2014 target harvest was 250 wolves and 272 were harvested.

The Minnesota management plan requires that population-management measures be implemented in such a way to maintain a statewide late-winter wolf population of at least 1,600 animals (MN DNR 2001, pp. 19–20), well above the planning goal of 1,251 to 1,400 wolves for the State in the Revised Recovery Plan (USFWS 1992, p. 28); therefore, implementing such management measures under that

requirement would ensure the wolf's continued survival in Minnesota.

The Wisconsin Wolf Management Plan—Both the Wisconsin and Michigan Wolf Management Plans are designed to manage and ensure the existence of wolf populations in the States as if they are isolated populations and are not dependent upon immigration of wolves from an adjacent State or Canada, while still maintaining connections to those other populations. We support this approach as it provides strong assurances that the wolf in both States will remain a viable component of the wolves in the Great Lakes area and the larger gray wolf entity.

The Wisconsin Plan allows for differing levels of protection and management within four separate management zones (see WI DNR 2006a, figure 8). The Northern Forest Zone (Zone 1) and the Central Forest Zone (Zone 2) now contain most of the State's wolf population, with approximately 6 percent of the Wisconsin wolves in Zones 3 and 4 (Wydeven and Wiedenhoef 2009, table 1). Zones 1 and 2 contain all the larger unfragmented areas of suitable habitat, so we anticipate that most of the State's wolf packs will continue to inhabit those parts of Wisconsin. At the time the 1999 Wisconsin Plan was completed, it recommended immediate reclassification from State-endangered to State-threatened status, because Wisconsin's wolf population had already exceeded its reclassification criterion of 80 wolves for 3 years; thus, State reclassification occurred that same year.

The Wisconsin Plan contains a minimum population goal of 350 wolves outside of Native American reservations, and specifies that the species should be delisted by the State once the population reaches 250 animals outside of reservations. The species was proposed for State delisting in late 2003, and the State delisting process was completed in 2004. Upon State delisting, the species was classified as a "protected nongame species," a designation that continues State prohibitions on sport hunting and trapping of the species (Wydeven and Jurewicz 2005, p. 1; WI DNR 2006b, p. 71). The Wisconsin Plan includes criteria for when State re-listing to threatened (a decline to fewer than 250 wolves for 3 years) or endangered status (a decline to fewer than 80 wolves for 1 year) should be considered. The Wisconsin Plan will be reviewed annually by the Wisconsin Wolf Advisory Committee and will be reviewed by the public every 5 years. Recently the WI DNR began work on

updating the State's wolf-management plan, which may include increasing the State management goal (Wydeven and Wiedenhoef 2009, p. 3).

The Wisconsin Plan was updated during 2004–06 to reflect current wolf numbers, additional knowledge, and issues that have arisen since its 1999 completion. This update is in the form of text changes, revisions to two appendices, and the addition of a new appendix to the 1999 plan, rather than a major revision to the plan. Several components of the plan that are key to our delisting evaluation are unchanged. The State wolf-management goal of 350 animals and the boundaries of the four wolf-management zones remain the same as in the 1999 Plan. The updated 2006 Plan continues access management on public lands and the protection of active den sites. Protection of pack-*rendezvous* sites, however, is no longer considered to be needed in areas where wolves have become well established, due to the transient nature of these sites and the larger wolf population. The updated Plan states that *rendezvous* sites may need protection in areas where wolf colonization is still under way or where pup survival is extremely poor, such as in northeastern Wisconsin (WI DNR 2006a, p. 17). The guidelines for the wolf depredation-control program (see *Post-delisting Depredation Control in Wisconsin*) did not undergo significant alteration during the update process. The only substantive change to depredation-control practices is to expand the area of depredation-control trapping in Zones 1 and 2 to 1 mi (1.6 km) outward from the depredation site, replacing the previous 0.5-mi (0.8-km) radius trapping zone (WI DNR 2006a, pp. 3–4).

An important component of the Wisconsin Plan is the annual monitoring of wolf populations by radio collars and winter track surveys in order to provide comparable annual data to assess population size and growth for at least 5 years after Federal delisting. This monitoring would include health monitoring of captured wolves and necropsies of dead wolves that are found. Wolf scat would be collected and analyzed to monitor for canine viruses and parasites. Health monitoring would be part of the capture protocol for all studies that involve the live-capture of Wisconsin wolves (WI DNR 2006a, p. 14). The 2006 update to the Wisconsin Wolf Management Plan did not change the WI DNR's commitment to annual wolf population monitoring, and ensures accurate and comparable data (WI DNR 1999, pp. 19–20).

Cooperative habitat management would be promoted with public and

private landowners to maintain existing road densities in Zones 1 and 2, protect wolf dispersal corridors, and manage forests for deer and beaver (WI DNR 1999, pp. 4, 22–23; 2006a, pp. 15–17). Furthermore, in Zone 1, a year-round prohibition on tree harvest within 330 feet (100 m) of den sites and seasonal restrictions to reduce disturbance within one-half mile (0.8 km) of dens would be WI DNR policy on public lands and would be encouraged on private lands (WI DNR 1999, p. 23; 2006a, p. 17).

The 1999 Wisconsin Plan contains, and the 2006 update retains, other components that would provide protection to assist in maintenance of a viable wolf population in the State following delisting: (1) Continue the protection of the species as a "protected wild animal" with penalties similar to those for unlawfully killing large game species (fines of \$1,000–\$2,000, loss of hunting privileges for 3–5 years, and a possible 6-month jail sentence), (2) maintain closure zones where coyotes cannot be shot during deer-hunting season in Zone 1, (3) legally protect wolf dens under the Wisconsin Administrative Code, (4) require State permits to possess a wolf or wolf-dog hybrid, and (5) establish a restitution value to be levied in addition to fines and other penalties for wolves that are illegally killed (WI DNR 1999, pp. 21, 27–28, 30–31; 2006a, pp. 3–4).

The 2006 update of the Wisconsin Plan continues to emphasize the need for public education efforts that focus on living with a recovered wolf population, ways to manage wolves and wolf-human conflicts, and the ecosystem role of wolves. The Plan continues the State reimbursement for depredation losses (including dogs and missing calves), citizen stakeholder involvement in the wolf-management program, and coordination with the Tribes in wolf management and investigation of illegal killings (WI DNR 1999, pp. 24, 28–29; 2006a, pp. 22–23).

Depredation Control in Wisconsin—Lethal depredation control has not been authorized in Wisconsin (due to the listed status of wolves there as endangered) except for several years when such control was authorized under a permit from the USFWS or while wolves were delisted under previous actions. The rapidly expanding Wisconsin wolf population has resulted in an increased need for depredation control, however. From 1979 through 1989, there were only five cases (an average of 0.4 per year) of verified wolf depredations in Wisconsin, but the number of incidents has steadily increased over the subsequent decades.

During the 1990s there were an average of approximately 4 incidents per year, increasing to an average of approximately 38 per year during the 2000s and to an average of approximately 69 per year since 2010 (WI DNR data files and summary of wolf survey and depredation reports).

A significant portion of depredation incidents in Wisconsin involve attacks on dogs. In most cases, these have been hunting dogs that were being used for, or being trained for, hunting bears, bobcats, coyotes, and snowshoe hare (Ruid *et al.* 2009, pp. 285–286). It is believed that the dogs entered the territory of a wolf pack and may have been close to a den, rendezvous site, or feeding location, thus triggering an attack by wolves defending their territory or pups. The frequency of attacks on hunting dogs has increased as the State's wolf population has grown. Of the 206 dogs killed by wolves during the 25 years from 1986–2010, more than 80 percent occurred during the period from 2001–10, with an average of 17 dogs killed annually during that 10-year period (WI DNR files). Data on depredations from 2013 to 2017 show a continued increase in wolf attacks on dogs, with an average of 23 dogs killed annually (with a high of 41 dogs in 2016). While the WI DNR compensates dog owners for mortalities and injuries to their dogs, the DNR takes no action against the depredating pack unless the attack was on a dog that was leashed, confined, or under the owner's control on the owner's land. Instead, the DNR issues press releases to warn bear hunters and bear-dog trainers of the areas where wolf packs have been attacking bear dogs (WI DNR 2008, p. 5) and provides maps and advice to hunters on the WI DNR website (see <https://dnr.wi.gov/topic/WildlifeHabitat/wolf/dogdeps.html>). In 2010, wolf attacks on dogs occurred 14 times near homes, which was the highest level seen of this type of depredation (Wydeven *et al.* 2011, p. 3).

During the first periods that wolves were federally delisted in Wisconsin (from March 2007 through September 2008 and from April through early July 2009), 92 wolves were killed for depredation control in the State, including 8 legally shot by private landowners (Wydeven and Wiedenhoef 2008, p. 8; Wydeven *et al.* 2009b, p. 6; Wydeven *et al.* 2010, p. 13). When wolves were again delisted from January 2012 through December 2014, depredation control resulted in 164 wolves being killed, including 38 legally shot by private landowners (McFarland and Wiedenhoef 2013, p. 9;

Wiedenhoef *et al.* 2014, p. 10; Wiedenhoef *et al.* 2015, p. 10).

Post-delisting Depredation Control in Wisconsin—Following Federal delisting, wolf depredation control in Wisconsin would be carried out according to the 2006 Updated Wisconsin Wolf Management Plan (WI DNR 2006a, pp. 19–23), Guidelines for Conducting Depredation Control on Wolves in Wisconsin Following Federal Delisting (WI DNR 2008), and any Tribal wolf-management plans or guidelines that may be developed for reservations in occupied wolf range. The 2006 updates did not significantly change the 1999 State Plan, and the State wolf management goal of 350 wolves outside of Indian reservations (WI DNR 2006a, p. 3) is unchanged. Verification of wolf depredation incidents would continue to be conducted by USDA–APHIS–Wildlife Services, working under a cooperative agreement with WI DNR, or at the request of a Tribe, depending on the location of the suspected depredation incident. If determined to be a confirmed or probable depredation by a wolf or wolves, one or more of several options would be implemented to address the depredation problem. These options include technical assistance, loss compensation to landowners, translocating or euthanizing problem wolves, and private landowner control of problem wolves in some circumstances (WI DNR 2006a, pp. 3–4, 20–22).

Technical assistance, consisting of advice or recommendations to prevent or reduce further wolf conflicts, would be provided. This may also include providing the landowner with various forms of noninjurious behavior-modification materials, such as flashing lights, noise makers, temporary fencing, and fladry (a string of flags used to contain or exclude wild animals). Monetary compensation is also provided for all verified and probable losses of domestic animals and for a portion of documented missing calves (WI DNR 2006a, pp. 22–23). The compensation is made at full market value of the animal (up to a limit of \$2,500 for dogs) and can include veterinarian fees for the treatment of injured animals (WI DNR 2006c 12.54). Current Wisconsin law requires the continuation of the compensation payment for wolf depredation regardless of Federal listing or delisting of the species (WI DNR 2006c 12.50). In recent years, annual depredation compensation payments have ranged from \$91,000 (2009) to \$256,000 (2017). From 1985 through April, 2018, the WI DNR had spent over \$2,378,000 on reimbursement for damage caused by

wolves in the State, with 60 percent of that total spent over the last 10 years (since 2009) (<https://dnr.wi.gov/topic/wildlifehabitat/wolf/documents/WolfDamagePayments.pdf>).

For depredation incidents in Wisconsin Zones 1 through 3, where all wolf packs currently reside, wolves may be trapped by USDA–Wildlife Services or Wisconsin Department of Natural Resources personnel and, if feasible, translocated and released at a point distant from the depredation site. If wolves are captured adjacent to an Indian reservation or a large block of public land, the animals may be translocated locally to that area. Long-distance translocating of depredating wolves has become increasingly difficult in Wisconsin and is likely to be used infrequently in the future as long as the off-reservation wolf population is above 350 animals. In most wolf-depredation cases where technical assistance and nonlethal methods of behavior modification are judged to be ineffective, wolves would be shot or trapped and euthanized by Wildlife Services or DNR personnel. Trapping and euthanizing would be conducted within a 1-mi (1.6-km) radius of the depredation in Zones 1 and 2, and within a 5-mi (8-km) radius in Zone 3. There is no distance limitation for depredation-control trapping in Zone 4, and all wolves trapped in Zone 4 would be euthanized, rather than translocated (WI DNR 2006a, pp. 22–23).

Full authority to conduct lethal depredation control has not been allowed in Wisconsin (due to the listed status of the wolf as an endangered species) except for short periods of time. So we have evaluated post-delisting lethal depredation control based upon verified depredation incidents over the last decade and the impacts of the implementation of similar lethal control of depredating wolves under 50 CFR 17.40(d) for Minnesota, § 17.40(o) for Wisconsin and Michigan, and section 10(a)(1)(A) of the Act for Wisconsin and Michigan. Under those authorities, WI DNR and Wildlife Services trapped and euthanized 17 wolves in 2003; 24 in 2004; 29 in 2005; 18 in 2006; 37 in 2007; 39 in 2008; 9 in 2009; and 16 in 2010 (WI DNR 2006a, p. 32; Wydeven *et al.* 2009a, pp. 6–7; Wydeven *et al.* 2010, p. 15; Wydeven *et al.* 2011, p. 3).

