DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R6–ES–2011–0039; 92220–1113–0000–C6]

RIN 1018–AX94

Endangered and Threatened Wildlife and Plants; Removal of the Gray Wolf in Wyoming From the Federal List of Endangered and Threatened Wildlife and Removal of the Wyoming Wolf Population's Status as an Experimental Population

AGENCY: U.S. Fish and Wildlife Service, Interior.

ACTION: Proposed rule; notice of a public hearing.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service or USFWS), are proposing to remove the gray wolf (*Canis lupus*) in Wyoming from the List of Endangered and Threatened Wildlife. This rule focuses on the Wyoming portion of the Northern Rocky Mountain (NRM) Distinct Population Segment (DPS), except where discussion of the larger Greater Yellowstone Area (GYA) or NRM metapopulation (a population that exists as partially isolated sets of subpopulations) is necessary to understand impacts to wolves in Wyoming. The best scientific and commercial data available indicate that wolves in Wyoming are recovered and no longer meet the definition of endangered or threatened under the Endangered Species Act of 1973, as amended (Act). Wyoming's wolf population is stable, threats are addressed, and a post-delisting monitoring and management framework has been developed. However, additional changes to Wyoming State law and Wyoming Game and Fish Commission regulations are necessary for implementation. We expect the State of Wyoming to adopt the necessary statutory and regulatory changes within the next several months. If this proposal is finalized, the gray wolf would be delisted in Wyoming, the nonessential experimental population designation would be removed, and future management for this species, except in National Parks and National Wildlife Refuges, would be conducted by the appropriate State or Tribal wildlife agencies. We seek information, data, and comments from the public about this proposal including the post-delisting monitoring and management framework.

DATES: *Public Comments:* We will accept comments received or postmarked on or before January 13, 2012. Please note that if you are using the Federal eRulemaking Portal (see **ADDRESSES**), the deadline for submitting an electronic comment is 11:59 p.m. Eastern Daylight Time on this date.

Public Hearing: We will hold a public hearing on this proposed rule on November 15, 2011, as well as an informational open house immediately preceding the public hearing. For more information, see ''Public Hearing and Open House'' in **SUPPLEMENTARY INFORMATION**.

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

(1) *Electronically:* Go to the Federal eRulemaking Portal: *http://www.regulations.gov.* In the Enter Keyword or ID box, enter FWS–R6–ES–2011–0039, which is the docket number for this rulemaking. Then, in the Search panel at the top of the screen, under the Document Type heading, check the box next to Proposed Rules to locate this document. You may submit a comment by clicking on ''Submit a Comment.''

(2) *By hard copy:* Submit by U.S. mail or hand-delivery to: Public Comments Processing, *Attn:* FWS–R6–ES–2011–0039, Division of Policy and Directives Management, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042–PDM, Arlington, VA 22203.

We will post all comments on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see ''Public Comments'' in **SUPPLEMENTARY INFORMATION** for more information).

FOR FURTHER INFORMATION CONTACT: For information on wolves in the northern Rocky Mountains see *http://www.fws.gov/mountain-prairie/species/mammals/wolf/,* or contact U.S. Fish and Wildlife Service, Mountain-Prairie Region Office, Ecological Services Division, 134 Union Blvd., Lakewood, CO 80228; telephone 303–236–7400. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Public Comments

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned government agencies, the scientific community, industry, or any other interested party concerning this proposed rule. Specifically, we request information on the following questions:

(1) Is our description and analysis of the biology, population, and distribution accurate?

(2) Does the proposed rule provide accurate and adequate review and analysis of the factors relating to the threats?

(3) Are the conclusions we reach, including their projection of maintenance of a viable population, logical and supported by the evidence provided?

(4) Did we include all the necessary and pertinent literature to support our assumptions, arguments, and conclusions?

(5) Is it reasonable for us to conclude that Wyoming's approach to wolf management is likely to maintain Wyoming's wolf population above recovery levels?

(6) Is it reasonable for us to conclude that Wyoming's approach to wolf management is likely to provide for sufficient levels of gene flow (either natural or human assisted) to prevent genetic problems from negatively impacting the GYA's population or the larger NRM metapopulation in a manner that would meaningfully impact viability?

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We will not accept comments sent by e-mail or fax or to an address not listed in **ADDRESSES**. If you submit a comment via *http://www.regulations.gov,* your entire comment—including your personal identifying information—will be posted on the Web site. If you submit a hardcopy comment 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 comments 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,* or by appointment, during normal business hours, at the Mountain-Prairie Region Office (see **FOR FURTHER INFORMATION CONTACT**).

Public Hearing and Open House

Section 4(b)(5)(E) of the Act requires that we hold one public hearing on the proposal, if requested. In anticipation of such a request, we have scheduled an informational meeting (a brief presentation about the proposed rule

with a question-and-answer period) from 4:30 p.m. to 6 p.m., and a public hearing from 6:30 p.m. to 8:30 p.m., on November 15, 2011, at the Robert A. Peck Arts Center, Central Wyoming College, 2660 Peck Avenue, Riverton, WY 82501; 307–855–2000.

Anyone wishing to make an oral statement at the public hearing for the record is encouraged to provide a written copy of their statement to us at the hearing. In the event there is a large attendance, the time allotted for oral statements may be limited. Speakers can sign up at the informational meeting and hearing if they desire to make an oral statement. Oral and written statements receive equal consideration. There are no limits on the length of written comments submitted to us. If you have any questions concerning the public hearing or need reasonable accommodations to attend and participate in the public hearing, please contact the Denver Regional Office's Ecological Service's Division at 303–236–7400 [see **FOR FURTHER INFORMATION CONTACT** section below], as soon as possible, but no later than 1 week before the hearing date, to allow sufficient time to process requests. Information regarding the proposal is available in alternative formats upon request.

Peer Review

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), we intend to subject this proposal to peer review. A peer review panel will conduct this assessment. We anticipate this assessment will be completed during the public comment period and posted online at *http://www.regulations.gov* to allow for public review and comment.

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

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Background

Delisting Wolves in Wyoming—The Focus of This Rule

This proposed rule focuses on the Wyoming portion of the NRM DPS, except where discussion of the larger GYA or NRM metapopulation is necessary to understand impacts to wolves in Wyoming. This rulemaking is separate and independent from, but additive to, the previous action delisting wolves in the NRM DPS (74 FR 15123, April 2, 2009; 76 FR 25590, May 5, 2011). We believe this approach is appropriate given the Congressional directive to reissue our 2009 delisting, which created a remnant piece of the NRM DPS. This approach is also consistent with our 2009 delisting determination which stated that ''if Wyoming were to develop a Service-approved regulatory framework it would be delisted in a separate rule'' (74 FR 15123, April 2, 2009, p. 15155). This proposal does not depend on, or implicate our previous, separate action to remove the other portions of the NRM DPS from the List of Endangered and Threatened Wildlife. Outside Wyoming, this rule will not affect the status of the gray wolf in the portions of the NRM DPS under State laws or suspend any other legal protections provided by State law.

Previous Federal Actions

In 1967, we determined the eastern timber wolf (*C. l. lycaon*) in the Great Lakes region was threatened with extinction (32 FR 4001, March 11, 1967). In 1973, we added the NRM gray wolf (*C. l. irremotus*) to the U.S. List of Endangered Fish and Wildlife (38 FR 14678, June 4, 1973). Both of these listings were pursuant to the Endangered Species Conservation Act of 1969. In 1974, these subspecies were listed as endangered under the Act of 1973 (39 FR 1158, January 4, 1974). We listed a third gray wolf subspecies, the Mexican wolf (*C. l. baileyi*) as endangered on April 28, 1976 (41 FR 17736) in Mexico and the southwestern United States. In 1976, we listed the Texas gray wolf subspecies (*C. l. monstrabilis*) as endangered in Texas and Mexico (41 FR 24062, June 14, 1976).

Due to questions about the validity of subspecies classification at the time and issues associated with the narrow geographic scope of each subspecies, we published a rule reclassifying the gray wolf as endangered at the species level (*C. lupus*) throughout the coterminous 48 States and Mexico (43 FR 9607, March 9, 1978). The exception was Minnesota, where the gray wolf was reclassified to threatened. This rule also provided assurance that this reclassification would not alter our intention to focus recovery on each population as separate entities. Accordingly, recovery plans were developed for: The Great Lakes in 1978 (revised in 1992) (Service 1978, entire; Service 1992, entire); the NRM region in 1980 (revised in 1987) (Service 1980, entire; Service 1987, entire); and the Southwest in 1982 (Service 1982, entire). A revision to the southwest recovery plan is now under way.

In 1994, we designated portions of Idaho and Montana, and all of Wyoming as nonessential experimental gray wolf populations under section 10(j) of the Act (50 CFR 17.84(i)), including the Yellowstone Experimental Population Area (59 FR 60252, November 22, 1994) and the Central Idaho Experimental Population Area (59 FR 60266,

November 22, 1994). These designations assisted us in initiating gray wolf reintroductions in central Idaho and in Yellowstone National Park (YNP). The Yellowstone Experimental Population Area included the entire State of Wyoming. In 2005 and 2008, we revised these regulations to provide increased management flexibility for this recovered wolf population in States and on Tribal lands with Service-approved post-delisting wolf management plans (70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(n)).

The NRM gray wolf population achieved its numerical and distributional recovery goals at the end of 2000 (Service *et al.* 2011, Table 4). The temporal portion of the recovery goal was achieved in 2002 when the numerical and distributional recovery goals were exceeded for the third successive year (Service *et al.* 2011, Table 4). In light of this success, we once reclassified and twice delisted all or part of this population (68 FR 15804, April 1, 2003; 73 FR 10514, February 27, 2008; 74 FR 15123, April 2, 2009). These reclassification and delisting rules were overturned by Federal District courts (*Defenders of Wildlife, et al.* v. *Norton, et al.,* 354 F.Supp.2d 1156 (D. Or. 2005); *National Wildlife Federation, et al.* v. *Norton, et al.,* 386 F.Supp.2d 553 (D. Vt. 2005); *Defenders of Wildlife, et al.* v. *Hall, et al.,* 565 F.Supp.2d 1160 (D. Mont. 2008); *Defenders of Wildlife, et al.* v. *Salazar, et al.,* 729 F.Supp.2d 1207 (D. Mont. 2010). Each of these rulemakings and the subsequent litigation are discussed below.