Although these lethal control authorities applied to Wisconsin and Michigan DNRs for only a portion of 2003 (April through December) and 2005 (all of January for both States; April 1 and April 19, for Wisconsin and Michigan respectively, through September 13), they covered nearly all of the verified wolf depredations during

2003–05, and thus provide a reasonable measure of annual lethal depredation control. For 2003, 2004, and 2005, this represents 5.1 percent, 6.4 percent, 7.4 percent (including the several possible wolf-dog hybrids), respectively, of the late-winter population of Wisconsin wolves during the previous winter. This level of lethal depredation control was followed by a wolf population increase of 11 percent from 2003 to 2004, 17 percent from 2004 to 2005, and 7 percent from 2005 to 2006 (Wydeven and Jurewicz 2005, p. 5; Wydeven *et al.* 2006, p. 10). Limited lethal-control authority was granted to WI DNR for 3.5 months in 2006 by a section 10 permit, resulting in removal of 18 wolves (3.9 percent of the winter wolf population) (Wydeven *et al.* 2007, p. 7).

Lethal depredation control was again authorized in the State while wolves were delisted in 2007 (9.5 months) and 2008 (9 months). During those times, 40 and 43 wolves, respectively, were killed for depredation control (by Wildlife Services or by legal landowner action), representing 7 and 8 percent of the late-winter population of Wisconsin wolves during the previous year. This level of lethal depredation control was followed by a wolf population increase of 0.5 percent from 2007 to 2008, and 12 percent from 2008 to 2009 (Wydeven and Wiedenhoef 2008, pp. 19–22; Wydeven *et al.* 2009a, p. 6). Authority for lethal control on depredating wolves occurred for only 2 months in 2009. During that time, eight wolves were euthanized for depredation control by USDA–Wildlife Services, and one wolf was shot by a landowner; additionally, later in 2009 after re-listing, a wolf was captured and euthanized by USDA–Wildlife Services for human safety concerns (Wydeven *et al.* 2010, p. 15). Thus in 2009, 10 wolves, or 2 percent of the winter wolf population, was removed in control activities.

In 2010, authority for lethal control of wolves depredating livestock was not available in Wisconsin, but 16 wolves or 2 percent of the winter population were removed for human-safety concerns (Wydeven *et al.* 2011, p. 3). The Wisconsin wolf population in winter 2010–11 grew to 687 wolves, an increase of 8 percent from the wolf population in winter 2009–10 (Wydeven *et al.* 2010, pp. 12–13). When wolves were again delisted from January 2012 through December 2014, a total of 164 wolves were killed under authorized lethal depredation control (McFarland and Wiedenhoef 2013, p. 9; Wiedenhoef *et al.* 2014, p. 10; Wiedenhoef *et al.* 2015, p. 10). It is more difficult to evaluate the effects attributed specifically to depredation

control over that time, as the State also implemented a regulated public harvest those years; however, information from previous years where depredation control was the primary change in management provides strong evidence that this form and magnitude of depredation control would not adversely affect the viability of the Wisconsin wolf population. The locations of depredation incidents provide additional evidence that lethal control would not have an adverse impact on the State's wolf population. Most livestock depredations are caused by packs near the northern forest–farm land interface. Few depredations occur in core wolf range and in large blocks of public land. Thus, lethal depredation-control actions would not affect most of the Wisconsin wolf population (WI DNR 2006a, p. 30).

One substantive change to lethal control that would result from Federal delisting is the ability of a small number of private landowners, whose farms have a history of recurring wolf depredation, to obtain limited-duration permits from Wisconsin Department of Natural Resources to kill a limited number of depredating wolves on land they own or lease, based on the size of the pack causing the local depredations (WI DNR 2008, p. 8). Such permits would be issued to: (1) Landowners with verified wolf depredations on their property within the last 2 years; (2) landowners within 1 mile (1.6 km) of properties with verified wolf depredations during the calendar year; (3) landowners with vulnerable livestock within WI DNR-designated proactive control areas; (4) landowners with human safety concerns on their property, and (5) landowners with verified harassment of livestock on their property (WI DNR 2008, p. 8). Limits on the number of wolves to control would be based on the estimated number of wolves in the pack causing depredation problems.

During the 19 months in 2007 and 2008 when wolves were federally delisted, the DNR issued 67 such permits, resulting in 2 wolves being killed. Some landowners received permits more than once, and permits were issued for up to 90 days at a time and restricted to specific calendar years. In addition, landowners and lessees of land statewide would be allowed without obtaining a permit to kill a wolf “in the act of killing, wounding, or biting a domestic animal.” The incident must be reported to a conservation warden within 24 hours, and the landowners are required to turn any dead wolves over to the WI DNR (WI DNR 2006a, pp. 22–23; WI DNR 2008,

p. 6). During that same 19-month time period, landowners killed a total of five wolves under that authority. One wolf was shot in the act of attack on domestic animals during the 2 months when wolves were delisted in 2009; then 38 wolves were legally shot by landowners during the 35 months wolves were delisted from 2012–2014. The death of these 46 additional wolves—which accounted for less than 3 percent of the State's wolves in any year—did not affect the viability of the population.

Another potential substantive change after delisting would be proactive trapping or “intensive control” of wolves in sub-zones of the larger wolf-management zones (WI DNR 2006a, pp. 22–23). Triggering actions and type of controls planned for these “proactive control areas” are listed in the WI DNR depredation-control guidelines (WI DNR 2008, pp. 7–9). Controls on these actions would be considered on a case-by-case basis to address specific problems, and would be carried out only in areas that lack suitable habitat, have extensive agricultural lands with little forest interspersion, in urban or suburban settings, and only when the State wolf population is well above the management goal of 350 wolves outside Indian reservations in late-winter surveys. The use of intensive population management in small areas would be adapted as experience is gained with implementing and evaluating localized control actions (Wydeven 2006, pers. comm.). We are confident that the number of wolves killed by these actions would not affect the long-term viability of the Wisconsin wolf population, because generally less than 15 percent of packs cause depredations that would initiate such controls, and “proactive” controls would be carried out only if the State's late-winter wolf population exceeds 350 animals outside Indian reservations.

The State's current guidelines for conducting depredation-control actions say that no control trapping would be conducted on wolves that kill “dogs that are free roaming, roaming at large, hunting, or training on public lands, and all other lands except land owned or leased by the dog owner” (WI DNR 2008, p. 5). Controls would be applied on wolves depredating pet dogs attacked near homes and wolves attacking livestock. Because of these State-imposed limitations, we conclude that lethal control of wolves depredating on hunting dogs would be rare and, therefore, would not be a significant additional source of mortality in Wisconsin. Lethal control of wolves that attack captive deer is included in the WI DNR depredation-control program,

because farm-raised deer are considered to be livestock under Wisconsin law (WI DNR 2008, pp. 5–6; 2006c, 12.52). However, Wisconsin regulations for deer farm fencing have been strengthened, and it is unlikely that more than an occasional wolf would need to be killed to end wolf depredations inside deer farms in the foreseeable future. Claims for wolf depredation compensation are rejected if the claimant is not in compliance with regulations regarding farm-raised-deer fencing or livestock-carcass disposal (Wisconsin Statutes 90.20 & 90.21, WI DNR 2006c 12.54).

Data from verified wolf depredations in recent years indicate that depredation on livestock is likely to increase as long as the Wisconsin wolf population increases in numbers and range. Wolf packs in more marginal habitat with high acreage of pasture land are more likely to become depredators (Treves *et al.* 2004, pp. 121–122). Most large areas of forest land and public lands are included in Wisconsin Wolf Management Zones 1 and 2, and they have already been colonized by wolves. Therefore, new areas likely to be colonized by wolves in the future would be in Zones 3 and 4, where they would be exposed to much higher densities of farms, livestock, and residences. During 2008, of farms experiencing wolf depredation, 25 percent (8 of 32) were in Zone 3, yet only 4 percent of the State wolf population occurs in this zone (Wydeven *et al.* 2009a, p. 23). Further expansion of wolves into Zone 3 would likely lead to an increase in depredation incidents and an increase in lethal control actions against Zone 3 wolves. However, these Zone 3 mortalities would have no impact on wolf population viability in Wisconsin because of the much larger wolf populations in Zones 1 and 2.

We anticipate that under the management laid out in the Wisconsin Wolf Management Plan the wolf population in Zones 1 and 2 would continue to greatly exceed the recovery goal in the Recovery Plan for the Eastern Timber Wolf of 200 late-winter wolves for an isolated population and 100 wolves for a subpopulation connected to the larger Minnesota population, regardless of the extent of wolf mortality from all causes in Zones 3 and 4. Ongoing annual wolf population monitoring by WI DNR would provide timely and accurate data to evaluate the effects of wolf management under the Wisconsin Plan.

Post-delisting Regulated Harvest in Wisconsin—A regulated public harvest of wolves is acknowledged in the Wisconsin Wolf Management Plan and

its updates as a potential management technique (WI DNR 1999, appendix D; 2006c, p. 23). Wisconsin Act 169 was enacted in April 2012, following Federal delisting of wolves earlier that year. The law reclassified wolves in Wisconsin as a game species and directed the WI DNR to establish a harvest season in 2012. The harvest season was set from October 15–February 28 with zones closing as individual quotas are met. The WI DNR holds the authority to determine harvest zones and set harvest quotas.

Harvest quotas for the first season in 2012–13 were designed to begin reducing the population toward the established objective, and the harvest zones were designed to focus harvest in areas of highest human conflict with lower harvest rates in areas of primary wolf habitat. State-licensed hunters and trappers were not allowed permits within the reservation boundaries of the Bad River, Red Cliff, Lac Courte Oreilles, Lac Du Flambeau, Menominee, and Stockbridge-Munsee reservations, and separate quotas were set for these ceded territories. The Wisconsin Natural Resources Board established a total quota of 201 wolves (broken into a State-licensed quota of 116 wolves and a tribal quota of 85 wolves). A total of 117 wolves were harvested during that first season, all under the State licenses (Tribes did not authorize tribal members to harvest wolves within reservation boundaries). In 2013–14, the total quota was 275 wolves; a State-licensed quota of 251, and a tribal quota of 24. That year, 257 wolves were harvested. The 2014–15 wolf quota was reduced to 156 (a 57-percent reduction from the 2013–14 wolf quota), and 154 wolves were harvested that season (a 60-percent decrease from the 2013–14 harvest).

Regardless of the methods used to manage wolves in the State, the Wisconsin Department of Natural Resources is committed to maintaining a wolf population at 350 wolves outside of Indian reservations, which translates to a statewide population of 361 to 385 wolves in late winter. No harvest would be allowed if the wolf population fell below this goal (WI DNR 1999, pp. 15, 16). Also, the fact that the Wisconsin Plan calls for State re-listing of the wolf as a threatened species if the population falls to fewer than 250 for 3 years provides a strong assurance that any public harvest is not likely to threaten the persistence of the population (WI DNR 1999, pp. 15–17). Based on wolf population data, the current Wisconsin Plan and the 2006 updates, we conclude that any public harvest plan would continue to maintain the State wolf population well above the recovery goal of 200 wolves in late winter.

The Michigan Wolf Management Plan—The 2015 updated Michigan Plan describes the wolf recovery goals and management actions needed to maintain a viable wolf population in the Upper Peninsula of Michigan, while facilitating wolf-related benefits and minimizing conflicts. The updated Michigan Plan contains new scientific information related to wolf management, updated information on the legal status of wolves, clarifications related to management authorities and decisionmaking, and updated strategic goals, objectives, and management actions informed by internal evaluation and responses and comments received from stakeholders. The updated plan retains the four principal goals of the 2008 plan, which are to “(1) maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered (more than 200 wolves); (2) facilitate wolf-related benefits; (3) minimize wolf-related conflicts; and (4) conduct science-based wolf management with socially acceptable methods” (MI DNR 2015, p. 16). The Michigan Plan details wolf-management actions, including public education and outreach activities, annual wolf population and health monitoring, research, depredation control, ensuring adequate legal protection for wolves, and prey and habitat management. It does not address the potential need for wolf recovery or management in the Lower Peninsula, nor wolf management within Isle Royale National Park (where the wolf population is fully protected by the National Park Service).

As with the Wisconsin Plan, the Michigan Department of Natural Resources has chosen to manage the State’s wolves as though they are an isolated population that receives no genetic or demographic benefits from immigrating wolves, even though their population will continue to be connected with populations in Minnesota, Wisconsin, and Canada. The Michigan wolf population must exceed 200 wolves in order to achieve the Plan’s first goal of maintaining a viable wolf population in the Upper Peninsula. This number is consistent with the Federal Recovery Plan for the Eastern Timber Wolf’s definition of a viable, isolated wolf population (USFWS 1992, p. 25). The Michigan Plan, however, clearly states that 200 wolves is not the target population size, and that a larger population may be necessary to meet the other goals of the Plan. Therefore, the State would maintain a wolf population that would “provide all of the ecological and social benefits valued

by the public” while “minimizing and resolving conflicts where they occur” (MI DNR 2015, p. 17). We strongly support this approach, as it provides assurance that a viable wolf population would remain in the Upper Peninsula regardless of the future fate of wolves in Wisconsin or Ontario.

The Michigan Plan identifies wolf population monitoring as a priority activity, and specifically states that the Michigan Department of Natural Resources would monitor wolf abundance twice a year for at least 5 years post-delisting (MI DNR 2015, p. 26). This includes monitoring to assess wolf presence in the northern Lower Peninsula. From 1989 through 2006, the MI DNR attempted to count wolves throughout the entire Upper Peninsula. As the wolf population increased, this method became more difficult. In the winter of 2006–07, the MI DNR implemented a new sampling approach based on an analysis by Potvin *et al.* (2005, p. 1668) to increase the efficiency of the State survey. The new approach is based on a geographically based stratified random sample and produces an unbiased, regional estimate of wolf abundance. The Upper Peninsula was stratified into three sampling areas, and within each stratum the DNR intensively surveys roughly 40 to 50 percent of the wolf habitat area annually. Computer simulations have shown that such a geographically stratified monitoring program would produce unbiased and precise estimates of the total wolf population, which can be statistically compared to estimates derived from the previous method to detect significant changes in the Upper Peninsula wolf population (Beyer *in litt.* 2006, see attachment by Drummer; Lederle *in litt.* 2006; Roell *et al.* 2009, p. 3).

Another component of wolf population monitoring is monitoring wolf health. The MI DNR would continue to monitor the impact of parasites and disease on the viability of wolf populations in the State through necropsies of dead wolves and analyzing biological samples from captured live wolves. Prior to 2004, MI DNR vaccinated all captured wolves for canine distemper and parvovirus and treated them for mange. These inoculations were discontinued to provide more natural biotic conditions and to provide biologists with an unbiased estimate of disease-caused mortality rates in the population (Roell *in litt.* 2005). Since diseases and parasites are not currently a significant threat to the Michigan wolf population, the MI DNR is continuing the practice of not actively managing disease. If

monitoring indicates that diseases or parasites may pose a threat to the wolf population, the MI DNR would again consider more active management similar to that conducted prior to 2004 (MI DNR 2015, p. 35).

The Michigan Plan includes maintaining habitat and prey necessary to sustain a viable wolf population in the State as a management component. This includes maintaining prey populations required for a viable wolf population while providing for sustainable human uses, maintaining habitat linkages to allow for wolf dispersal, and minimizing disturbance at known, active wolf dens (MI DNR 2015, pp. 32–34).

To minimize illegal take, the Michigan Plan calls for enacting and enforcing regulations to ensure adequate legal protection for wolves in the State. Under State regulations, wolves could be classified as a threatened, endangered, game, or protected animal, all of which prohibit killing (or harming) the species except under a permit, license, or specific conditions. Michigan removed gray wolves from the State’s threatened and endangered species list in 2009 and classified the species as a game animal in 2015. Game-animal status allows but does not require the establishment of a regulated harvest season. The Michigan Plan states that regulations would be reviewed, modified, or enacted as necessary to provide the wolf population with appropriate levels of protection with the following possible actions: (1) Reclassify wolves as endangered or threatened under State regulations if population size declines to 200 or fewer wolves; (2) review, modify, recommend, and/or enact regulations, as necessary, to ensure appropriate levels of protection for the wolf population; and (3) if necessary to avoid a lapse in legal protection, amend the Wildlife Conservation Order to designate wolves as a protected animal (MI DNR 2015, p. 28).

The Michigan Plan emphasizes the need for public information and education efforts that focus on living with a recovered wolf population and ways to manage wolves and wolf-human interaction (both positive and negative) (MI DNR 2015, pp. 22–25). The Plan also recommends continuing important research efforts, continuing reimbursement for depredation losses, minimizing the impacts of captive wolves and wolf-dog hybrids on the wild wolf population, and citizen stakeholder involvement in the wolf-management program (MI DNR 2015, pp. 27, 52–53, 55–56, 60).

The Michigan Plan calls for establishing a wolf-management stakeholder group that would meet annually to monitor the progress made toward implementing the Plan. Furthermore, the Plan will be reviewed and updated at 5-year intervals to address “ecological, social, and regulatory” changes (MI DNR 2015, pp. 60–61). The plan also addresses currently available and potential new sources of funding to offset costs associated with wolf management (MI DNR 2015, pp. 61–62). The MI DNR has long been an innovative leader in wolf-recovery efforts, exemplified by its initiation of the nation’s first attempt to reintroduce wild wolves to vacant historical wolf habitat in 1974 (Weise *et al.* 1975). The MI DNR’s history of leadership in wolf recovery and its repeated written commitments to ensure the continued viability of a Michigan wolf population above a level that would trigger State or Federal listing as threatened or endangered further reinforces that the 2015 Michigan Wolf Management Plan would provide adequate regulatory mechanisms for Michigan wolves. The DNR’s primary goal remains to conduct management to maintain the wolf population in Michigan above the minimum size that is biologically required for a viable, isolated population and to provide for ecological and social benefits valued by the public while resolving conflicts where they occur (MI DNR 2015, p. 16).

Depredation Control in Michigan—Data from Michigan show a general increase in confirmed events of wolf depredations on livestock over the past two decades, with an average of 3.4 animals killed annually from 1998 through 2002, an average of 10.6 annually in 2003–2007; an average of 38.2 annually from 2008–2012; and an average of 19.2 annually in 2013–2017. Over 80 percent of the depredation events were on cattle, with the rest on sheep, poultry, rabbits, goats, horses, swine, and captive deer (Roell *et al.* 2009, pp. 9, 11; Beyer *in litt.* 2018).

Michigan has not experienced as high a level of attacks on dogs by wolves as Wisconsin, although a slight increase in such attacks has occurred over the last decade. Yearly losses vary, and actions of a single pack of wolves can be an important influence. In Michigan, there is not a strong relationship between wolf depredation on dogs and wolf abundance (Roell *et al.* 2010, p. 7). The number of dogs killed in the State during the 15 years from 1996 to 2010 totaled 34; that number increased to 70 during the 7-year period from 2011 through 2017 (Beyer *in litt.* 2018). The majority of the wolf-related dog deaths

involved hounds used to hunt bears. Similar to Wisconsin, MI DNR has guidelines for its depredation-control program, stating that lethal control would not be used when wolves kill dogs that are free roaming, hunting, or training on public lands. Lethal control of wolves, however, would be considered if wolves have killed confined pets and remain in the area where more pets are being held (MI DNR 2005a, p. 6). However, in 2008, the Michigan Legislature passed a law that would allow dog owners or their designated agents to remove, capture, or, if deemed necessary, use lethal means to destroy a gray wolf that is in the act of preying upon the owner's dog, which includes dogs free roaming or hunting on public lands.

During the several years that lethal control of depredating wolves had been conducted in Michigan, there was no evidence of resulting adverse impacts to the maintenance of a viable wolf population in the Upper Peninsula. MI DNR and USDA–Wildlife Services killed 50 wolves in response to depredation events during the time period when permits or special rules were in effect or while wolves were not on the Federal lists of endangered and threatened species (Roell *et al.* 2010, p. 8). In 2008, Michigan passed two House bills that would become effective after Federal delisting. Those bills authorized a livestock or dog owner (or a designated agent) to “remove, capture, or use lethal means to destroy a wolf that is in the act of preying upon” the owner's livestock or dog. During the 2 months that wolves were federally and State delisted in 2009, no wolves were killed under these authorizations; 32 wolves were killed under these authorities from 2012 through 2014 (Beyer *in litt.* 2018). The numbers of wolves killed each year for depredation control are as follows: 4 (2003), 5 (2004), 2 (2005), 7 (2006), 14 (2007), 8 (2008), 1 (during 2 months in 2009), 18 (2012), 10 (2013), and 13 (2014) (Beyer *et al.* 2006, p. 88; Roell *in litt.* 2006, p. 1; Roell *et al.* 2010, p. 19; Beyer *in litt.* 2018). This represents 0.2 percent (2009) to 2.7 percent (2007) of the Upper Peninsula's late-winter population of wolves during the previous winter. During the years where depredation control took place absent a regulated public harvest, the wolf population increased from 2 percent (2007–2008) to 17 percent (2006–2007) despite the level of depredation control, demonstrating that the wolf population continues to increase at a healthy rate (Huntzinger *et al.* 2005, p. 6; MI DNR 2006, Roell *et al.* 2009, p. 4).

Post-delisting Depredation Control in Michigan—Following Federal delisting, wolf depredation control in Michigan would be carried out according to the 2015 Michigan Wolf Recovery and Management Plan (MI DNR 2015) and any Tribal wolf-management plans that may be developed in the future for reservations in occupied wolf range.

To provide depredation-control guidance when lethal control is an option, Michigan Department of Natural Resources has developed detailed instructions for incident investigation and response (MI DNR 2005a). Verification of wolf depredation incidents will be conducted by MI DNR or USDA–APHIS–Wildlife Services personnel (working under a cooperative agreement with MI DNR or at the request of a Tribe, depending on the location) who have been trained in depredation investigation techniques. The MI DNR specifies that the verification process would use the investigative techniques that have been developed and successfully used in Minnesota by Wildlife Services (MI DNR 2005a, append. B, pp. 9–10). Following verification, one or more of several options would be implemented to address the depredation problem. Technical assistance, consisting of advice or recommendations to reduce wolf conflicts, would be provided. Technical assistance may also include providing to the landowner various forms of noninjurious behavior modification materials, such as flashing lights, noise makers, temporary fencing, and fladry.

Trapping and translocating depredating wolves has been used in the past, resulting in the translocation of 23 Upper Peninsula wolves during 1998–2003 (Beyer *et al.* 2006, p. 88), but as with Wisconsin, suitable relocation sites are becoming rarer, and there is local opposition to the release of translocated depredators. Furthermore, none of the past translocated depredators have remained near their release sites, making this a questionable method to end the depredation behaviors of these wolves (MI DNR 2005a, pp. 3–4). Therefore, reducing depredation problems by relocation is no longer recommended as a management tool in Michigan (MI DNR 2008, p. 57).

Lethal control of depredating wolves is likely to be the most common future response in situations when improved livestock husbandry and wolf-behavior-modification techniques (for example, flashing lights, noise-making devices) are judged to be inadequate. As wolf numbers continue to increase on the Upper Peninsula, the number of verified depredations will also increase, and will

probably do so at a rate that exceeds the rate of wolf population increase. This will occur as wolves increasingly disperse into and occupy areas of the Upper Peninsula with more livestock and more human residences, leading to additional exposure to domestic animals. In a previous application for a lethal take permit under section 10(a)(1)(A) of the Act, MI DNR received authority to euthanize up to 10 percent of the late-winter wolf population annually (MI DNR 2005b, p. 1). However, based on 2003–05 and 2007–09 depredation data, it is likely that significantly less than 10 percent lethal control would be needed over the next several years.

The Michigan Plan provides recommendations to guide management of various conflicts caused by wolf recovery, including depredation on livestock and pets, human safety, and public concerns regarding wolf impacts on other wildlife. We view the Michigan Plan's depredation and conflict control strategies to be conservative, in that they commit to nonlethal depredation management whenever possible, oppose preventative wolf removal where problems have not yet occurred, encourage incentives for best management practices that decrease wolf–livestock conflicts without affecting wolves, and support closely monitored and enforced take by landowners of wolves “in the act of livestock depredation” or under limited permits if depredation is confirmed and nonlethal methods are determined to be ineffective. Based on these components of the revised Michigan Plan and the stated goal for maintaining wolf populations at or above recovery goals, the Service concludes that any wolf-management changes implemented following delisting would not be implemented in a manner that results in significant reductions in Michigan wolf populations. The MI DNR remains committed to ensuring a viable wolf population above a level that would trigger re-listing as either threatened or endangered in the future (MI DNR 2015, p. 8).