In 2003, we reclassified the coterminous 48-State listing into three DPSs including a threatened Western DPS, a threatened Eastern DPS, and an endangered Southwestern DPS (68 FR 15804, April 1, 2003). The Western DPS, centered around the recovered NRM gray wolf population, included California, northern Colorado, Idaho, Montana, Oregon, northern Utah, Washington, and Wyoming. This rule also removed the protections of the Act for gray wolves in all or parts of 16 southern and eastern States where the species historically did not occur. Finally, this rule established a special 4(d) rule to respond to wolf-human conflicts in areas not covered by existing nonessential experimental population rules. In 2005, the U.S. District Courts in Oregon and Vermont concluded that the 2003 final rule was ''arbitrary and capricious'' and violated the Act (*Defenders of Wildlife, et al.* v. *Norton, et al.,* 354 F.Supp.2d 1156 (D. Or. 2005); *National Wildlife Federation, et al.* v. *Norton, et al.,* 386 F.Supp.2d 553 (D. Vt. 2005)). Both courts ruled the Service improperly downlisted entire DPSs based just on the viability of a core population. The courts' rulings invalidated the April 2003 changes to the gray wolf listing under the Act.

In 2003, we also published an advanced notice of proposed rulemaking announcing our intention to delist the Western DPS as the recovery goals had been satisfied (68 FR 15879, April 1, 2003). This notice explained that delisting would require consideration of threats, and that the adequacy of State wolf management plans to address threats in the absence of protections of the Act would be a major determinant in any future delisting evaluation.

In 2004, we determined that Montana's and Idaho's laws and wolf management plans were adequate to assure that their shares of the NRM wolf population would be maintained above recovery levels (Williams 2004a, in litt.; Williams 2004b, in litt.). However, we also found the 2003 Wyoming legislation and plan would not ensure maintenance of Wyoming's share of a recovered NRM gray wolf population (Williams 2004c, in litt.). Wyoming challenged this determination, and the United States District Court in Wyoming dismissed the case (*State of Wyoming, et al.* v. *United States Department of Interior, et al.,* 360 F.Supp.2d 1214, (D. Wyoming 2005)). Wyoming's subsequent appeal was unsuccessful (*State of Wyoming, et al.* v. *United States Department of Interior, et al.,* 442 F.Supp.3d 1262 (10th Cir. 2006)). Wyoming lost this case on procedural grounds because it failed to identify a final agency action necessary to confer standing prior to the litigation. To address this procedural shortcoming, in 2005, Wyoming petitioned us to revise the listing status for the gray wolf by recognizing a NRM DPS and to remove it from the Federal List of Endangered and Threatened Species (Freudenthal 2005, entire). In 2006, we announced a 12-month finding that Wyoming's petition (delisting wolves in all of Montana, Idaho, and Wyoming) was not warranted because the 2003 Wyoming State laws and its 2003 wolf management plan did not provide adequate regulatory mechanisms to ensure that Wyoming's share of a recovered NRM wolf population would be conserved (71 FR 43410, August 1, 2006). Wyoming challenged this finding in Wyoming Federal District Court. This challenge was made moot by Wyoming's revisions to its laws and management plan in 2007, which allowed delisting to move forward. On February 27, 2008, a Wyoming Federal District Court issued an order dismissing the case (*State of Wyoming, et al.* v. *United States Department of Interior, et al.,* U.S. District Court Case No. 2:06–CV–00245).

In 2008, we issued a final rule recognizing the NRM DPS and removing it from the List of Endangered and Threatened Wildlife (73 FR 10514, February 27, 2008). This DPS included Idaho, Montana, eastern Oregon, north-central Utah, eastern Washington, and Wyoming. This DPS was smaller than the 2003 Western DPS and more closely approximates the historic range of the originally listed NRM gray wolf in the United States and the areas focused on in both NRM recovery plans (39 FR 1171, January 4, 1974; Service 1980, pp. 3, 7–8; Service 1987, pp. 2, 23). The Service removed protections across the entire DPS after Wyoming revised its wolf management plan and State law. At the time, we concluded this Wyoming framework provided adequate regulatory protections to conserve Wyoming's portion of a recovered wolf population into the foreseeable future (Hall 2007, in litt.).

Environmental litigants challenged this final rule in the U.S. District Court for the District of Montana. The plaintiffs also moved to preliminarily enjoin the delisting. On July 18, 2008, the court granted the plaintiffs' motion for a preliminary injunction and enjoined the Service's implementation of the final delisting rule (*Defenders of Wildlife, et al.,* v. *Hall, et al.,* 565 F.Supp.2d 1160 (D. Mont. 2008)). The court stated that we acted arbitrarily in delisting a wolf population that lacked evidence of natural genetic exchange between subpopulations. The court also stated that we acted arbitrarily and capriciously when we approved Wyoming's 2007 wolf management plan because the State failed to commit to managing for at least 15 breeding pairs, and Wyoming's 2007 statute allowed the Wyoming Game and Fish Commission (WGFC) to diminish the trophy game area if it ''determines the diminution does not impede the delisting of gray wolves and will facilitate Wyoming's management of wolves.'' In light of the court order, on September 22, 2008, we asked the court to vacate the final rule and remand it to us. On October 14, 2008, the court granted our request *(Defenders of Wildlife* v. *Hall,* 9:08–CV–00056–DWM (D. Mont 2008)). The court's rulings invalidated the February 2008 rule designating and delisting the NRM DPS.

Following the July 18, 2008 court ruling, we reexamined the NRM DPS and Wyoming's statutes, regulations, and management plan. This

reevaluation considered several issues not considered in the previous evaluation. We determined that the best scientific and commercial data available demonstrated that: (1) The NRM DPS was not threatened or endangered throughout ''all'' of its range (*i.e.,* not threatened or endangered throughout all of the DPS); and (2) the Wyoming portion of the range represented a significant portion of its range where the species remained in danger of extinction because of the inadequacy of existing regulatory mechanisms. Thus, on April 2, 2009, we published a final rule recognizing the NRM DPS and removing the DPS from the List of Endangered and Threatened Wildlife, except in Wyoming, where wolves continued to be regulated as a nonessential, experimental population under 50 CFR 17.84(i) and (n) (74 FR 15123). The decision to retain the Act's protections only in Wyoming was consistent with a March 16, 2007, Memorandum Opinion issued by the Solicitor of the Department of the Interior, ''The Meaning of 'In Danger of Extinction Throughout All or a Significant Portion of Its Range' '' (M–Opinion) (Department of the Interior 2007, in litt.). The final rule determined that Wyoming's existing regulatory framework did not provide the necessary regulatory mechanisms to assure that Wyoming's share of a recovered NRM wolf population would be conserved if the protections of the Act were removed and stated that, until Wyoming revised its statutes, regulations, and management plan, and obtained Service approval, wolves in Wyoming would remain protected by the Act (74 FR 15123, April 2, 2009).

The April 2009 rule (74 FR 15123, April 2, 2009) was challenged in the U.S. District Court for the District of Montana by environmental litigants and in the U.S. District Court for the District of Wyoming by the State of Wyoming, the Wyoming Wolf Coalition, and Park County, Wyoming. On August 5, 2010, the U.S District Court for Montana ruled on the merits of the case and vacated our April 2009 final rule (*Defenders of Wildlife, et al.* v. *Salazar, et al.,* 729 F. Supp.2d 1207 (D. Mont. 2010)). The court concluded that the NRM DPS must be listed or delisted in its entirety. The court rejected the rule's approach allowing protection of only a portion of the species' range because it was inconsistent with the Act's definition of ''species.'' (The Department of Interior withdrew the M-Opinion on this topic on May 4, 2011 (Department of the Interior 2011, in litt.)). Thus, before delisting could occur, Wyoming had to develop a regulatory framework that was determined by the Service to be adequate to maintain Wyoming's share of a recovered NRM gray wolf population. The court's ruling invalidated the April 2009 rule designating and delisting most of the NRM DPS.

On October 26, 2010, in compliance with the order of the U.S. District Court for Montana, we published a final rule notifying the public that the Federal protections in place prior to the 2009 delisting had been reinstated (75 FR 65574). Wolves in eastern Washington, eastern Oregon, northcentral Utah, the Idaho panhandle, and northern Montana were again listed as endangered. Former special rules designating the gray wolf in the remainder of Montana and Idaho as nonessential experimental populations were likewise reinstated. Additionally, the NRM gray wolf DPS established by the April 2, 2009, final rule was set aside. Because wolves in Wyoming were not delisted by the April 2, 2009 final rule, their listed status was not impacted by the October 26, 2010 rule.

Following the Montana District Court decision, the United States Congress passed, and President Obama signed, H.R. 1473, Public Law 112–10—The Department of Defense and Full Year Continuing Appropriations Act of 2011. Section 1713 of the law directed the Service to reissue its April 2009 delisting rule. The Service complied with this directive on May 5, 2011 (76 FR 25590). The constitutionality of H.R. 1473 was challenged by environmental plaintiffs (*Alliance for the Wild Rockies et al.,* v. *Salazar, et al.,* case no. CV 11–70–M–DWM). The United States District Court for Montana ruled on August 3, 2011, that the law was constitutional. This ruling was appealed to the Ninth Circuit (*Alliance for the Wild Rockies, et al.,* v. *Salazar, et al.,* case no. 11–35670). Plaintiffs also filed an emergency motion for injunction in order to stop Idaho's and Montana's planned fall 2011 hunts, which was denied. As of this writing, a decision on the appeal is pending.

As for the Wyoming challenge to the April 2009 partial delisting rule (74 FR 15123, April 2, 2009), a United States District Court for Wyoming ruled in favor of the three Wyoming plaintiffs on November 18, 2010 (*Wyoming et al.,* v. *U.S. Department of the Interior, et al.,* 2010 U.S. Dist. LEXIS 122829). The court rejected the Service position that recommended the entire State of Wyoming be designated as a trophy game area and found this position to be arbitrary and capricious, as it was not supported by the administrative record. The court concluded that the record indicated only northwestern Wyoming, which has the vast majority of the State's suitable habitat, was biologically essential to maintenance of the NRM population. However, the court did not render an opinion on whether Wyoming's current plan, including the proposed size and location of its 2007 trophy game area, was sufficient. Instead, the court remanded the matter to us to reconsider whether Wyoming's regulatory framework would maintain its share of a recovered wolf population and provide adequate genetic connectivity. Subsequent to this order, the Service and the State reinitiated negotiations on revisions to their wolf management framework that would satisfy the standards of the Act and allow delisting to again move forward. The results of this process led to development of a revised wolf management plan and are incorporated in this proposal.

Reengaging Wyoming and Changes to Their Wolf Management Plan

The April 2009 rule stated that ''until Wyoming revises their statutes, management plan, and associated regulations, and is again Service approved, wolves in Wyoming continue to require the protections of the Act'' (74 FR 15123, April 2, 2009). This rule specifically expressed concern over: (1) The size and permanency of Wyoming's Wolf Trophy Game Management Area (WTGMA); (2) conflicting language within the State statutes concerning whether Wyoming would manage for at least 15 breeding pairs and at least 150 wolves, exactly 15 breeding pairs and 150 wolves, or only 7 breeding pairs and 70 wolves; and (3) liberal depredation control authorizations and legislative mandates to aggressively manage the population down to minimum levels.

In early 2011, we began discussions with Wyoming seeking to develop a strategy for each of these issues. In August 2011, the Service and the State of Wyoming announced the framework of an agreement that we believe will allow us to delist wolves in Wyoming (WGFC 2011, appendix I). Following this announcement, Wyoming revised their 2008 wolf management plan (WGFC 2008, entire) to reflect the terms of this agreement (WGFC 2011, entire). Below we summarize the key points in the agreement relative to the three overarching Service concerns highlighted above.

First, this agreement commits Wyoming to make permanent the existing WTGMA. In total, Wyoming wolves will be permanently managed as game animals or protected (*e.g.,* in

National Parks) in about 40,000 km^2 (15,400 mi^2) in the northwestern portion of the State (15.7 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and the Wind River Indian Reservation (Lickfett 2011, in litt.). Wolves will be designated as predatory animals in the remainder of the State (predator area). The above protected and game areas (see Figure 1) include: 100 percent of the portion of the GYA recovery area within Wyoming (Service 1987, Figure 2); approximately 79 percent of the portion of the primary analysis area in Wyoming focused on by the 1994 reintroduction EIS (Service 1994, Figure 1.1); the entire home range for 24 of 27 breeding pairs in Wyoming and 24 of 34 packs in the State (Service *et al.* 2011, Figure 3); and approximately 76 percent of the State's suitable habitat as determined by Oakleaf *et al.* (2006, entire) (including 81 percent of the high-quality habitat (with an 80 percent or greater chance of supporting wolves) and 62 percent of the medium-high-quality habitat (with a 50 to 79 percent chance of supporting wolves) (Oakleaf 2011, in litt.)). This area is of sufficient size to support a recovered wolf population in Wyoming, under the management regime proposed for this area.

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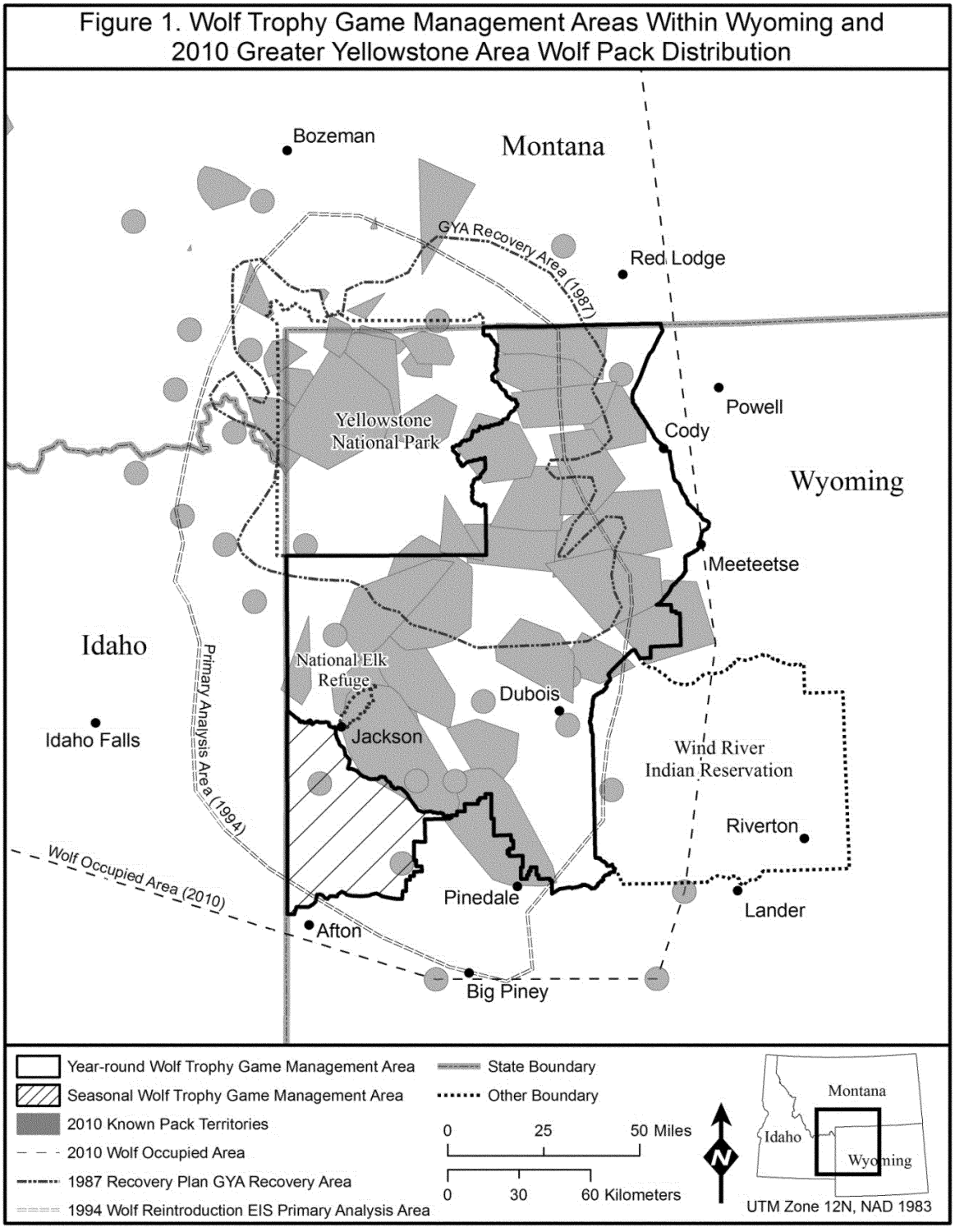

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The Service's prior concern that the size of the WTGMA would impact natural connectivity and genetic exchange was also addressed in the agreement. The agreement and the State's wolf management plan clearly articulate a goal for gene flow of at least one effective natural migrant per generation entering into the GYA, as measured over multiple generations (WGFC 2011, pp. 4, 9, 26–29, 54). To address our concerns about genetics and connectivity, Wyoming agreed to a seasonal expansion of the WTGMA. This seasonal adjustment expands the WTGMA approximately 80 kilometers (km) (50 miles (mi)) south for four and a half months during peak wolf dispersal periods (WGFC 2011, pp. 2, 8, 52). We believe this will benefit natural dispersal. Furthermore, Wyoming commits to an adaptive management approach that adjusts management if the above minimum level of gene flow is not documented, as well as to use human-assisted migration if necessary (WGFC 2011, pp. 26–29). Collectively, these measures will ensure that inbreeding depression resulting from

the loss of genetic diversity never threatens the population.

Next, Wyoming agreed to maintain a population of at least 10 breeding pairs and at least 100 wolves in areas under State jurisdiction (WGFC 2011, pp. 1–5, 16–26, 52). Importantly, this commitment does not reflect an intention by Wyoming Game and Fish Department (WGFD) to reduce the population down to this minimum population level. Rather, Wyoming intends to maintain an adequate buffer above minimum population objectives to accommodate management needs (the desire to hunt wolves annually) and ensure uncontrollable sources of mortality (such as disease or take in defense of property) do not drop the population below this minimum population level (WGFC 2011, p. 24). This management strategy will provide for the population's representation, resiliency, and redundancy (Shaffer and Stein 2000, entire) within the GYA as well as improve public acceptance for wolves outside YNP.

The wolf populations in YNP and on the lands of sovereign nations will provide an additional buffer above the minimum recovery goal intended by the step-down management objective of at least 15 breeding pairs and at least 150 wolves Statewide (see ''Recovery Planning and Implementation'' below for more information). From 2001 to the end of 2010, the wolf population in YNP ranged from 96 to 171 wolves, and between 6 to 16 breeding pairs, with an average of 9.8 breeding pairs. While a lower long-term future population level in YNP is predicted (Smith 2010, pers. comm.), YNP will always provide a large, secure wolf population providing a safety margin above the minimum recovery goal. The Wind River Indian Reservation typically contains a small number of wolves (single digits), which sometimes form packs that count toward Tribal population totals. On the whole, we expect the statewide wolf population in Wyoming will be maintained well above minimum recovery levels.

Another substantial improvement is Wyoming's management framework inside the WTGMA. For example, Wyoming has committed to remove current statutory mandates for aggressive management of wolves (WGFC 2011, pp. 24, 52). Current Wyoming law requires aggressive management until the population outside the National Parks falls to six breeding pairs or below. This issue was a major Service concern with Wyoming's existing law, and will be remedied.