Similar to Wisconsin, Michigan livestock owners are compensated when they lose livestock as a result of a confirmed wolf depredation. Currently there are two complementary compensation programs in Michigan, one funded by the MI DNR and implemented by Michigan Department of Agriculture (MI DA) and another set up through donations (from Defenders of Wildlife and private citizens) and administered by the International Wolf Center (IWC), a nonprofit organization. From the inception of the program to

2000, MI DA has paid 90 percent of full market value of depredated livestock at the time of loss. The IWC account was used to pay the remaining 10 percent from 2000 to 2002 when MI DA began paying 100 percent of the full market value of depredated livestock. The IWC account continues to be used to pay the difference between value at time of loss and the full fall market value for depredated young-of-the-year livestock, and together the two funds have provided nearly \$183,000 in livestock-loss compensation through 2017 (Roell et al. 2010, p. 15; Beyer *in litt.* 2018). Neither of these programs provides compensation for pets or for veterinary costs to treat wolf-inflicted livestock injuries. The MI DNR plans to continue cooperating with MI DA and other organizations to maintain the wolf-depredation-compensation program (MI DNR 2008, pp. 59–60).

Post-delisting Regulated Harvest in Michigan—Although the Michigan Plan itself does not determine whether a public harvest would be used as a management strategy, it does discuss developing “socially and biologically responsible management recommendations regarding public harvest of wolves” (MI DNR 2015, p. 56). The Michigan Plan discusses developing recommendations regarding public harvest for two separate purposes: To reduce wolf-related conflicts and for reasons other than managing wolf-related conflicts (*e.g.*, recreational and utilitarian purposes). With regard to implementing a public harvest for recreational or utilitarian purposes, the Michigan Plan identifies the need to gather and evaluate biological and social information, including the biological effects and the public acceptability of a general wolf harvest (MI DNR 2015, p. 60). A public harvest during a regulated season requires that wolves be classified as game animals in Michigan (they were classified as such in 2015). With wolves classified as game animals, the Michigan Natural Resource Commission (NRC) has the exclusive authority to enact regulations pertaining to the methods and manner of public harvest. Although the decisions regarding establishment of a harvest season would be made by the NRC, the MI DNR would be called upon to make recommendations regarding socially and biologically responsible public harvest of wolves. Michigan held a regulated public hunting season in 2014 that took into consideration the recommendations of the MI DNR. Based on those recommendations, the Michigan NRC established quotas for that season based

on zones in the Upper Peninsula, with a quota of 16 wolves in the far western part of the peninsula, 19 in 4 central counties, and 8 in the eastern part of the peninsula. Twenty-two wolves were taken during that 2014 season.

Post-Delisting Management in the West Coast States

Wolves are classified as endangered under the Washington State Endangered Species Act (WAC 220–610–010). 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). Wolves in California are similarly classified as endangered under the California Endangered Species Act (CESA; California Fish and Game Commission 2014, entire). Under CESA, take (defined as hunt, pursue, catch, capture, kill, or attempts to hunt, pursue, catch, capture, or kill) of listed wildlife species is prohibited (California Fish and Game Codes § 86 and § 2080). Wolves in Oregon have achieved recovery objectives and were delisted from the State Endangered Species Act in 2015. Wolves in Oregon remain protected by the State Plan and its associated rules, and Oregon’s wildlife policy. The wildlife policy states “that wildlife shall be managed to prevent the serious depletion of any indigenous species” and includes seven coequal management goals (ORS 496.012) (ODFW 2017, p. 6). Although it remains a possibility for the future, there are no current plans to initiate a hunting season, and regulatory mechanisms remain in place through the State plan and Oregon statute to ensure a sustainable wolf population.

Oregon, Washington, and California also have adopted wolf-management plans intended to provide for the conservation and reestablishment of wolves in these States (ODFW 2010, entire; Wiles *et al.* 2011, entire; CDFW 2016a, entire; 2016b, entire). These plans include population objectives, education and public outreach goals, damage-management strategies, and monitoring and research plans. Wolves will remain on State endangered species lists in Washington and California until recovery objectives have been reached. Once recovery objectives have been achieved, the process for delisting wolves at the State level will be initiated. Once removed, the States have the authority to consider using regulated harvest to manage wolf populations. All three State plans also recognize that management of livestock conflicts is a

necessary component of wolf management (ODFW 2010, p. 40; Wiles *et al.* 2011, p. 72; CDFW 2016a, p. 4). Control options are currently limited to preventative and nonlethal methods within the federally listed portions of Oregon, Washington, and California. If Federal delisting occurs, guidelines outlined in each State’s plan define conditions under which depredating wolves can be lethally removed by agency officials (CDFW 2016b, pp. 278–285; ODFW 2010, pp. 43–54; Wiles *et al.* 2011, pp. 72–94).

The Oregon Wolf Management Plan—The Oregon Wolf Conservation and Management Plan was developed prior to wolves becoming established in Oregon. The plan, first finalized in 2005, contains provisions that require it to be updated every 5 years. The first revision occurred in 2010, and a subsequent revision is presently under review. The Oregon Fish and Wildlife Commission provided a set of guiding principles to a newly formed Wolf Advisory Committee, which was directed to work on plan development. The guiding principles included writing a plan based on the conservation of wolves, incorporating public concerns and comments, not allowing reintroduction of wolves into Oregon, providing flexibility for management while conserving wolves, seeking assistance for livestock producers for wolf depredation, and assessing of impacts to prey populations. Key stakeholder groups are invited to participate in reviews of revisions to the plan. Stakeholders include local government, Tribes, non-governmental organizations, State agencies and organizations, and Federal agencies.

The Oregon plan includes two management zones that roughly divide the State into western and eastern halves. This division line is further to the west of the line that delineates the listed and non-listed portions of Oregon. Each zone has a separate population objective of seven breeding pairs (ODFW 2017, p. 16). Within each zone, management phases (Phase I, Phase II, and Phase III) are used to assess population objectives, which in turn influence conservation and management objectives.

Phase I includes a conservation population objective of obtaining four breeding pairs for 3 consecutive years; upon reaching this objective, delisting of wolves statewide may be initiated. The ODFW defines a breeding pair as a pack of wolves with an adult male, an adult female, and at least two pups surviving to the end of December (ODFW 2010, p. 17). This population objective was met in 2014 in the eastern

management zone, and wolves were State delisted in Oregon in 2015. Wolves in the eastern management zone were then managed under Phase II (ODFW 2016, p. 2). Wolves in the western management zone have yet to reach this conservation objective. Despite State delisting, wolves in the western management zone (currently in Phase I) are still managed with a level of protection mimicking that of Oregon ESA protections for wolves.

Phase II management actions work towards a management population objective of seven breeding pairs in the eastern management zone for 3 consecutive years. During this phase populations are managed to prevent declines that could result in re-listing under the Oregon ESA. This Phase II management population objective was met in 2016, which resulted in the transition of management to Phase III for the eastern management zone (ODFW 2017, p. 2).

Phase III acts to set a balance such that populations do not decline below Phase II objectives, but also do not reach unmanageable levels resulting in conflicts with other land uses. Phase III is a maintenance phase. While the 2010 plan does not include a minimum or maximum population level for wolves in Oregon, the plan leaves room for development of population thresholds in future planning efforts (ODFW 2010, p. 28). Similarly, legal harvest of wolves is not included in Phase III of the 2010 plan; however, Phase III does provide more management flexibility in the case of depredating wolves (ODFW 2010, p. 45). Currently, hunting of wolves is not permitted in Oregon.

The Washington Wolf Management Plan—The 2011 Wolf Conservation and Management Plan for Washington was developed in response to the State endangered status for the species, the expectation that the wolf population in Washington would be increasing through natural dispersal of wolves from adjacent populations, and the eventual return of wolf management to the State after Federal delisting. The purpose of the plan is to facilitate reestablishment of a self-sustaining population of gray wolves in Washington and to encourage social tolerance for the species by addressing and reducing conflicts. An advisory Wolf Working Group was appointed at the outset to give recommendations on the plan. In addition, the plan underwent extensive peer and public review prior to finalization.

The Washington Plan provides recovery goals for downlisting and delisting the species under Washington State law, and identifies strategies to

achieve recovery and manage conflicts with livestock and ungulates. Recovery objectives are defined as numbers of successful breeding pairs that are maintained on the landscape for 3 consecutive years, with a set geographic distribution within 3 specified recovery regions: The Eastern Washington, Northern Cascades, and Southern Cascades and Northwest Coast (Wiles *et al.* 2011, p. 60 figure 9). A successful breeding pair of wolves is defined in the Washington Plan as an adult male and an adult female with at least two pups surviving to December 31 in a given year (Wiles *et al.* 2011, p. 58). Specific target numbers and distribution for downlisting and delisting within the three recovery regions identified in the Washington Plan are as follows:

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

In addition to the delisting objective of 15 successful breeding pairs distributed in the three geographic regions for 3 consecutive years, an alternative delisting objective is also established whereby the gray wolf will be considered for delisting when 18 successful breeding pairs are present, with 4 successful breeding pairs in the Eastern Washington region, 4 successful breeding pairs in the Northern Cascades region, 4 successful breeding pairs distributed in the Southern Cascades and Northwest Coast region, and 6 anywhere in the State.

After State delisting, wolves could be reclassified as a game animal through the Washington Fish and Wildlife Commission's public process. WDFW intends to develop a new plan for managing wolves following Federal and State delisting. Any proposals to hunt wolves would go through a public process with the Fish and Wildlife Commission (Wiles *et al.* 2011, pp. 70–71).

The California Wolf Management Plan—The 2016 *Conservation Plan for Gray Wolves in California* was developed in anticipation of the return of wolves to California. The CDFW worked with stakeholder groups in 2014 and 2015 during plan development.

Stakeholders included local government, non-governmental organizations, State agencies and organizations, and Federal agencies. During the planning process, CDFW and the stakeholders identified sideboards and plan goals to direct development of the State plan. These sideboards and goals included direction to develop alternatives for wolf management, no reintroduction of wolves into California, historical distribution and abundance are not achievable, conserve biologically sustainable populations, manage native ungulates for wolf and human uses, management to minimize livestock depredations, and public outreach.

The California Plan recognizes that wolf activity in the State will increase with time, and that the plan needs to be flexible to account for information that is gained during the expansion of wolves into the State. Similar to plans for other States, the California Plan uses a three-phase strategy for wolf conservation and management.

Phase I is a conservation-based strategy to account for the reestablishment of wolves under both State and Federal Endangered Species Acts. Phase I will end when there are four breeding pairs for 2 consecutive years in California. The CDFW defines a breeding pair as at least one adult male, one adult female, and at least two pups that survive to the end of December (CDFW 2016a, p. 21). California is currently in Phase I of the plan, with the Lassen Pack as the only breeding pair present for 2 consecutive years.

Phase II is expected to represent a point at which California's wolf population is growing more through reproduction of resident wolves than by dispersal of wolves from other States. This phase will conclude when there are eight breeding pairs for 2 consecutive years. During Phase II, CDFW anticipates gaining additional information and experience with wolves in the State, which will help inform future revisions to the State plan. During Phase II, flexibility for managing wolves for depredation response or predation on wild ungulates may be initiated.

Phase III is less specific due to the information available to CDFW at the time of plan development. This phase moves toward longer term management of wolves in California. Specific aspects of Phase III are more likely to be developed toward the middle of Phase II when more information on wolf distribution and abundance in the State are available. Towards the end of Phase II and the beginning of Phase III, a status review of wolves in California may be

initiated to determine if continued State listing as endangered is warranted. Currently, hunting of wolves is not permitted in California.

Tribal Management and Conservation of Wolves

Native American tribes and inter-tribal resource-management organizations have indicated to the Service that they will continue to conserve wolves on most, and probably all, Native American reservations in the primary wolf areas of the Great Lakes area. The wolf retains great cultural significance and traditional value to many Tribes and their members, and to retain and strengthen cultural connections, many tribes oppose unnecessary killing of wolves on reservations and on ceded lands, even following any Federal delisting (Hunt *in litt.* 1998; Schrage *in litt.* 1998a; Schlender *in litt.* 1998). Some Native Americans view wolves as competitors for deer and moose, whereas others are interested in harvesting wolves as furbearers (Schrage *in litt.* 1998a). Many tribes intend to sustainably manage their natural resources, wolves among them, to ensure that they are available to their descendants. Traditional natural-resource harvest practices, however, often include only a minimum amount of regulation by the Tribal governments (Hunt *in litt.* 1998).

Although not all Tribes with wolves that visit or reside on their reservations have completed management plans specific to the wolf, several Tribes have informed us that they have no plans or intentions to allow commercial or recreational hunting or trapping of the species on their lands after Federal delisting. The Red Lake Band of Chippewa Indians (Minnesota) and the Little Traverse Bay Band of Odawa Indians (Michigan) have developed wolf monitoring and/or management plans. The Service has also awarded a grant to the Ho-Chunk Nation to identify wolf habitat on reservation lands.

As a result of many past contacts with, and previous written comments from, the Midwestern Tribes and their inter-tribal natural-resource-management agencies—the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), the 1854 Authority, and the Chippewa Ottawa Treaty Authority—it is clear that their predominant sentiment is strong support for the continued protection of wolves at a level that ensures that viable wolf populations remain on reservations and throughout the treaty-ceded lands surrounding the reservations. While several Tribes stated that their members may be interested in killing small

numbers of wolves for spiritual or other purposes, this would be carried out in a manner that would not affect reservation or ceded-territory wolf populations.

The Red Lake Band of Chippewa Indians (Minnesota) completed a wolf-management plan in 2010 (Red Lake Band of Chippewa Indians 2010). A primary goal of the management plan is to maintain wolf numbers at a level that will ensure the long-term survival of wolves on Red Lake lands. Key components of the plan are habitat management, public education, and law enforcement. To address human-wolf interactions, the plan outlines how wolves may be taken on Red Lake lands. Wolves thought to be a threat to public safety may be harassed at any time, and if they must be killed, the incident must be reported to tribal law enforcement. Agricultural livestock are not common on Red Lake lands, and wolf-related depredation on livestock or pets is unlikely to be a significant management issue. If such events do occur, tribal members may protect their livestock or pets by lethal means, but “all reasonable efforts should be made to deter wolves using non-lethal means” (Red Lake Band of Chippewa Indians 2010, p. 15). Hunting or trapping of wolves on tribal lands will be prohibited. The Reservation currently has 7 or 8 packs with an estimated 40–48 wolves within its boundaries (Red Lake Band of Chippewa Indians 2010, p. 12).

In 2009, the Little Traverse Bay Bands of Odawa Indians (LTBB) finalized a management plan for the 1855 Reservation and portions of the 1836 ceded territory in the northern Lower Peninsula of Michigan (Little Traverse Bay Bands of Odawa Indians Natural Resource Department 2009). The plan provides the framework for managing wolves on the LTBB Reservation with the goal of maintaining a viable wolf presence on the LTBB Reservation or within the northern Lower Peninsula should a population become established by (1) prescribing scientifically sound biological strategies for wolf management, research, and monitoring; (2) addressing wolf-related conflicts; (3) facilitating wolf-related benefits; and (4) developing and implementing wolf-related education and public information.

The Tribal Council of the Leech Lake Band of Minnesota Ojibwe (Council) approved a resolution that describes the sport and recreational harvest of wolves as an inappropriate use of the animal. That resolution supports limited harvest of wolves to be used for traditional or spiritual uses by enrolled Tribal members if the harvest is done in a

respectful manner and would not negatively affect the wolf population. Over the last several years, the Council has been working to revise the Reservation Conservation Code to allow Tribal members to harvest some wolves after Federal delisting (Googgeye, Jr. *in litt.* 2004; Johnson *in litt.* 2011). Until this revision occurs, it is unknown whether harvest would be allowed and how a harvest might be implemented. The Tribe is currently developing a wolf-management plan (Mortensen 2011, pers. comm.). In 2005, the Leech Lake Reservation was home to an estimated 75 wolves, the largest population of wolves on a Native American reservation in the 48 conterminous States (Mortensen 2006, pers. comm.; White *in litt.* 2003). Although no recent surveys have been conducted, the number of wolves on the reservation likely remains about the same (Mortensen 2009, pers. comm.; Johnson *in litt.* 2011).

The Fond du Lac Band (Minnesota) believes that the “well-being of the wolf is intimately connected to the well-being of the Chippewa People” (Schrage *in litt.* 2003). In 1998, the Band passed a resolution opposing Federal delisting and any other measure that would permit trapping, hunting, or poisoning of the wolf (Schrage *in litt.* 1998b; *in litt.* 2003; 2009, pers. comm.). If the prohibition of trapping, hunting, or poisoning is rescinded, the Band’s Resource Management Division would coordinate with State and Federal agencies to ensure that any wolf hunting or trapping would be “conducted in a biologically sustainable manner” (Schrage *in litt.* 2003).

The Red Cliff Band (Wisconsin) has strongly opposed State and Federal delisting of the gray wolf. Current Tribal law protects wolves from harvest, although harvest for ceremonial purposes would likely be permitted after Federal delisting (Symbal *in litt.* 2003).

The Menominee Indian Tribe of Wisconsin is committed to establishing a self-sustaining wolf population, continuing restoration efforts, ensuring the long-term survival of the wolf in Menominee, placing emphasis on the cultural significance of the wolf as a clan member, and resolving conflicts between wolves and humans. The Tribe has shown a great deal of interest in wolf recovery and protection. In 2002, the Tribe offered their Reservation lands as a site for translocating seven depredating wolves that had been trapped by WI DNR and Wildlife Services. Tribal natural resources staff participated in the soft release of the wolves on the Reservation and helped

with the subsequent radio-tracking of the wolves. Although by early 2005 the last of these wolves died on the reservation, the tribal conservation department continued to monitor another pair that had moved onto the Reservation, as well as other wolves near the reservation (Wydeven *in litt.* 2006). When the female of that pair was killed in 2006, Reservation biologists and staff worked diligently to raise the orphaned pups in captivity with the WI DNR and the Wildlife Science Center (Forest Lake, Minnesota) in the hope that they could later be released to the care of the adult male. However, the adult male died prior to pup release, and they were moved back to the Wildlife Science Center (Pioneer Press 2006). The Menominee Tribe continues to support wolf conservation and monitoring activity in Wisconsin.

The Keweenaw Bay Indian Community (Michigan) would continue to list the wolf as a protected animal under the Tribal Code following any Federal delisting, with hunting and trapping prohibited (Mike Donofrio 1998, pers. comm.). Furthermore, the Keweenaw Bay Community developed a management plan in 2013 that “provides a course of action that will ensure the long-term survival of a self-sustaining, wild gray wolf (*Canis lupus*) population in the 1842 ceded territory in the western Upper Peninsula of Michigan” (KBIC Tribal Council 2013, p. 1). At least four other Tribes (Stockbridge Munsee Community, Lac Courte Oreilles Band of Ojibwe, the Mille Lacs Band of Ojibwe, and Grand Portage Band of Lake Superior Chippewa) have indicated plans to develop Tribal wolf-management plans.

Several Midwestern Tribes (for example, the Bad River Band of Lake Superior Chippewa Indians and the LTBB) have expressed concern that Federal delisting would result in increased mortality of wolves on reservation lands, in the areas immediately surrounding the reservations, and in lands ceded by treaty to the Federal Government by the Tribes (Kiogama and Chingwa *in litt.* 2000). In 2006, a cooperative effort among tribal natural resource departments of several tribes in Wisconsin, WI DNR, the Service, and USDA Wildlife Services led to a wolf-management agreement for lands adjacent to several reservations in Wisconsin. The goal is to reduce the threats to reservation wolf packs when they are temporarily off the reservation. Other Tribes have expressed interest in such an agreement. This agreement, and additional agreements if they are implemented, provides supplementary

protection to certain wolf packs in the western Great Lakes area.

The GLIFWC has stated its intent to work closely with the States to cooperatively manage wolves in the ceded territories in the core areas, and will not develop a separate wolf-management plan (Schlender *in litt.* 1998). Furthermore, the Voigt Intertribal Task Force of GLIFWC has expressed its support for strong protections for the wolf, stating “[delisting] hinges on whether wolves are sufficiently restored and will be sufficiently protected to ensure a healthy and abundant future for our brother and ourselves” (Schlender *in litt.* 2004).

According to the 1854 Authority, “attitudes toward wolf management in the 1854 Ceded Territory run the gamut from a desire to see total protection to unlimited harvest opportunity.” However, the 1854 Authority would not “implement a harvest system that would have any long-term negative impacts to wolf populations” (Edwards *in litt.* 2003). In comments submitted for our 2004 delisting proposal for a larger Eastern DPS of the gray wolf, the 1854 Authority stated that the Authority is “confident that under the control of State and tribal management, wolves will continue to exist at a self-sustaining level in the 1854 Ceded Territory. Sustainable populations of wolves, their prey and other resources within the 1854 Ceded Territory are goals to which the 1854 Authority remains committed. As such, we intend to work with the State of Minnesota and other tribes to ensure successful state and tribal management of healthy wolf populations in the 1854 Ceded Territory” (Myers *in litt.* 2004).

While there are few written Tribal protections currently in place for wolves, the highly protective and reverential attitudes that have been expressed by Tribal authorities and members have assured us that any post-delisting harvest of reservation wolves would be very limited and would not adversely affect the delisted wolf populations. Furthermore, any off-reservation harvest of wolves by tribal members in the ceded territories would be limited to a portion of the harvestable surplus at some future time. Such a harvestable surplus would be determined and monitored jointly by State and tribal biologists, and would be conducted in coordination with the Service and the Bureau of Indian Affairs (BIA), as is being successfully done for the ceded territory harvest of inland and Great Lakes fish, deer, bear, moose, and furbearers in Minnesota, Wisconsin, and Michigan. Therefore, we conclude that any future Native American take of

delisted wolves will not significantly affect the viability of the wolf population, either locally or across the Great Lakes area.

The Service and the Department of the Interior recognize the unique status of the federally recognized tribes, their right to self-governance, and their inherent sovereign powers over their members and territory. Therefore, the Department, the Service, the BIA, and other Federal agencies, as appropriate, will take the needed steps to ensure that tribal authority and sovereignty within reservation boundaries are respected as the States implement their wolf-management plans and revise those plans in the future.

Furthermore, there may be tribal activities or interests associated with wolves encompassed within the tribes’ retained rights to hunt, fish, and gather in treaty-ceded territories. The Department is available to assist in the exercise of any such rights. If biological assistance is needed, the Service may provide it via our field offices. Upon delisting, the Service would remain involved in the post-delisting monitoring of the wolves in the Great Lakes area, but all Service management and protection authority under the Act would end. Legal assistance would be provided to the tribes by the Department of the Interior, and the BIA would be involved, when needed. We strongly encourage the States and Tribes to work cooperatively toward post-delisting wolf management if wolves are delisted.

Consistent with our responsibilities to tribes and our goal to have the most comprehensive data available for our post-delisting monitoring, we would annually contact tribes and their designated intertribal natural resource agencies during the 5-year post-delisting monitoring period to obtain any information they wish to share regarding wolf populations, the health of those populations, or changes in their management and protection. Reservations that may have significant wolf data to provide during the post-delisting period include Bois Forte, Bad River, Fond du Lac, Grand Portage, Keweenaw Bay Indian Community, Lac Courte Oreilles, Lac du Flambeau, Leech Lake, Menominee, Oneida, Red Lake, Stockbridge-Munsee Community, and White Earth. Throughout the 5-year post-delisting monitoring period, the Service would annually contact the natural resource agencies of each of these reservations and that of the 1854 Treaty Authority and Great Lakes Indian Fish and Wildlife Commission.

Management on Federal Lands

Great Lakes Area

The five national forests with resident wolves (Superior, Chippewa, Chequamegon-Nicolet, Hiawatha, and Ottawa National Forests) in Minnesota, Wisconsin, and Michigan are all operating in conformance with standards and guidelines in their management plans that follow the 1992 Recovery Plan for the Eastern Timber Wolf's recommendations for the eastern timber wolf (USDA Forest Service (FS) 2004a, chapter 2, p. 31; USDA FS 2004b, chapter 2, p. 28; USDA FS 2004c, chapter 2, p. 19; USDA FS 2006a, chapter 2, p. 17; USDA FS 2006b, chapter 2, pp. 28–29). Delisting is not expected to lead to an immediate change in these standards and guidelines; in fact, the Regional Forester for U.S. Forest Service Region 9 expects to maintain the classification of the wolf as a Regional Forester Sensitive Species for at least 5 years after Federal delisting (Moore *in litt.* 2003; Eklund *in litt.* 2011). The Regional Forester has the authority to recommend classification or declassification of species as Sensitive Species. Under these standards and guidelines, a relatively high prey base will be maintained, and road densities will be limited to current levels or decreased. For example, on the Chequamegon-Nicolet National Forest in Wisconsin, the standards and guidelines specifically include the protection of den sites and key rendezvous sites, and management of road densities in existing and potential wolf habitat (USDA 2004c, chap. 2, p. 19).

The trapping of depredating wolves would likely be allowed on national forest lands under the guidelines and conditions specified in the respective State wolf-management plans. However, there are relatively few livestock raised within the boundaries of national forests in the upper Midwest, so wolf depredation and lethal control of wolves is neither likely to be a frequent occurrence, nor constitute a significant mortality factor, for the wolves in the Great Lakes area. Similarly, in keeping with the practice for other State-managed game species, any public hunting or trapping season for wolves that might be opened in the future by the States would likely include hunting and trapping within the national forests (Lindquist *in litt.* 2005; Williamson *in litt.* 2005; Piehler *in litt.* 2005; Evans *in litt.* 2005). The continuation of current national forest management practices will be important in ensuring the long-term viability of wolf populations in Minnesota, Wisconsin, and Michigan.