Additionally, Wyoming agreed wolves in the permanent or seasonal WTGMA would never be treated as predatory animals (WGFC 2011, pp. 3, 16–17, 23). Existing State laws allow depredating wolves within the WTGMA to be treated as predatory animals under certain circumstances at the discretion of the State Fish and Game Commission (WGFC 2011, pp. 3, 16–17, 23). Wyoming has indicated an intention to modify W.S. 23–1–302(a)(ii) to ensure it does not apply to wolves in the WTGMA. This change is a substantial improvement over current Wyoming law that will help ensure that the wolf population in Wyoming (outside of YNP and the Wind River Indian Reservation) always remains at or above 10 breeding pairs and 100 individuals.

Furthermore, Wyoming intends to establish defense-of-property regulations that are similar to our nonessential experimental population rules (50 CFR 17.84(n)) (WGFC 2011, pp. 4, 22–23, 30–31, 53). Also, management of depredating wolves will be similar to Service management under the Act's protections (WGFC 2011, pp. 4, 22–23, 30–31, 53). Such rules were in place in Montana and Idaho prior to delisting and allowed continued population growth. These management approaches are an additional improvement over the framework Wyoming had in place for most of 2008.

These, and other improvements discussed in more detail below, have addressed the Service's concerns about wolf management in Wyoming and made this proposed delisting rule possible. Wyoming's wolf management plan was recently revised to reflect the new agreement (WGFC 2011, entire). However, conforming changes to Wyoming State law and WGFC regulations are also necessary to implement this plan. Wyoming recognizes statutory and regulatory changes will be required to implement this agreement and intends to pursue these changes. These changes will be made prior to any final decision that delists gray wolves in Wyoming.

Species Description and Basic Biology

Gray wolves (*Canis lupus*) are the largest wild members of the dog family (Canidae). Adult gray wolves range from 18–80 kilograms (kg) (40–175 pounds (lb)) depending upon sex and geographic region (Mech 1974, p. 1). In the NRM region, adult male gray wolves average just over 45 kg (100 lb), but may weigh up to 60 kg (130 lb). Females weigh about 20 percent less than males. Wolves' fur color is frequently a grizzled gray, but it can vary from pure white to coal black (Gipson *et al.* 2002, p. 821).

Gray wolves have a circumpolar range including North America, Europe, and Asia. As Europeans began settling the United States, they poisoned, trapped, and shot wolves, causing this once-widespread species to be eradicated from most of its range in the 48 conterminous States (Mech 1970, pp. 31–34; McIntyre 1995, entire). Gray wolf populations were eliminated from Montana, Idaho, and Wyoming, as well as adjacent southwestern Canada by the 1930s (Young and Goldman 1944, p. 414).

Wolves primarily prey on medium and large mammals. Wolf prey in the NRM region is composed mainly of elk (*Cervus canadensis*), white tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), and (in the GYA) bison (*Bison bison*). Bighorn sheep (*Ovis canadensis*), mountain goats (*Oreamnos americanus*), and pronghorn antelope (*Antilocapra americana*) also are common but less important, at least to date, as wolf prey.

Wolves normally live in packs of 2 to 12 animals. In the NRM region, pack sizes average 7 wolves but are slightly larger in protected areas. A few complex packs have been substantially bigger in some areas of YNP (Smith *et al.* 2006, p. 243; Service *et al.* 2011, Tables 1–3). Packs typically occupy large distinct territories from 518 to 1,295 square kilometers (km^2) (200 to 500 square miles (mi^2)) and defend these areas from other wolves or packs. Once a given area is occupied by resident wolf packs, it becomes saturated and wolf numbers become regulated by the amount of available prey, intra-species conflict, other forms of mortality, and dispersal. Dispersing wolves may cover large areas as they try to join other packs or attempt to form their own pack in unoccupied habitat (Mech and Boitani 2003, pp. 11–17).

Typically, only one male and female in each pack breed and produce pups (Packard 2003, p. 38; Smith *et al.* 2006, pp. 243–4; Service *et al.* 2011, Tables 1–3). Females and males typically begin breeding as 2-year-olds and may annually produce young until they are over 10 years old. In the NRM region, litters are typically born in mid to late April and range from 1 to 7 pups, but average around 5 pups (Service *et al.* 1989–2011, Tables 1–3). Most years, four pups survive until winter (Service *et al.* 1989–2011, Tables 1–3). Wolves can live 13 years (Holyan *et al.* 2005, p. 446), but the average lifespan in the NRM region is less than 4 years (Smith *et al.* 2006, p. 245). Pup production and survival can increase when wolf density is lower and food availability per wolf increases (Fuller *et al.* 2003, p. 186). Pack social structure is very adaptable and resilient. Breeding members can be

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

For detailed information on the biology of this species see the ''Biology and Ecology of Gray Wolves'' section of the April 1, 2003, final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States (2003 Reclassification Rule) (68 FR 15804).

Recovery Planning and Implementation

This section discusses recovery planning and implementation. Specifically, this section includes a detailed discussion of the recovery criteria including their development, continuous evaluation, and revision as necessary. Finally, this section includes our summary of progress towards recovery including an assessment of whether the criteria are met. This section discusses the entire NRM population because the recovery criteria apply to the entire population.

Recovery Planning and the Development of Recovery Criteria—Shortly after the gray wolf was listed, we formed the Interagency Wolf Recovery Team to complete a recovery plan for the NRM population (Service 1980, p. i; Fritts *et al.* 1995, p. 111). The NRM Wolf Recovery Plan (recovery plan) was approved in 1980 (Service 1980, p. i) and revised in 1987 (Service 1987, p. i). Recovery plans are not regulatory documents, but are instead intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, the Service may judge that the threats have been minimized sufficiently, and the species is robust enough to reclassify from endangered to threatened or to delist. In other cases, recovery opportunities may have been recognized that were not known at the time the recovery plan was finalized. These opportunities may be used instead of methods identified in the recovery plan. Likewise, information on the species may be learned that was not known at the time the recovery plan was finalized. The new information may change the extent that criteria need to be met for recognizing recovery of the species. 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.

The 1980 recovery plan's objective was to reestablish and maintain viable populations of the NRM wolf (*C. l. irremotus*) in its former range where feasible (Service 1980, p. iii). This plan did not include recovery goals (*i.e.*, delisting criteria). The 1980 plan covered an area similar to the NRM DPS, as it was once believed to be the range of the purported NRM wolf subspecies. It recommended that recovery actions be focused on the large areas of public land in northwestern Montana, central Idaho, and the GYA. The 1987 revised recovery plan (Service 1987, p. 57) concluded that the subspecies designations may no longer be valid and simply referred to gray wolves in the NRM region. Consistent with the 1980 plan, it also recommended focusing recovery actions on the large blocks on public land in the NRM region.

The 1987 plan specified a recovery criterion of a minimum of 10 breeding pairs of wolves (defined as 2 wolves of opposite sex and adequate age, capable of producing offspring) for a minimum of 3 successive years in each of 3 distinct recovery areas including: (1) Northwestern Montana (Glacier National Park; the Great Bear, Bob Marshall, and Lincoln Scapegoat Wilderness Areas; and adjacent public and private lands); (2) central Idaho (Selway-Bitterroot, Gospel Hump, Frank Church River of No Return, and Sawtooth Wilderness Areas; and adjacent, mostly Federal, lands); and (3) the YNP area (including the Absaroka-Beartooth, North Absaroka, Washakie, and Teton Wilderness Areas; and adjacent public and private lands). That plan recommended that wolf establishment not be promoted outside these distinct recovery areas, but it encouraged connectivity between recovery areas. However, no attempts were made to prevent wolf pack establishment outside of the recovery areas unless chronic conflict required resolution (Service 1994, pp. 1–15, 16; Service 1999, p. 2). Since completion of the 1987 recovery plan, we have expended considerable effort to develop, repeatedly reevaluate, and when necessary modify, the recovery goals (Service 1987, p. 12; Service 1994, Appendix 8 and 9; Fritts and Carbyn 1995, p. 26; Bangs 2002, p. 1; 73 FR 10514, February 27, 2008; 74 FR 15123, April 2, 2009, and this proposed rule).

The 1994 Environmental Impact Statement on The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho (EIS) reviewed wolf recovery in the NRM region and the adequacy of the recovery goals to assure that the 1987 goals were sufficient (Service 1994, pp. 6:68–78). We were particularly concerned about the 1987 definition of a breeding pair, since any male and female wolf are 'capable' of producing offspring and lone wolves may not have territories. We also believed the relatively small recovery areas identified in the 1987 plan greatly reduced the amount of area that could be used by wolves and would almost certainly eliminate the opportunity for meaningful natural demographic and genetic connectivity. We conducted a thorough literature review of wolf population viability analysis and minimum viable populations, reviewed the recovery goals for other wolf populations, surveyed the opinions of the top 43 wolf experts in North America (of which 25 responded), and incorporated our own expertise into a review of the NRM wolf recovery goal. We published our analysis in the EIS and a peer-reviewed paper (Service 1994, Appendix 8 & 9; Fritts and Carbyn 1995, pp. 26–38).

Our 1994 analysis concluded that the 1987 recovery goal was, at best, a minimum recovery goal, and that modifications were warranted on the basis of more recent information about wolf distribution, connectivity, and numbers. We also concluded ''Data on survival of actual wolf populations suggest greater resiliency than indicated by theory'' and theoretical treatments of population viability ''have created unnecessary dilemmas for wolf recovery programs by overstating the required population size'' (Fritts and Carbyn 1995, p. 26). Based on our analysis, we redefined a breeding pair as an adult male and an adult female wolf that have produced at least 2 pups that survived until December 31 of the year of their birth, during the previous breeding season. We also concluded that ''Thirty or more breeding pairs comprising some 300+ wolves in a metapopulation (a population that exists as partially isolated sets of subpopulations) with genetic exchange between subpopulations should have a high

probability of long-term persistence'' because it would contain enough individuals in successfully reproducing packs that were distributed over distinct but somewhat connected large areas, to be viable for the longterm (Service 1994, p. 6:75). We explicitly stated the required genetic exchange could occur by natural means or by human-assisted migration management and that dispersal of wolves between recovery areas was evidence of that genetic exchange (Service *et al.* 1994, Appendix 8, 9). In defining a ''Recovered Wolf Population'' we found ''in the northern Rockies a recovered wolf population is 10 breeding pairs of wolves in each of 3 areas for 3 successive years with some level of movement between areas'' (Service 1994, pp. 6–7). We further determined that a metapopulation of this size and distribution among the three areas of core suitable habitat in the NRM DPS would result in a wolf population that would fully achieve our recovery objectives.

For more than 15 years, we have concluded that movement of individuals between the metapopulation segments could occur either naturally or by human-assisted migration management (Service 1994, pp. 7–67). Specifically, the 1994 EIS stated ''The importance of movement of individuals between sub-populations cannot be overemphasized. The dispersal ability of wolves makes such movement likely, unless wolves were heavily exploited between recovery areas, as could happen in the more developed corridor between central Idaho and YNP. Intensive migration management might become necessary if 1 of the 3 sub-populations should develop genetic or demographic problems.'' (Service 1994, pp. 7–67). The finding went on to say that human-assisted migration should not be viewed negatively and would be necessary in other wolf recovery programs (Service 1994, pp. 7–67). Furthermore, we found that the 1987 wolf recovery plan's population goal of 10 breeding pairs of wolves in 3 separate recovery areas for 3 consecutive years was reasonably sound and would maintain a viable wolf population into the foreseeable future. We did caution that the numerical recovery goal was somewhat conservative, and should be considered minimal (Service 1994, pp. 6–75).

We conducted another review of what constitutes a recovered wolf population in late 2001 and early 2002 to reevaluate and update our 1994 analysis and conclusions (Service 1994, Appendix 9). We attempted to resurvey the same 43 experts we had contacted in 1994 as well as 43 other biologists from North America and Europe who were recognized experts about wolves and conservation biology. We asked experts with a wide diversity of perspectives to participate in our review. In total, 53 people provided their expert opinion regarding a wide range of issues related to the NRM recovery goal. We also reviewed a wide range of literature, including wolf population viability analyses from other areas (Bangs 2002, pp. 1–9).

Despite varied professional opinions and a great diversity of suggestions, experts overwhelmingly thought the recovery goal derived in our 1994 analysis was more biologically appropriate than the 1987 recovery plan's criteria for recovery and represented a viable and recovered wolf population. Reviewers also thought genetic exchange, either natural or human-facilitated, was important to maintaining the metapopulation configuration and wolf population viability. Reviewers also believed the proven ability of a breeding pair to show successful reproduction was a necessary component of a biologically meaningful breeding pair definition. Reviewers recommended other concepts/numbers for recovery goals, but most were slight modifications to those we recommended in our 1994 analysis. While experts strongly (78 percent) supported our 1994 conclusions regarding a viable wolf population, they also tended to believe that wolf population viability was enhanced by higher, rather than lower, population levels and longer, rather than shorter, demonstrated timeframes.

A common minority recommendation was an alternative goal of 500 wolves and 5 years. A slight majority of reviewers indicated that even the 1987 recovery goal of only 10 breeding pairs (defined as a male and female capable of breeding) in each of 3 distinct recovery areas may be viable, given the persistence of other small wolf populations in other parts of the world. The results of previous population viability analyses for other wolf populations varied widely, and as we had concluded in our 1994 analysis, reviewers in 2002 concluded theoretical results were strongly dependent on the variables and assumptions used in such models and conclusions often predicted different outcomes than actual empirical data had conclusively demonstrated. Based on that review, we reaffirmed our more relevant and stringent 1994 definition of wolf breeding pairs, population viability, and recovery (Service 1994, p. 6:75; Bangs 2002, pp. 1–9).

We measure the wolf recovery goal by the number of breeding pairs as well as by the number of wolves because wolf populations are maintained by packs that successfully raise pups. We use ''breeding pairs'' (packs that have at least one adult male and at least one adult female and that raised at least two pups until December 31) to describe successfully reproducing packs (Service 1994, p. 6:67; Bangs 2002, pp. 7–8; Mitchell *et al.* 2008, p. 881; Mitchell *et al.* 2010, p. 101). The breeding pair metric includes most of the important biological concepts in wolf conservation, including the potential disruption of human-caused mortality that might affect breeding success in social carnivores (Brainerd *et al.* 2008, p. 89; Wallach *et al.* 2009, p. 1; Creel and Rotella 2010, p. 1). Specifically, we thought it was important for breeding pairs to have: both male and female members together going into the February breeding season; successful occupation of a distinct territory (generally 500–1,300 km^2 (200–500 mi^2) and almost always in suitable habitat; enough pups to replace themselves; offspring that become yearling dispersers; at least four wolves following the point in the year with the highest mortality rates (summer and fall); all social structures and age classes represented within a wolf population; and adults that can raise and mentor younger wolves.

We also have determined that an equitable distribution of wolf breeding pairs and individual wolves among the three States and the three recovery zones is an essential part of achieving recovery. Like peer reviewers in 1994 and 2002, we concluded that NRM wolf recovery and long-term wolf population viability is dependent on its distribution as well as maintaining the minimum numbers of breeding pairs and wolves. While uniform distribution is not necessary, a well-distributed population with no one State/recovery area maintaining a disproportionately low number of packs or number of individual wolves is needed. This approach will maintain wolf distribution in and adjacent to all three recovery areas and most of the region's suitable habitat. Such an approach will facilitate natural connectivity.

Following the 2002 review of our recovery criteria, we began to use States, in addition to recovery areas, to measure progress toward recovery goals (Service *et al.* 2003–2011, Table 4). Because Montana, Idaho, and Wyoming each contain the vast majority of one of the original three core recovery areas, we determined the metapopulation structure would be best conserved by

equally dividing the overall recovery goal between the three States (73 FR 10514, February 27, 2008, p. 10522). This approach made each State's responsibility for wolf conservation fair, consistent, and clear. It avoided any possible confusion that one State might assume the responsibility for maintaining the required number of wolves and wolf breeding pairs in a shared recovery area that was the responsibility of the adjacent State. State regulatory authorities and traditional management of resident game populations occur on a State-by-State basis. We determined that management by State would still maintain a robust wolf population in each core recovery area because they each contain manmade or natural refugia from human-caused mortality (*e.g.,* National Parks, wilderness areas, and remote Federal lands) that guarantee those areas remain the stronghold for wolf breeding pairs and source of dispersing wolves in each State. Recovery targets by State promote connectivity and genetic exchange between the metapopulation segments by avoiding management that focuses solely on wolf breeding pairs in relatively distinct core recovery areas. This approach also will increase the numbers of potential wolf breeding pairs in the GYA because it is shared by all three States. A large and well-distributed population within the GYA is especially important because it is the most isolated recovery segment within the NRM DPS (Oakleaf *et al.* 2005, p. 554; vonHoldt *et al.* 2007, p. 19) and the southern tip of a larger western gray wolf population that now contains more than 14,000 wolves when combined with western Canada (Boitani 2003, p. 322).

The numerical component of the recovery goal represents the minimum number of breeding pairs and individual wolves needed to achieve and maintain recovery. To ensure that the NRM wolf population always exceeds the recovery goal of 30 breeding pairs and 300 wolves, we required that each State manage for at least 15 breeding pairs and at least 150 wolves in mid-winter in accordance with a step-down management objective. This 50 percent safety margin above minimum recovery levels was intended to provide an adequate safety margin recognizing that all wildlife populations, including wolves, can fluctuate widely over a relatively short period of time. Managing for a buffer above the minimum recovery target is consistent with our 1994 determination that the addition of a few extra pairs would add security to the population and should be considered in the post-EIS management planning (Service 1994, pp. 6–75). Additionally, because the recovery goal components are measured in mid-winter when the wolf population is near its annual low point, the average annual wolf population will be higher than these minimal goals.

Because Wyoming, unlike Montana and Idaho, has a large portion of its wolf population in areas outside the State's control (*e.g.,* YNP and the Wind River Indian Reservation), we developed an alternative approach for Wyoming to achieve the desired safety margin above the minimum recovery goal. Specifically, we determined that at least 10 breeding pairs and at least 100 wolves at mid-winter in Wyoming outside YNP and the Wind River Indian Reservation will satisfy Wyoming's contribution to NRM gray wolf recovery. Under this approach, the wolf populations in YNP and the Wind River Indian Reservation will provide the remaining buffer above the minimum recovery goal intended by the step-down management objective employed in Montana and Idaho (*i.e.,* population targets 50 percent above minimum recovery levels).

Wyoming's wolf population will be further buffered because WGFD intends to maintain an adequate buffer above minimum population objectives to accommodate management needs and ensure uncontrollable sources of mortality do not drop the population below the 10 breeding pair and 100 wolf minimum population level. The State of Wyoming is also committed to coordinate with YNP and the Wind River Indian Reservation to contribute to the step-down recovery target of at least 15 breeding pairs and at least 150 wolves statewide, including YNP and the Wind River Indian Reservation. In our view, this alternative approach to the step-down wolf population target in Wyoming is biologically superior to a single statewide standard in that: It provides population stability outside the park, minimizing the chances of a bad year in YNP compromising maintenance of the recovery goal (such a scenario is described in our 2009 delisting rule's analysis of Wyoming's 2007 wolf plan (74 FR 15123, April 2, 2009)); It adds an extra layer of representation, resiliency, and redundancy to the Greater Yellowstone Area's gray wolf population; and it builds public acceptance for a minimum wolf population outside YNP.

To summarize, based on the information above, the current recovery goal for the NRM gray wolf population is: Thirty or more breeding pairs (an adult male and an adult female that raise at least 2 pups until December 31) comprising 300+ wolves well-distributed between Montana, Idaho, and Wyoming functioning as a metapopulation (a population that exists as partially isolated sets of subpopulations) with genetic exchange (either natural or, if necessary, agency-managed) between subpopulations. This overarching NRM recovery goal is stepped-down by State. The step-down recovery target requires Montana and Idaho to each maintain at least 10 breeding pairs and at least 100 wolves by managing for a safety margin of at least 15 breeding pairs and at least 150 wolves in mid-winter. In Wyoming, the step-down recovery target is at least 10 breeding pairs and at least 100 wolves primarily within the State's jurisdiction while the YNP and the Wind River Indian Reservation provide the remainder of the buffer above the minimum recovery goal. Our recovery and post-delisting management goals were designed to provide the NRM gray wolf population with sufficient representation, resilience, and redundancy for their long-term conservation. After evaluating all available information, we conclude that the best scientific and commercial information available indicates the population will remain viable following delisting if the recovery targets continue to be met.