Wolves regularly use four units of the National Park System in the Great Lakes area and may occasionally use three or four other units. Although the National Park Service (NPS) has participated in the development of some of the State wolf-management plans in this area, NPS is not bound by States' plans. Instead, the NPS Organic Act and the NPS Management Policy on Wildlife generally require the agency to conserve natural and cultural resources and the wildlife present within the parks. NPS management policies require that native species be protected against harvest, removal, destruction, harassment, or harm through human action, although certain parks may allow some harvest in accordance with State management plans. Management emphasis in National Parks after delisting would continue to minimize the human impacts on wolf populations. Thus, because of their responsibility to preserve all native wildlife, units of the National Park System are often the most protective of wildlife. In the case of the wolf, the NPS Organic Act and NPS policies would continue to provide protection following Federal delisting.

Management and protection of wolves in Voyageurs National Park, along Minnesota's northern border is not likely to change after delisting. The park's management policies require that "native animals will be protected against harvest, removal, destruction, harassment, or harm through human action." No population targets for wolves will be established for the National Park (Holbeck *in litt.* 2005). To reduce human disturbance, temporary closures around wolf denning and rendezvous sites will be enacted whenever they are discovered in the park. Sport hunting is already prohibited on park lands, regardless of what may be allowed beyond park boundaries (West *in litt.* 2004). A radio-telemetry study conducted between 1987 and 1991 of wolves living in and adjacent to the park found that all mortality inside the park was due to natural causes (for example, killing by other wolves or starvation), whereas the majority (60–80 percent) of mortality outside the park was human-induced (for example, shooting and trapping) (Gogan *et al.* 2004, p. 22). If there is a need to control depredating wolves outside the park, which seems unlikely due to the current absence of agricultural activities adjacent to the park, the park would work with the State to conduct control activities where necessary (West *in litt.* 2004).

The wolf population of Isle Royale National Park, Michigan, is small and isolated and lacks genetic uniqueness

(Wayne *et al.* 1991). For genetic reasons and constraints on expansion due to the island's small size, this wolf population does not contribute significantly towards meeting numerical recovery criteria; however, long-term research on this wolf population has added a great deal to our knowledge of the species. The wolf population on Isle Royale has typically varied from 18 to 27 wolves in 3 packs, but has been down to just 2 wolves (a father-daughter pair) since the winter of 2015–2016 (Peterson *et al.* 2018). NPS recently announced plans to move additional wolves to Isle Royale in an effort to restore a viable wolf population (83 FR 11787; March 16, 2018).

Two other units of the National Park System, Pictured Rocks National Lakeshore and St. Croix National Scenic Riverway, are regularly used by wolves. Pictured Rocks National Lakeshore is a narrow strip of land along Michigan's Lake Superior shoreline. Lone wolves periodically use, but do not appear to be year-round residents of, the Lakeshore. If denning occurs after delisting, the Lakeshore would protect denning and rendezvous sites at least as strictly as the Michigan Plan recommends (Gustin *in litt.* 2003). Harvesting wolves on the Lakeshore may be allowed (if the Michigan DNR allows for harvest in the State), but trapping is not allowed. The St. Croix National Scenic Riverway, in Wisconsin and Minnesota, is also a mostly linear ownership. Approximately 54–58 wolves from 11 packs used the Riverway on the Wisconsin side in 2010 (Wydeven *in litt.* 2011). The Riverway is likely to limit public access to denning and rendezvous sites and to follow other management and protective practices outlined in the respective State wolf-management plans, although trapping is not allowed on NPS lands except possibly by Native Americans (Maercklein *in litt.* 2003).

At least one pack of 4–5 wolves used the shoreline areas of the Apostle Islands National Lakeshore, with a major deer yard area (a place where deer congregate in the winter) occurring on portions of the Park Service land. Wolf tracks have been detected on Sand Island, and a wolf was photographed by a trail camera on the island in September 2009. It is not known if wolves periodically swim to this and other islands, or if they only travel to islands on ice in winter.

Wolves occurring on National Wildlife Refuges in the Great Lakes area would be monitored, and Refuge habitat management would maintain the current prey base for them for a minimum of 5 years after delisting.

Trapping or hunting by government trappers for depredation control would not be authorized on National Wildlife Refuges. Because of the relatively small size of these Refuges, however, most or all wolf packs or individual wolves in these Refuges also spend significant amounts of time off these Refuges.

Wolves also occupy the Fort McCoy military installation in Wisconsin. Management and protection of wolves on the installation would not change significantly after Federal or State delisting. Den and rendezvous sites would continue to be protected, hunting seasons for other species (coyote) would be closed during the gun-deer season, and current surveys would continue, if resources are available. Fort McCoy has no plans to allow a public harvest of wolves on the installation (Nobles *in litt.* 2004; Wydeven *et al.* 2005, p. 25; 2006a, p. 25).

Minnesota National Guard's Camp Ripley contains parts of two pack territories, which typically include 10 to 20 wolves. Minnesota National Guard wildlife managers try to have at least one wolf in each pack radio-collared and to fit an additional one or two wolves in each pack with satellite transmitters that record long-distance movements. There have been no significant conflicts with military training or with the permit-only public deer-hunting program at the camp, and no new conflicts are expected following delisting. Long-term and intensive monitoring has detected only two wolf mortalities within the camp boundaries—both were of natural causes (Dirks 2009, pers. comm.).

The protection afforded to resident and transient wolves, their den and rendezvous sites, and their prey by five national forests, four National Parks, two military facilities, and numerous National Wildlife Refuges in Minnesota, Wisconsin, and Michigan will further ensure the conservation of wolves in the three States after delisting. In addition, wolves that disperse to other units of the National Refuge System or the National Park System within the Great Lakes area will also receive the protection afforded by these Federal agencies.

West Coast States

The west coast States generally contain a greater proportion of public land than the Great Lakes area. Public lands here include many National Parks, National Forests, National Monuments, and National Wildlife Refuges. These areas are largely unavailable and/or unsuitable for intensive development, and contain abundant ungulate populations. A lack of human

occupancy and development combined with an adequate prey base increase the likelihood of public lands in the west coast States to provide suitable habitat for gray wolves.

In the listed portions of the west coast States of California, Oregon, and Washington, wolves are resident on portions of the Lassen, Plumas, Fremont-Winema, Rogue-Siskiyou, Mount Hood, Okanogan-Wenatchee, and Mt. Baker-Snoqualmie National Forests (Forests). Land and Resource Management Plans (LRMPs) for these Forests pre-date the re-establishment of wolf packs and, therefore, do not contain standards and guidelines specific to wolf management. The LRMPs do, however, recognize that the Forests have obligations under sections 7(a)(1) and 7(a)(2) of the Act to proactively conserve and avoid adverse effects to Federally listed species. If federally delisted, the Regional Foresters for U.S. Forest Service Regions 5 and 6 are expected to include the gray wolf as a Regional Forester Sensitive Species. As a Sensitive Species, conservation objectives for the gray wolf and its habitat will continue to be addressed during planning and implementation of projects.

Gray wolves disperse through but are not currently residents of National Parks, National Monuments, and National Wildlife Refuges in the listed portions of all three west coast States. Similar to these types of lands in the Great Lakes areas, management plans provide for the conservation of natural and cultural resources and wildlife. The gray wolf and its habitat are expected to persist on these lands should Federal delisting occur.

Overall, public lands on the west coast have the ability to support the continued expansion of gray wolves as they disperse from resident packs and surrounding States and provinces to establish new packs in the west coast States. Because these areas are in public ownership and we do not foresee habitat-related threats, we conclude that they will continue to provide secure, optimal habitat for a resident wolf population.

Summary of Post-Delisting Management

In summary, upon delisting, there will be varying State and Tribal classifications and protections provided to wolves. The State wolf-management plans currently in place for Minnesota, Wisconsin, and Michigan will be more than sufficient to retain viable wolf populations in each State. Each of those plans contains management goals that will maintain healthy populations of wolves in their State by establishing a

minimum population of 1,600 in Minnesota, 350 in Wisconsin, and 200 in Michigan. Similarly, State management plans developed for Washington, Oregon, and California contain objectives to conserve and recover gray wolves. To ensure healthy populations are maintained, each State will monitor population abundance and trends, habitat and prey availability, and impacts of disease and take actions as needed to maintain populations. They are also committed to continuing necessary biological and social research and outreach and education to maintain healthy wolf populations. Each of the three Great Lakes States has a long-standing history of leadership in wolf conservation. All of the State management plans provide a high level of assurance of the persistence of healthy wolf populations, demonstrating their commitment to wolf conservation.

Furthermore, when federally delisted, wolves in Minnesota, Wisconsin, and Michigan will continue to receive protection from general human persecution by State laws and regulations. Wolves are protected as game species in each of those States, which prohibits lethal take without a permit, license, or authorization, except under a few limited situations (as described under the management plans above). Each of the three States will consider population-management measures, including public hunting and trapping, after Federal delisting, but regardless of the methods used to manage wolves, each State will maintain minimum wolf populations to ensure healthy wolf populations remain.

Wolves in Washington, Oregon, and California will also be protected by State laws and regulations when federally delisted. Currently wolves in Washington and California are protected under State statutes or acts as endangered species, as well as by their respective State management plans. Wolves in Oregon are State delisted but still receive protection under its State management plan. Each plan contains various phases outlining objectives for conservation and recovery. As recolonization of the west coast States continues, different phases of management will be enacted. All phases within the various State management plans are designed to achieve and maintain healthy wolf populations.

Finally, based on our review of the completed Tribal management plans and communications with Tribes and Tribal organizations, federally delisted wolves are very likely to be adequately protected on Tribal lands. Furthermore, the minimum population goals of the

Minnesota, Wisconsin, and Michigan State management plans can be achieved (based on the population and range of off-reservation wolves) even without Tribal protection of wolves on reservation lands. In addition, on the basis of information received from other Federal land-management agencies, we expect National Forests, units of the National Park System, military bases, and National Wildlife Refuges will provide protections to wolves in the areas they manage that will match, and in some cases will exceed, the protections provided by State wolf-management plans and State protective regulations.

Determination of Species Status

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so throughout all or a significant portion of its range. The Act defines “endangered species” as any species that is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 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.” 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 “foreseeable future” is the period of time over which events or effects reasonably can or should be anticipated, or trends extrapolated.

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or

manmade factors affecting its continued existence.

We may delist a species according to 50 CFR 424.11(d) if the best available scientific and commercial data indicate that the species is neither endangered nor threatened.

Summary and Conclusion of Our Analysis

Prior to listing in the 1970s, wolves in the gray wolf entity had been reduced to about 1,000 individuals and extirpated from all of their range except northeastern Minnesota and Isle Royale, Michigan. The primary cause of the decline of wolves in the gray wolf entity was targeted elimination by humans. However, gray wolves are highly adaptable; their populations are remarkably resilient as long as prey availability, habitat, and regulation of human-caused mortality are adequate. Wolf populations can rapidly overcome severe disruptions, such as pervasive human-caused mortality or disease, once those disruptions are removed or reduced.

Provided the protections of the Act, the size of the gray wolf population increased to over four times that at the time of the initial gray wolf listings in the early 1970s, and more than triple that at the time of the 1978 reclassification (a figure which does not include the wolves currently found in the northern Rocky Mountains, which was part of those earlier listings, although not now part of the current gray wolf entity). The population’s range has expanded outside of northeastern Minnesota to central and northwestern Minnesota, northern and central Wisconsin, and the entire Upper Peninsula of Michigan, and is in the early stages of expanding into western Washington, western Oregon, and northern California from areas outside the gray wolf entity. Wolves in the gray wolf entity now primarily exist as a large, stable to growing, metapopulation of about 4,400 individuals in the Great Lakes area and a small number of colonizing wolves in the west coast States that represent the expanding edge of a large metapopulation outside the gray wolf entity (in the northern Rocky Mountains and western Canada). Despite the substantial increase in gray wolf numbers and distribution within the gray wolf entity since 1978, the species currently occupies only a small portion of its historical range within the entity. This loss of historical range has resulted in a reduction of gray wolf individuals, populations, and suitable habitat (including adequate prey levels) within the gray wolf entity compared to historical levels.

To sustain populations over time, a species must have a sufficient number and distribution of healthy populations to withstand annual variation in its environment (resiliency); catastrophes (redundancy); and novel changes in its biological and physical environment (representation) (Shaffer and Stein 2000, pp. 308–311). A species with sufficient number and distribution of healthy populations is generally better able to adapt to future changes and to tolerate stressors (factors that cause a negative effect to a species or its habitat). Metapopulations are widely recognized as being more secure over the long-term than are several isolated populations that contain the same total number of packs and individuals (Service 1994, appendix 9). This is because adverse effects experienced by one of its subpopulations resulting from genetic drift, demographic shifts, and local environmental fluctuations can be countered by occasional influxes of individuals and their genetic diversity from other subpopulations in the metapopulation.