Monitoring and Managing Recovery—In 1989, we formed an Interagency Wolf Working Group (Working Group) composed of Federal, State, and Tribal agency personnel (Bangs 1991, p. 7; Fritts *et al.* 1995, p. 109; Service *et al.* 1989–2009, p. 1). The Working Group conducted four basic recovery tasks (Service *et al.* 1989–2009, pp. 1–2), in addition to the standard enforcement functions associated with the take of a listed species. These tasks were: (1) Monitor wolf distribution and numbers; (2) control wolves that attacked livestock by moving them, conducting other nonlethal measures, or by killing them (Bangs *et al.* 2006, p. 7); (3) conduct research and publish scientific publications on wolf relationships to ungulate prey, other carnivores and scavengers, livestock, and people; and (4) provide accurate science-based information to the public and mass media so that people could develop their opinions about wolves and wolf management from an informed perspective.

The size and distribution of the wolf population is estimated by the Working Group each year and, along with other information, is published in an interagency annual report (Service *et al.*

1989–2009, Table 4, Figure 1). Since the early 1980s, the Service and our cooperating partners have radio-collared and monitored approximately 2,000 wolves in the NRM region to assess population status, conduct research, and to reduce/resolve conflict with livestock. The Working Group's annual population estimates represent the best scientific and commercial data available regarding year-end NRM gray wolf population size and trends, as well as distributional and other information.

Recovery by State—At the end of 2000, the NRM population first met its overall numerical and distributional recovery goal of a minimum of 30 breeding pairs and more than 300 wolves well-distributed among Montana, Idaho, and Wyoming (68 FR 15804, April 1, 2003; Service *et al.* 2011, Table 4). Because the recovery goal must be achieved for 3 consecutive years, the temporal element of recovery was not achieved until the end of 2002 when 663 wolves and 49 breeding pairs were present (Service *et al.* 2003, Table 4). By the end of 2010, the NRM wolf population achieved its numerical and distributional recovery goal for 11 consecutive years (Service *et al.* 2001–2008, Table 4; 68 FR 15804, April 1, 2003; 71 FR 6634, February 8, 2006). By the end of 2010, the NRM gray wolf population included approximately 1,651 wolves (566 in Montana; 705 in Idaho; 343 in Wyoming; 16 in eastern Washington; 21 in eastern Oregon) in 111 breeding pairs (35 in Montana; 46 in Idaho; 27 in Wyoming; 1 in Washington; 2 in Oregon). Distribution at the end of 2010 is illustrated in Figure 2. Population trends through the end of 2010 are illustrated in Figure 3.

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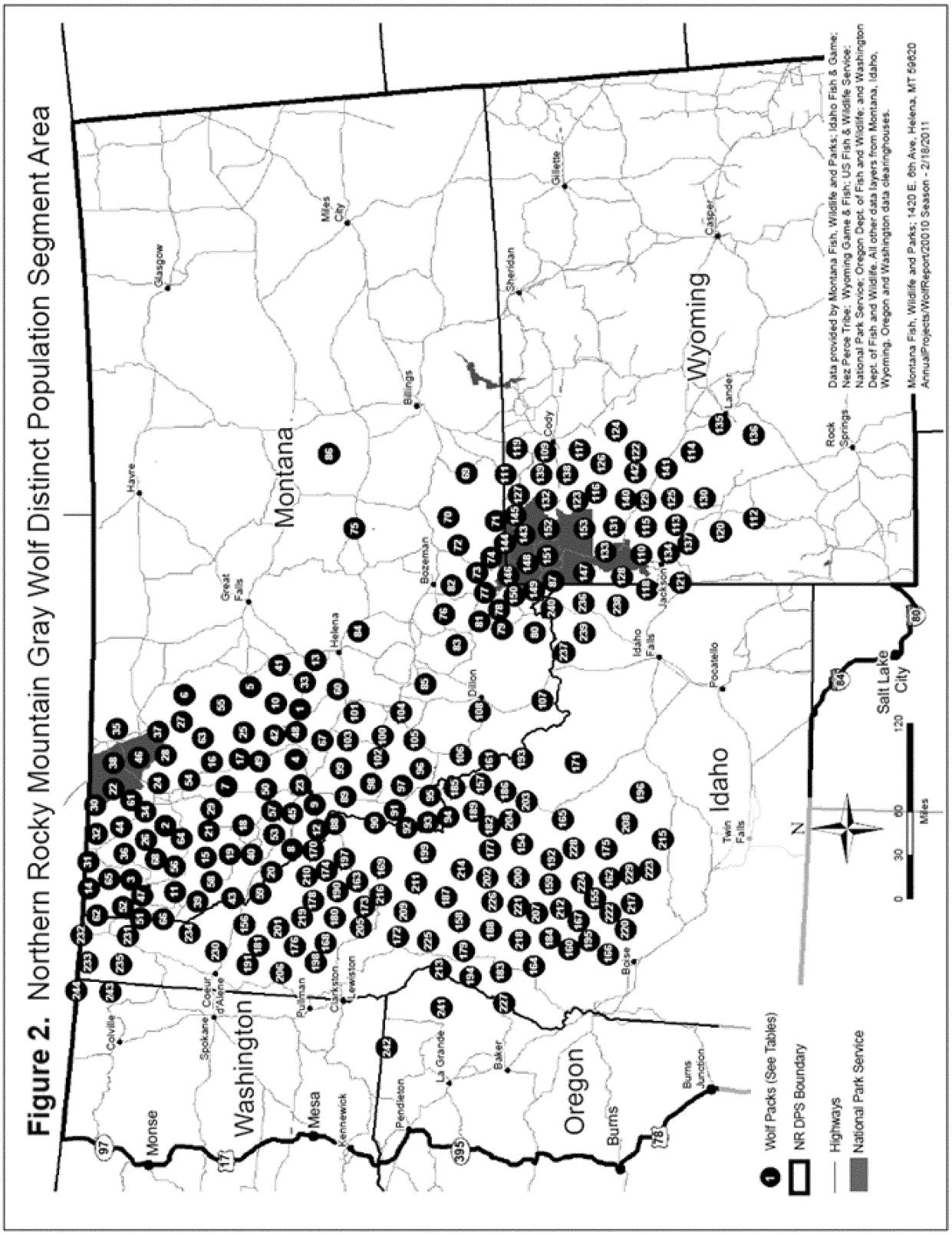
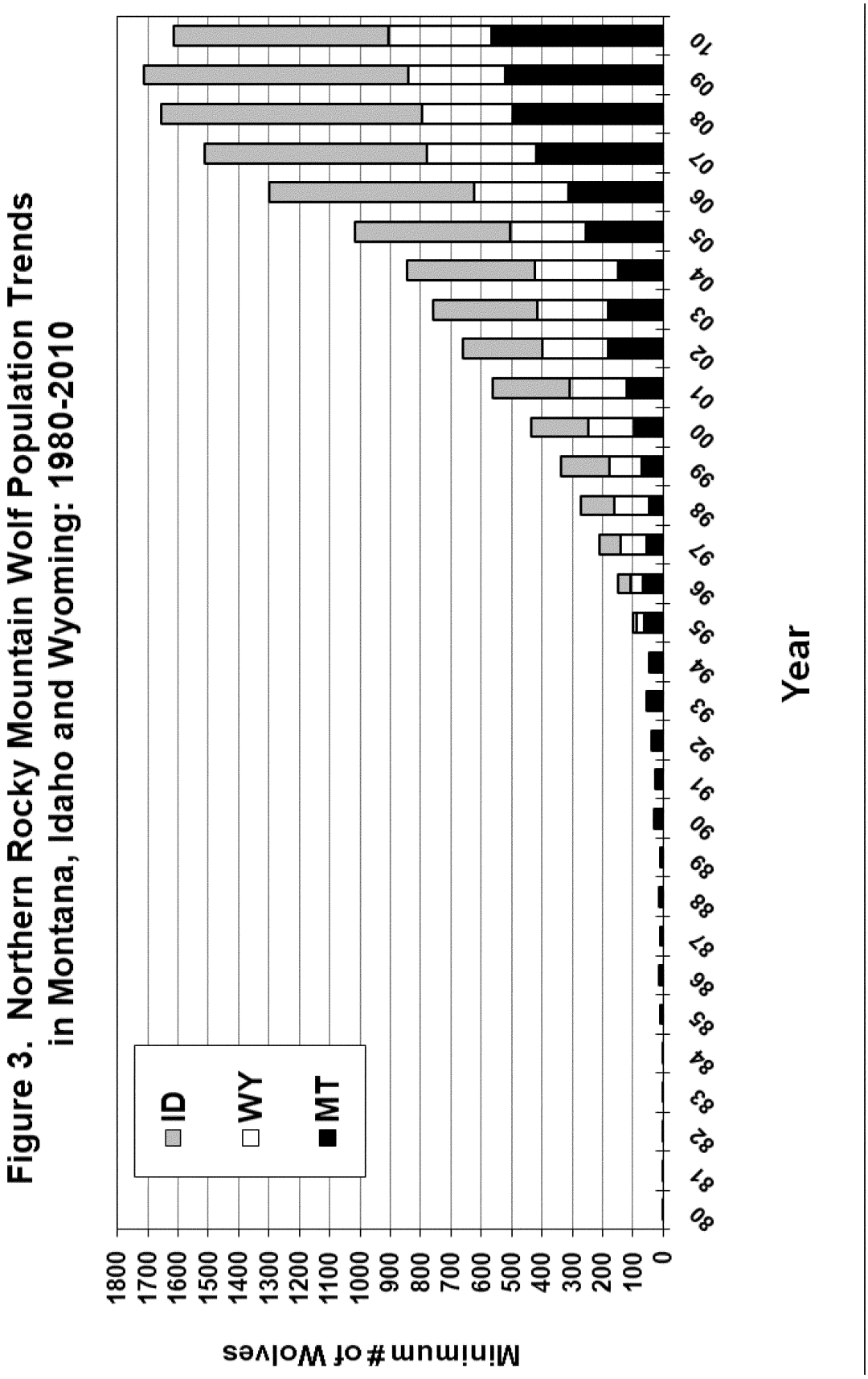


Figure 2. Northern Rocky Mountain Gray Wolf Distinct Population Segment Area
Montana
Wyoming
Idaho
Washington
Oregon
Glasgow
Miles City
Gillette
Sheridan
Casper
Havre
Billings
Cody
Lander
Great Falls
Bozeman
Rock Springs
Helena
Dillon
Idaho Falls
Pocatello
Salt Lake City
Twin Falls
Boise
Colville
Spokane
Coeur d'Alene
Pullman
Clarkston
Lewiston
Mesa
Kennewick
Pendleton
La Grande
Baker
Burns
Burns Junction
Monse
Wolf Packs (See Tables)
NR DPS Boundary
Highways
National Park Service
Miles
Data provided by Montana Fish, Wildlife and Parks; Idaho Fish & Game; Nez Perce Tribe; Wyoming Game & Fish; US Fish & Wildlife Service; National Park Service; Oregon Dept. of Fish and Wildlife; and Washington Dept. of Fish and Wildlife. All other data layers from Montana, Idaho, Wyoming, Oregon and Washington data clearinghouses.
Montana Fish, Wildlife and Parks; 1420 E. 6th Ave, Helena, MT 59620
Annual/Projects/WolfReport/20010 Season - 2/18/2011



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Recovery by Recovery Area—As discussed previously, after the 2002 peer review of the wolf recovery efforts, we began using States, in addition to recovery areas, to measure progress toward recovery goals (Service *et al.* 2003–2011, Table 4). However, because the 1987 Recovery Plan (Service 1987, pp. v, 12, 23) included goals for core recovery areas we have included the following discussion on the history of the recovery efforts and status of these core recovery areas, including how the wolf population's distribution and metapopulation structure is important to maintaining its viability and how the biological characteristics of each core recovery area differ (Service *et al.* 2011, Table 4).

The Northwestern Montana Recovery Area's 84,800 km² (33,386 mi²) includes: Glacier National Park; the Great Bear, Bob Marshall, and Lincoln Scapegoat Wilderness Areas; and adjacent public and private lands in northern Montana and the northern Idaho panhandle. Wolves in this recovery area were listed and managed as endangered species. Wolves naturally recolonized this area from Canada. Reproduction first occurred in northwestern Montana in 1986 (Ream *et al.* 1989, entire). The natural ability of wolves to find and quickly recolonize empty habitat (Mech and Boitani 2003, pp. 17–19), the interim control plan (Service 1988, 1999, entire), and the interagency recovery program combined to effectively promote an increase in wolf numbers (Bangs 1991, pp. 7–13). By 1996, the number of wolves had grown to about 70 wolves in 7 known breeding pairs. However, from 1996 through 2004, the estimated number of breeding pairs and wolves in northwestern Montana fluctuated at a low level, partly due to actual population size and partly due to limited monitoring effort. However, since 2005, it has steadily increased (Service *et al.* 2011, Table 4). In 2010, we estimated 374 wolves in 24 breeding pairs in the northwestern Montana recovery area (Service *et al.* 2011, Table 4).

The Northwestern Montana Recovery Area has sustained fewer wolves than the other recovery areas because there is less suitable habitat and it is more fragmented (Oakleaf *et al.* 2005. p. 560; Smith *et al.* 2010, p. 622). Some of the variation in our wolf population estimates for northwestern Montana is also due to the difficulty of counting wolves in the area's thick forests. Wolves in northwestern Montana also prey mainly on white-tailed deer, resulting in smaller packs and territories, which lower the chances of detecting a pack (Bangs *et al.* 1998, p. 878). Increased monitoring efforts in northwestern Montana by Montana Fish, Wildlife and Parks (MFWP) since 2005 were likely responsible for more accurate population estimates. Wolf numbers in 2003 and 2004 also likely exceeded 10 breeding pairs and 100 wolves, but were not documented simply due to less intensive monitoring those years (Service *et al.* 2011, Table 4). By the end of 2010, this recovery area contained more than 10 breeding pairs and 100 wolves for the sixth consecutive year (2005–2010), and probably did so the last 9 years (2002–2010) (Service *et al.* 2011, Table 4).

Routine dispersal of wolves has been documented among northwestern Montana, central Idaho, and adjacent Canadian populations demonstrating that northwestern Montana's wolves are demographically and genetically linked to both the wolf population in Canada and in central Idaho (Pletscher *et al.* 1991, pp. 547–548; Boyd and Pletscher 1999, pp. 1105–1106; Sime 2007, p. 4; vonHoldt *et al.* 2010, p. 4412; Jimenez *et al.* 2011, p. 1). Because of fairly contiguous but fractured suitable habitat, wolves dispersing into northwestern Montana from both directions will continue to join or form new packs and supplement this segment of the overall wolf population (Forbes and Boyd 1996, p. 1082; Forbes and Boyd 1997, p. 1226; Boyd *et al.* 1995, p. 140; vonHoldt *et al.* 2007, p. 19; vonHoldt *et al.* 2010; Thiessen 2007, p. 50; Sime 2007, p. 4, Jimenez *et al.* 2011, p. 1).

Unlike YNP or the central Idaho Wilderness complex, northwestern Montana lacks a large core refugium that contains large numbers of overwintering wild ungulates and few livestock. Therefore, wolf numbers may not ever be as high in northwestern Montana as they are in the central Idaho or the GYA recovery areas. However, that population segment has persisted for nearly 20 years, is robust today, and habitat there is capable of supporting hundreds of wolves (Service *et al.* 2011, Table 4). State management, pursuant to the Montana State wolf management plan (2003), will ensure this population segment continues to thrive (see Factor D).

The Central Idaho Recovery Area's 53,600 km² (20,700 mi²) includes: The Selway-Bitterroot, Gospel Hump, Frank Church River of No Return, and Sawtooth Wilderness Areas; adjacent, mostly Federal lands, in central Idaho; and adjacent parts of southwestern Montana (Service 1994, p. iv). In January 1995, 15 young adult wolves from Alberta, Canada, were released in central Idaho (Bangs and Fritts 1996, p. 409; Fritts *et al.* 1997, p. 7). In January 1996, an additional 20 wolves from British Columbia were released (Bangs *et al.* 1998, p. 787). Central Idaho contains the greatest amount of highly suitable wolf habitat compared to either northwestern Montana or the GYA (Oakleaf *et al.* 2005, p. 559). Consequently, the central Idaho area population has grown substantially and expanded its range since reintroduction. As in the Northwestern Montana Recovery Area, some of the Central Idaho Recovery Area's increase in its wolf population estimate beginning in 2005 was likely due to an increased monitoring effort by Idaho Department of Fish and Game (IDFG). In 2010, the population appears to have declined, but some of the estimated decline was likely due to difficult monitoring conditions in the most remote and inaccessible areas of central Idaho. We estimated 739 wolves in 47 breeding pairs in the central Idaho recovery area at the end of 2010 (Service *et al.* 2011, Table 4). This recovery area has contained at least 10 breeding pairs and 100 wolves for 13 consecutive years (1998–2010) (Service *et al.* 2011; Table 4).

The GYA recovery area (63,700 km² (24,600 mi²)) includes portions of southeastern Montana, eastern Idaho, and northwestern Wyoming. Portions of Wyoming that are occupied by wolves (Figure 1 above) include: most of YNP, Grand Teton National Park, and John D. Rockefeller Memorial Parkway; the Absaroka Beartooth, Bridger, Fitzpatrick, Gros Ventre, Jedediah Smith, North Absaroka, Popo Agie, Teton, Washakie, and Winegar Hole Wilderness Areas; the Dubois Badlands, Owl Creek, Scab Creek, and Whiskey Mountain Wilderness Study Areas; and adjacent public and private lands (Service 1994, p. iv). Much of the wilderness portions of the GYA are primarily used seasonally by wolves due to high elevation, deep snow, and low productivity (in terms of sustaining year-round wild ungulate populations) (Service *et al.* 2011, Figure 3). In 1995, 14 wolves representing 3 family groups from Alberta were released in YNP (Bangs and Fritts 1996, p. 409; Fritts *et al.* 1997, p. 7; Phillips and Smith 1996, pp. 33–43). In 1996, this procedure was repeated with 17 wolves representing 4 family groups from British Columbia. Finally, 10 pups were removed from northwestern Montana in a wolf control action and released in YNP in the spring of 1997 (Bangs *et al.* 1998, p. 787). Two of these pups became breeding adults and their genetic signature is common

both in YNP and the GYA (VonHoldt *et al.* 2008, entire; vonHoldt *et al.* 2010, p. 4421). We estimated 501 wolves were in 37 breeding pairs in the GYA at the end of 2010 (Service *et al.* 2011, Table 4). By the end of 2010, this recovery area had at least 10 breeding pairs and 100 wolves for 11 consecutive years (2000–2010) (Service *et al.* 2011, Table 4).