Changes resulting from loss of historical range for the gray wolf entity have increased the species’ vulnerability within the entity to threats such as reduced genetic diversity and restricted gene flow (reduced representation), and all or most of its populations being affected by a catastrophic event (reduced redundancy). However, the large size of the Great Lakes metapopulation and the high quality of the habitat it occupies provide the gray wolf entity resiliency in the face of annual environmental fluctuations (for example, prey availability, pockets of disease outbreaks), periodic disturbances, and anthropogenic stressors. Further, while the subpopulations within the metapopulation are interconnected, they are broadly distributed across the northern portions of three States. This broad distribution of subpopulations within the Great Lakes area provides the gray wolf entity the redundancy to survive a catastrophic event because such an event is unlikely to simultaneously affect wolf subpopulations from Minnesota to Michigan. Lastly, the gray wolf is a generalist species that is highly adaptable to a variety of ecosystem types. A mixture of western gray wolves and eastern wolves in the Great Lakes area, in particular, may provide additional adaptive capacity. Thus, the gray wolf entity is likely to contain the representation needed to be able to adapt to future changes in the environment.

The metapopulation in the Great Lakes area contains sufficient resiliency, redundancy, and representation to sustain populations within the gray wolf entity over time. Therefore, we conclude that the relatively few wolves that occur outside the Great Lakes area within the gray wolf entity, including those in the west coast States and lone dispersers in other States, are not necessary for the recovered status of the gray wolf entity. However, the viability of the entity is further increased by wolves that occur outside the Great Lakes area. The large and expansive population of about 12,000–14,000 wolves in eastern Canada increases the resiliency of the gray wolf entity through its connectivity to the Great Lakes area metapopulation. Additionally, a large metapopulation of about 16,000 wolves outside the gray wolf entity in the northern Rocky Mountains and western Canada is expanding into the gray wolf entity in Oregon, Washington, and California (figure 2). Such a large and widely distributed metapopulation of wolves not only contributes to the resiliency, redundancy, and representation of gray wolves in the lower 48 United States, but also is likely to further increase the viability of the gray wolf entity because these wolves are colonizing the western portion of the gray wolf entity. With ongoing post-delisting management from States, further expansion of the metapopulation into the gray wolf entity is likely to continue in the west coast States, further increasing the viability of the gray wolf entity.

Wolves in the Great Lakes area now greatly exceed the recovery criteria for (1) a secure wolf population in Minnesota, and (2) a second population outside Minnesota and Isle Royale consisting of 100 wolves for 5 successive years. Therefore, based on the criteria set by the Eastern Wolf Recovery Team, the Great Lakes area now contains sufficient wolf numbers and distribution, threats have been alleviated, and the States and Tribes are committed to continued management such that the long-term survival of the wolf is ensured. Consequently, because we have identified no other regions of the gray wolf entity as necessary for recovery of wolves in this entity, we conclude that the Great Lakes area contains sufficient wolf numbers and distribution to ensure the long-term survival of the gray wolf entity.

The recovery of the gray wolf entity is attributable primarily to successful interagency cooperation in the management of human-caused mortality. Such mortality is the most significant issue to the long-term conservation status of wolves in the gray

wolf entity. Therefore, managing this source of mortality remains the primary challenge to maintaining a recovered wolf population into the foreseeable future. Legal harvest and agency control to mitigate depredations on livestock will be the primary human-caused mortality factors that State agencies can manipulate to achieve management objectives once delisting occurs. Wolves in the Great Lakes area are well above Federal recovery requirements defined in the Eastern Timber Wolf Recovery Plan. As a result, we can expect to see some reduction in wolf populations in the Great Lakes areas as States begin to institute wolf-hunting seasons with the objective of slowing or reversing population growth while continuing to maintain wolf populations well above Federal recovery requirements in their respective States. Using an adaptive-management approach that adjusts harvest based on population estimates and trends, the initial objectives of States may be to lower wolf populations then manage for sustainable populations, similar to how States manage all other game species. For example, in 2013–2014, during a period when gray wolves were federally delisted in the Great Lakes area, Wisconsin reduced the State's wolf harvest quota by 43 percent in response to a reduced (compared to the previous year) estimated size of the wolf population. In the west coast States, wolf populations will likely be managed to ensure progress towards recovery objectives while also minimizing livestock losses caused by wolves.

Based on our analysis, we conclude that Minnesota, Wisconsin, and Michigan will maintain abundance and distribution of the Great Lakes wolf population above recovery levels for the foreseeable future, and that the threat of human-caused mortality has been sufficiently reduced. All three States have wolf-management laws, plans, and regulations that adequately regulate human-caused mortality. Each of the three States has committed to manage its wolf population at or above viable population levels, and we do not expect this commitment to change. Based on our review, we conclude that regulatory mechanisms in all three States are adequate to facilitate the maintenance of, and in no way threaten, the recovered status of wolves in the gray wolf entity if they are federally delisted. Adequate wolf-monitoring programs, as described in the State wolf-management plans, are likely to identify high mortality rates or low birth rates that warrant corrective action by the management agencies. Further, while

relatively few wolves occur in the west coast portion of the gray wolf entity at this time, and State wolf-management plans for Washington, Oregon, and California do not yet include population management goals, these plans include recovery objectives intended to ensure the reestablishment of self-sustaining populations in these States.

Based on the biology of wolves and our analysis of threats, we conclude that, as long as wolf populations in the Great Lakes States are maintained at or above identified recovery levels, wolf biology (namely the species' reproductive capacity) and the availability of large, secure blocks of suitable habitat within the occupied areas will enable the maintenance of populations capable of withstanding all other foreseeable threats. Although much of the historical range of the gray wolf entity is no longer occupied, based on our analysis we find that the amount and distribution of occupied wolf habitat currently provides, and will continue to provide, large core areas that contain high-quality habitat of sufficient size and with sufficient prey to support a recovered wolf population. Our analysis of land management shows these areas, specifically Minnesota Wolf Management Zone A (Federal Wolf Management Zones 1–4), Wisconsin Wolf Zones 1, and the Upper Peninsula of Michigan will maintain their suitability into the foreseeable future. Therefore, we conclude that, despite the loss of large areas of historical range for the gray wolf entity, Minnesota, Wisconsin, and the Upper Peninsula of Michigan contain a sufficient amount of high-quality wolf habitat to support wolf populations into the future.

While disease and parasites can temporarily affect population stability, as long as populations are managed above recovery levels, these factors are not likely to threaten the viability of the wolf population in the gray wolf entity at any point in the foreseeable future. Climate change is also likely to remain an insignificant factor in population dynamics into the foreseeable future, due to the adaptability of the species. Finally, based on our analysis, we conclude that cumulative effects of threats, do not now, nor are likely to in the foreseeable future, threaten the viability of the gray wolf entity throughout the range of wolves in the gray wolf entity.

Determination of Status Throughout All of Its Range

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the gray wolf entity

(the two *C. lupus* listed entities combined). We evaluated the status of, and assessed the factors likely to negatively affect, the gray wolf entity, including threats to the gray wolf entity identified at the time of reclassification. While wolves in the gray wolf entity currently occupy only a portion of wolf historical range, the best available information indicates that the gray wolf entity is recovered and is not now, nor likely in the foreseeable future, to be negatively affected by past, current, and potential future threats such that the entity is in danger of extinction.

Specifically, we have determined, based on the best available information, that human-caused mortality (Factor C); habitat and prey availability (Factor A); disease and parasites (Factor C); commercial, recreational, scientific, or educational uses (Factor B); climate change (Factor E); or other threats, singly or in combination, are not of sufficient imminence, intensity, or magnitude to indicate that wolves in the gray wolf entity are in danger of extinction or likely to become so within the foreseeable future throughout all of its range. We have also determined that ongoing effects of recovery efforts, which resulted in a significant expansion of the occupied range of and number of wolves in the gray wolf entity over the past decades, in conjunction with State, Tribal, and Federal agency wolf management and regulatory mechanisms that will be in place following delisting across the occupied range in the entity, will be adequate to ensure the conservation of wolves in the gray wolf entity. These activities will maintain an adequate prey base, preserve denning and rendezvous sites, monitor disease, restrict human take, and keep wolf populations well above the recovery criteria established in the Revised Recovery Plan (USFWS 1992, pp. 25–28).

The term “foreseeable future” describes the extent to which we can reasonably rely on the predictions about the future in making determinations about the future conservation status of the gray wolf entity. We conclude that it is reasonable to rely on the scientific studies and information assessing human-caused mortality; habitat and prey availability; the impacts of disease and parasites; commercial, recreational, scientific, or educational uses; gray wolf adaptability, including with respect to changing climate; recovery activities and regulatory mechanisms that will be in place following delisting; and predictions about how these may affect the gray wolf entity in making determinations about the gray wolf entity’s future status. Therefore, after

assessing the best available information, we have determined that the gray wolf entity is not in danger of extinction throughout all of its range nor is it likely to become so in the foreseeable future.

Because we determined that the gray wolf entity is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we will consider whether there are any significant portions of its range that are in danger of extinction or likely to become so in the foreseeable future.

Determination of Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species warrants listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range (SPR). Having determined that the gray wolf entity is not in danger of extinction now or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so in the foreseeable future in an SPR. The range of a species can theoretically be divided into portions in an infinite number of ways, so we first screen the potential portions of the species’ range to determine if there are any portions that warrant further consideration. To do this we look for portions of the species’ range for which there is substantial information indicating that: (1) The portion may be significant, and (2) the species may be in danger of extinction or likely to become so in the foreseeable future in that portion. A portion would not warrant further consideration if, for that portion, either one of these initial elements is not present. Therefore, if we determine that either of the initial elements is not present for a particular portion of the species’ range, then further analysis is not necessary and the species does not warrant listing because of its status in that portion of its range.

We emphasize that the presence of both of the initial elements is not equivalent to a determination that the species should be listed—rather, it is a determination that a portion warrants further consideration. If we identify any portions that meet both of the initial elements, we conduct a more thorough analysis to determine whether in fact (1) the portion is significant and (2) the species is in danger of extinction or likely to become so in the foreseeable future in that portion. Confirmation that a geographic area does indeed meet one of these standards (either the portion is significant or the species is endangered or threatened in that portion of its range) does not create a presumption,

or other determination as to whether the species is endangered or threatened in a significant portion of its range. Rather, we must then undertake a more detailed analysis of the other standard to make that determination. If the portion does indeed meet both standards, then the species is endangered or threatened in that significant portion of its range and warrants listing rangewide.

Thus, there can be two separate stages to the process of determining whether a species is threatened or endangered in a significant portion of its range: The stage of screening potential portions to identify if any portions warrant further consideration, and the stage of undertaking the more-detailed analysis of any portions that do warrant further consideration. At either stage, it may be more efficient for us to address the “significance” question first, or to address the “status” question first. Our selection of which question to address first for a particular portion depends on the biology of the species, its range, and the threats it faces. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the second question for that portion of the species’ range.

We note that a court has invalidated the USFWS and National Marine Fisheries Service (NMFS) definition of “significant” in their policy interpreting “significant portion of its range,” and issued a nationwide injunction prohibiting us from applying that definition (*Desert Survivors v. Dep’t of the Interior*, No. 16–cv–01165–JCS (N.D. Cal. Aug. 24, 2018)). Therefore, in our analysis for the gray wolf, we apply “significant” in a way that is consistent with that court’s opinion, and with other relevant case law. As USFWS and NMFS have not yet determined the best way to interpret “significant” in light of the decision in *Desert Survivors*, for the purposes of the analysis here, in determining whether any portions may warrant further consideration because they may be significant, we screen by looking for portions of the species’ range that could be significant under any reasonable definition of “significant” that relates to the conservation of the gray wolf entity. To do this, we look for any portions that may be biologically important in terms of the resiliency, redundancy, or representation of the species. Our use of this standard for “significant” is limited to this analysis, and is not precedent for any future determinations.

To screen for the second prong, we consider whether there are any portions where the gray wolf entity may be in

danger of extinction or likely to become so in the foreseeable future. This may include consideration of whether the threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale; if threats are not uniform throughout its range, this may be an indication that the species may warrant further evaluation to determine whether a different classification is appropriate. However, geographically concentrated threats do not necessarily indicate that a species may be in danger of extinction or likely to become so in the foreseeable future in that portion. Even if threats are concentrated in a portion, other factors could indicate that there is little chance those threats rise to a level such that the portion of the range may be in danger of extinction or likely to become so in the foreseeable future.

After reviewing the biology of the gray wolf entity and potential threats, we have not identified any portions of the gray wolf entity for which both (1) gray wolves may be in danger of extinction or likely to become so in the foreseeable future and (2) the portion may be significant. While some portions may be at increased threat from human-caused mortality or factors related to small numbers, we did not find that any of these portions may be significant. We provide examples below.

First, portions peripheral to the Great Lakes metapopulation that may contain lone dispersing wolves (e.g., western Minnesota, Lower Peninsula of Michigan, eastern South Dakota) or few wolves (e.g., Isle Royale), may be at greater threat from human caused mortality or due to factors related to small numbers of individuals. However, these portions are not biologically important to the gray wolf entity in terms of resiliency, redundancy, or representation. They are not important to the redundancy or resiliency of the gray wolf entity because they are not members of established breeding packs (lone dispersers) or are few in number and likely to remain as such (Isle Royale). They are also not important to the representation of the gray wolf entity because they lack genetic uniqueness relative to other wolves in the Great Lakes metapopulation—they are part of that metapopulation and are dispersing out from it. In addition, the gray wolf is a highly adaptable generalist species capable of long-distance dispersal. In other words, it possess the genetic diversity necessary to successfully colonize a broad range of habitat types and feed on a variety of prey species, and possess dispersal capabilities that facilitate colonization of those habitats in addition to gene

flow among and between populations. Therefore, we find that these portions are not “significant” under any reasonable definition of that term because they are not biologically important to the gray wolf entity in terms of its resiliency, redundancy, or representation.

Second, State wolf-management zones in which post-delisting depredation control would be allowed under a broader set of circumstances than in core population zones, such as Minnesota Wolf Management Zone B (Federal Wolf Management Zone 5) or Wisconsin Wolf Management Zones 3 and 4, are not significant under any reasonable definition of “significant.” While these portions would likely experience higher levels of human-caused mortality if the gray wolf entity were delisted, these portions are not “significant” under any reasonable definition of that term. The wolves in these zones occur on the periphery of a large metapopulation (the Great Lakes metapopulation), in areas of limited habitat suitability, and do not contribute appreciably to (and are thus not biologically important to) the resiliency, redundancy, or representation of the gray wolf entity. In fact, the Recovery Plan for the Eastern Timber Wolf advises against restoration of wolves in State Zone B (Federal Zone 5) because the area is “not suitable for wolves”. Wolves in these higher-intensity management zones are not important to the resiliency of the gray wolf entity because, even though they contain multiple established packs in addition to lone wolves, they comprise a small proportion of wolves in the Great Lakes metapopulation and, consequently, the gray wolf entity (Zone B contains approximately 15% of the Minnesota wolf population; Zones 3 and 4 contain about 6% of the Wisconsin wolf population). If wolves are delisted, a large metapopulation of wolves would still occur in the Great Lakes area outside these higher-intensity management zones in core zones of high-quality habitat and minimal human-caused mortality, providing the gray wolf entity the ability to withstand stochastic processes. These higher-intensity management zones are not important to the redundancy of the gray wolf entity because wolves in these zones represent a relatively small number and distribution of populations or packs in the Great Lakes metapopulation. The Great Lakes metapopulation is large and distributed across three states. Wolves in these higher-intensity management zones comprise a small proportion of wolves

in, and occur on the periphery of, this metapopulation. If wolves are delisted, wolves would still occur in multiple populations distributed across tens of thousands of square miles in Minnesota, Wisconsin, and Michigan, providing the gray wolf entity the ability to withstand a catastrophic event. Thus, wolves in these higher-intensity management zones do not contribute meaningfully to the ability of the Great Lakes metapopulation, or gray wolf entity, to withstand catastrophic events. Wolves in these higher-intensity management zones are not important to the representation of the gray wolf entity because they originate from the Great Lakes and eastern Canada metapopulation (they are genetically similar to other wolves in the Great Lakes area of the gray wolf entity) and because gray wolves are a highly adaptable generalist species capable of long distance-dispersal. Therefore, we do not find that these portions may be significant under any reasonable definition of “significant” because they are not biologically important to the gray wolf entity in terms of its resiliency, redundancy, or representation.

Third, the west coast portion of the gray wolf entity, where wolves exist in small numbers in California, western Oregon, and western Washington, also is not biologically important to the gray wolf entity in terms of resiliency, redundancy, or representation. This portion is not important to the gray wolf entity in terms of resiliency or redundancy because wolves occur in small numbers in this portion and include only a few breeding pairs. Because these wolves represent the expanding front of a recovered and stable source metapopulation, and are therefore not an independent population within the gray wolf entity, the small number of wolves there do not contribute meaningfully to the ability of any population, in the NRM or Great Lakes area, to withstand stochastic events, nor to the entire entity's ability to withstand catastrophic events. This portion is also not important in terms of representation, because (1) gray wolves are a highly adaptable generalist carnivore capable of long-distance dispersal, and (2) the gray wolves in this area are an extension of a large metapopulation of wolves in the northern Rocky Mountains and western Canada (i.e., they are not an isolated population with unique or markedly different genetic or phenotypic traits that is evolving separate from other wolf populations). Therefore, for the purpose of assessing the status of the gray wolf

entity under the Act, we do not find that this portion may be significant under any reasonable definition of “significant” because it is not biologically important to the gray wolf entity in terms of its resiliency, redundancy, or representation.

We conclude that there are no portions of the gray wolf entity for which both (1) gray wolves may be in danger of extinction or likely to become so in the foreseeable future and (2) the portion may be significant. As discussed above, portions that may be in danger of extinction or likely to become so in the foreseeable future are not significant under any reasonable definition of that term. Conversely, other portions that are or may be significant (*i.e.* the core areas of the Great Lakes metapopulation) are not in danger of extinction or likely to become so in the foreseeable future. Because we did not identify any portions of the gray wolf entity where threats may be concentrated and where the portion may be biologically important in terms of the resiliency, redundancy, or representation of the gray wolf entity, a more thorough analysis is not required. Therefore, we conclude that the gray wolf entity is not in danger of extinction or likely to become so in the foreseeable future within a significant portion of its range.

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 that removing the two entities of gray wolf (*Canis lupus*) from the List of Endangered and Threatened Wildlife (50 CFR 17.11) is appropriate. We have collectively evaluated the current and potential threats to the combined gray wolf entities, including those that result from past loss of historical range. Wolves have recovered in the combined entities as a result of the reduction of threats as described in the analysis of threats and are neither currently in danger of extinction, nor likely to become so in the foreseeable future, throughout all or a significant portion of their range.

Although substantial contraction of gray wolf historical range occurred within the combined entities since European settlement, the range of the gray wolf has expanded significantly since its original listing in 1978 and the impacts of lost historical range are no longer manifesting in a way that

threatens the viability of the species. The causes of the previous contraction (for example, targeted extermination efforts), and the effects of that contraction (for example, reduced numbers of individuals and populations, and restricted gene flow), in addition to the effects of all other threats, have been ameliorated or reduced such that the combined entities no longer meet the Act’s definitions of “threatened species” or “endangered species.” Further, we note that, while we combined the two *C. lupus* listed entities for our analysis, even if we had analyzed them separately, neither would meet the Act’s definitions of “threatened species” or “endangered species.” Both of these two listed entities are either part of the same metapopulation or the expanding front of the recovered NRM metapopulation. Therefore, because the status of each of these two listed entities is influenced by its connectedness to the other, the status of each would be the same as if analyzed in combination. We also note that the Act allows us to list species, subspecies, or DPSs and that, because the two listed entities are not discrete and are therefore not DPSs, neither of the two listed entities constitute valid listable entities under the Act and should, therefore, be removed from the List.

Effects of This Rule

This proposal, if made final, would revise 50 CFR 17.11(h) by removing the two existing *C. lupus* listed entities from the Federal List of Endangered and Threatened Wildlife. This proposal, if made final, would also remove the special regulations under section 4(d) of the Act for wolves in Minnesota. These regulations currently are found at 50 CFR 17.40(d).

Critical habitat was designated for the gray wolf in 1978 (43 FR 9607, March 9, 1978). That rule (codified at 50 CFR 17.95(a)) identifies Isle Royale National Park, Michigan, and Minnesota Wolf Management Zones 1, 2, and 3, as delineated in 50 CFR 17.40(d)(1), as critical habitat. Wolf Management Zones 1, 2, and 3 comprise approximately 25,500 km² (9,845 mi²) in northeastern and north-central Minnesota. This proposal, if made final, would remove the designation of critical habitat for gray wolves in Minnesota and on Isle Royale, Michigan.

Post-Delisting Monitoring

Section 4(g)(1) of the Act, added in the 1988 reauthorization, requires us to implement a system, in cooperation with the States, to monitor for not less than 5 years the status of all species that

have recovered and been removed from the Lists of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12). The purpose of this post-delisting monitoring (PDM) is to verify that a species delisted due to recovery remains secure from risk of extinction after it no longer has the protections of the Act. To do this, PDM generally focuses on evaluating (1) demographic characteristics of the species, (2) threats to the species, and (3) implementation of legal and/or management commitments that have been identified as important in reducing threats to the species or maintaining threats at sufficiently low levels. We are to make prompt use of the emergency-listing authority under section 4(b)(7) of the Act to prevent a significant risk to the well-being of any recovered species. Section 4(g) of the Act explicitly requires cooperation with the States in development and implementation of PDM programs, but we remain responsible for compliance with section 4(g) and, therefore, must remain actively engaged in all phases of PDM. We also will seek active participation of other State and Federal agencies or Tribal governments that are expected to assume management authority for the species’ conservation, should our proposed delisting be finalized. In some cases, agencies have already devoted significant resources toward wolf monitoring efforts. For example, the States of Washington, Oregon, and California have wolf-management plans that include monitoring strategies for wolves and wolf populations. Should such monitoring document significant declines, the Service will investigate the degree and importance of such declines.

We developed a PDM plan for wolves in the Great Lakes area with the assistance of the Eastern Wolf Recovery Team in 2008. That document remains applicable today as it focuses on monitoring wolves within the borders of Minnesota, Wisconsin, and the Upper Peninsula of Michigan and is available on our website (see **FOR FURTHER INFORMATION CONTACT**).

The PDM program will rely on a continuation of State monitoring activities, similar to those that have been conducted by Minnesota, Wisconsin, and Michigan DNR’s in recent years, and Tribal monitoring. These activities will include both population monitoring and health monitoring of individual wolves. During the PDM period, the Service will conduct a review of the monitoring data and program. We will consider various relevant factors (including but not limited to mortality rates, population changes and rates of change, disease

occurrence, range expansion or contraction) to determine if the population of wolves within the borders of Minnesota, Wisconsin, and the Upper Peninsula of Michigan warrants expanded monitoring, additional research, consideration for re-listing as threatened or endangered, or emergency listing.

Minnesota, Wisconsin, and Michigan DNRs have monitored wolves for several decades with significant assistance from numerous partners, including the U.S. Forest Service, National Park Service, USDA-APHIS-Wildlife Services, Tribal natural resource agencies, and the Service. To maximize comparability of future PDM data with data obtained before delisting, all three State DNRs have committed to continue their previous wolf-population-monitoring methodology, or will make changes to that methodology only if those changes will not reduce the comparability of pre- and post-delisting data.

In addition to monitoring wolf population numbers and trends, the PDM program will evaluate post-delisting threats, in particular human-caused mortality, disease, and implementation of legal and management commitments. If at any time during the monitoring period we detect a substantial downward change in the populations or an increase in threats to the degree that population viability may be threatened, we will work with the States and Tribes to evaluate and change (intensify, extend, and/or otherwise improve) the monitoring methods, if appropriate, and/or consider re-listing the gray wolf, if warranted.

This PDM monitoring program will extend for 5 years beyond the effective delisting date of the two currently listed gray wolf entities. At the end of the 5-year period, we will conduct another review and post the results on our website. In addition to the above considerations, the review will determine whether the PDM program should be terminated or extended.

Required Determinations

Clarity of This Proposed 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 **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers 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 we do not need to prepare an environmental assessment or an environmental impact statement, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), 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).

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 have coordinated the proposed rule with the affected Tribes and, furthermore, throughout several years of development of earlier related rules and this proposed rule, we have endeavored to consult with Native American Tribes and Native American organizations in order to both (1) provide them with a complete understanding of the proposed changes, and (2) to understand their concerns with those changes. If requested, we will conduct additional consultations with Native American Tribes and multi-tribal organizations subsequent to any final rule in order to facilitate the transition to State and

Tribal management of wolves within the Lower 48 United States outside of the NRM DPS where wolves are already under State and Tribal management. 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 proposed rule is available at <http://www.regulations.gov> under Docket No. FWS-HQ-ES-2018-0097 or upon request from the USFWS Headquarters Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are staff members of the USFWS.

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

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

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

- 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.

§ 17.11 [Amended]

- 2. Amend § 17.11(h) by removing both entries for “Wolf, gray (*Canis lupus*)” under MAMMALS in the List of Endangered and Threatened Wildlife.

§ 17.40 [Amended]

- 3. Amend § 17.40 by removing and reserving paragraph (d).

§ 17.95 [Amended]

- 4. Amend § 17.95(a) by removing the critical habitat entry for “Gray Wolf (*Canis lupus*).”

Dated: March 6, 2019.

Margaret E. Everson

Principal Deputy Director, U.S. Fish and Wildlife Service Exercising the Authority of the Director for the U.S. Fish and Wildlife Service.

[FR Doc. 2019-04420 Filed 3-14-19; 8:45 am]

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