Wolf numbers in the GYA were relatively stable from 2007 through 2009, as were breeding pairs (Service *et al.* 2011, Table 4). The GYA population grew to 501 wolves and 37 breeding pairs in 2010, primarily because numbers of wolves outside YNP in Wyoming grew while wolves in YNP have declined from 171 wolves in 16 known breeding pairs in 2004 to 97 wolves in 7 breeding pairs in 2010 (Service *et al.* 2005, 2011, Tables 2, 4). This decline likely occurred because: (1) Highly suitable habitat in YNP was saturated with wolf packs; (2) conflict among packs appeared to limit population density; (3) fewer elk occur in YNP than when reintroduction took place (White and Garrott 2006, p. 942; Vucetich *et al.* 2005, p. 259); and (4) suspected outbreaks of disease in 2005 and 2008 (canine distemper (CD) or possibly canine parvovirus (CPV)) reduced pup survival to 20 percent) (Service *et al.* 2006, 2009, 2011, Table 2; Smith *et al.* 2006, p. 244; Smith and Almberg 2007, pp. 17–20: Almberg *et al.* 2010, p. 2058). Since 2008, YNP has also seen a relatively high number of wolves killing other wolves and a high mortality rate among pups. YNP predicts wolf numbers in YNP may decline further and settle into a lower equilibrium long term (Smith 2010, pers. comm.). Additional significant growth in the National Park and Wilderness portions of the Wyoming wolf population above 150 wolves is unlikely because suitable wolf habitat is saturated with resident wolf packs. Maintaining wolf populations safely above recovery levels and promoting demographic and genetic exchange in the GYA segment of the NRM DPS will depend on wolf packs living outside the National Park and Wilderness portions of northwestern Wyoming and southwestern Montana (vonHoldt *et al.* 2010, p. 4422).

Genetic Exchange Relative to our Recovery Criteria—Finally, as noted above, the recovery criteria requires the NRM DPS function as a metapopulation (a population that exists as partially isolated sets of subpopulations) with genetic exchange between subpopulations. The available data conclusively demonstrate that this portion of the recovery criteria (*i.e.,* ''genetic exchange'') is met. Specifically, vonHoldt *et al.* (2010, p. 4412) demonstrated 5.4 effective migrants per generation among all three subpopulations from 1995 through 2004 when the NRM region contained between 101 and 846 wolves. This issue is discussed further in Factor E below.

Conclusion on Progress Towards our Recovery Goals—Given the above best available scientific and commercial information, we consider all prongs of the recovery criteria met. The numeric and distributional components of the overarching recovery goal has been exceeded for 11 consecutive years. Furthermore, Montana, Idaho, and Wyoming have each individually met or exceeded the minimum per-State recovery targets every year since at least 2002 and met or exceeded the step-down management goals every year since at least 2004. It is also worth noting that each of the recovery areas (which were originally used to measure progress towards recovery) have been documented at or above 10 breeding pairs and 100 wolves every year since 2005 (and probably exceeded these levels every year since 2002) (Service *et al.* 2011, Table 4). Finally, the available evidence demonstrates that the NRM gray wolf population is functioning as a metapopulation with robust levels of gene flow between subpopulations. Thus, we consider the population recovered.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR part 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five 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 must consider these same five factors in delisting decisions (50 CFR 424.11(d)). However, in delisting decisions, this analysis of threats is an evaluation of both the threats currently facing the species and the threats that are reasonably likely to affect the species in the foreseeable future following the delisting and the removal or reduction of the Act's protections.

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

Given the above, the following analysis examines the five factors affecting, or likely to affect, Wyoming wolves within the foreseeable future. This analysis includes a discussion of the larger GYA or NRM metapopulation, which is necessary to understand impacts to wolves in Wyoming.

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

This analysis evaluates the entire State of Wyoming, and within Wyoming we focus primarily on suitable habitat, currently occupied areas, and the WTGMA. Within Wyoming, we also examine unsuitable habitat. Habitat suitability is based on biological features that impact the ability of wolf packs to persist. Outside of Wyoming, this analysis looks at areas between the three recovery areas to inform our understanding of current and future connectivity, with particular focus on the central Idaho to GYA dispersal corridor. We analyze a number of potential threats to wolf habitat including increased human populations and development (including oil and gas), connectivity, ungulate populations, and livestock grazing.

Suitable Habitat—Wolves once occupied or transited all of Wyoming. However, much of the wolf's historical range within this area has been modified for human use. While lone wolves can travel through, or temporarily live, almost anywhere (Jimenez *et al.* 2011, p. 1), much of Wyoming is no longer suitable habitat to

support wolf packs and wolf breeding pairs (Oakleaf *et al.* 2006, p. 559; Carroll *et al.* 2006, p. 32). We have reviewed the quality, quantity, and distribution of habitat relative to the biological requirements of wolves. In doing so, we reviewed two models, Oakleaf *et al.* (2006, pp. 555–558) and Carroll *et al.* (2003, pp. 536–548; 2006, pp. 27–31), to help us gauge the current amount and distribution of suitable wolf habitat in Wyoming. Both models ranked habitat as ''suitable'' if they had characteristics that indicated they might have a 50 percent or greater chance of supporting wolf packs. Suitable wolf habitat was typically characterized in both models as public land with mountainous, forested habitat that contains abundant year-round wild ungulate populations, low road density, low numbers of domestic livestock that are only present seasonally, few domestic sheep, low agricultural use, and few people. Unsuitable wolf habitat was typically just the opposite (*i.e.,* private land, flat open prairie or desert, low or seasonal wild ungulate populations, high road density, high numbers of year-round domestic livestock including many domestic sheep, high levels of agricultural use, and many people). Despite their similarities, these two models had differences in the area analyzed, layers, inputs, and assumptions. As a result, the Oakleaf *et al.* (2006, p. 559) and Carroll *et al.* (2006, p. 33) models predicted different amounts of theoretically suitable wolf habitat in areas examined by both models.

Oakleaf's model was a more intensive effort that looked at potential wolf habitat in the NRM region (Oakleaf *et al.* 2005, p. 555). To comprise its geographic information system layers, the model used roads accessible to two-wheel and four-wheel vehicles, topography (slope and elevation), land ownership, relative ungulate density (based on State harvest statistics), cattle (*Bos sp.*) and sheep density, vegetation characteristics (ecoregions and land cover), and human density. Oakleaf analyzed the characteristics of areas occupied and not occupied by NRM wolf packs through 2000 to predict what other areas in the NRM region might be suitable or unsuitable for future wolf pack formation (Oakleaf *et al.* 2005, p. 555). In total, Oakleaf *et al.* (2006, p. 559) ranked 28,725 km^2 (11,091 mi^2) as suitable wolf habitat in Wyoming.

Carroll's model analyzed a much larger area (all 12 western States and northern Mexico) in a less specific way than Oakleaf's model (Carroll *et al.* 2006, pp. 27–31). Carroll's model used density and type of roads, human population density and distribution, slope, and vegetative greenness to estimate relative ungulate density to predict associated wolf survival and fecundity rates (Carroll *et al.* 2006, p. 29). These factors were used to develop estimates of habitat theoretically suitable for wolf pack persistence. In addition, Carroll predicted the potential effect of increased road development and human density expected by 2025 on suitable wolf habitat (Carroll *et al.* 2006, pp. 30–31). In total, Carroll *et al.* (2006, pp. 27–31) ranked 77,202 km^2 (29,808 mi^2) in Wyoming as suitable habitat. According to the Carroll model, approximately 30 percent of Wyoming would be ranked as suitable wolf habitat (Carroll *et al.* 2006, pp. 27–31).

The Carroll *et al.* (2006, pp. 31–34) model tended to be more generous than the Oakleaf (*et al.* 2006, pp. 558–560) model in identifying suitable wolf habitat. Based on empirical wolf data over our 17 years of experience in Wyoming, we have determined Oakleaf's projections were more realistic. However, due to the large area analyzed, Carroll's model provided a valuable relative measure across the western United States upon which comparisons could be made. The Carroll model did not incorporate livestock density into its calculations as the Oakleaf model did (Carroll *et al.* 2006, pp. 27–29; Oakleaf *et al.* 2005, p. 556). Thus, that model did not consider those conditions where wolf mortality is high and habitat unsuitable because of chronic conflict with livestock. A growing body of literature suggests, per individual, wolves cause more economic damage to livestock than any other large predator in North America (Oakleaf *et al.* 2003, p. 299; Collinge 2008, p. 129; Ashcroft *et al.* 2009, p. 1; Muhly *et al.* 2010, p. 1243; Sommers *et al.* 2010, p. 1425; Breck *et al.* 2011, p. 1). During the past 17 years, Wyoming wolf packs have been unable to persist in areas intensively used for livestock production, primarily because of agency control of problem wolves and illegal killing.

Many of the more isolated primary habitat patches that the Carroll model predicted as currently suitable were predicted to be unsuitable by the year 2025, indicating they were likely on the lower end of what ranked as suitable habitat in that model (Carroll *et al.* 2006, p. 32). Because these areas were typically too small to support breeding pairs and too isolated from the core population to receive enough dispersing wolves to overcome high mortality rates, we do not believe these areas are currently suitable habitat based upon our data on Wyoming wolf pack persistence for the past 17 years (Bangs 1991, p. 9; Bangs *et al.* 1998, p. 788; Service *et al.* 1999–2011, Figure 1).

Despite differences in each model's analysis area, layers, inputs, and assumptions, both models predicted that most suitable wolf habitat in Wyoming was in the GYA, which is the area currently occupied by wolves in Wyoming. These models are useful in understanding the relative proportions and distributions of various habitat characteristics and their relationships to wolf pack persistence. Both models generally support our earlier predictions about wolf habitat suitability in the GYA (Service 1980, p. 9; 1987, p. 7; 1994, p. vii). Because theoretical models only define suitable habitat as those areas that have characteristics with a 50 percent or greater probability of supporting wolf packs, the acreages of suitable habitat that they indicate can be successfully occupied are only estimates.

The Carroll *et al.* (2006, p. 25) model also indicated that the GYA and neighboring population centers had habitat suitable for dispersal between them, and such habitat would remain relatively intact in the future. However, the GYA is the most isolated (Oakleaf *et al.* 2005, p. 554). This conclusion is supported by dispersal and genetic exchange data (vonHoldt *et al.* 2010, p. 4420; Jimenez *et al.* 2011, p. 1). Collectively, the NRM DPS's three core areas are surrounded by large areas of habitat unsuitable for pack persistence (Service *et al.* 1999–2011, Figure 1). We note that some surrounding habitat that is considered unsuitable for pack persistence is still important for maintaining effective migration through natural dispersal.

Overall, we evaluated data from a number of sources on the location of suitable wolf habitat in developing our estimate of currently suitable wolf habitat. Specifically, we considered the recovery areas identified in the 1987 wolf recovery plan (Service 1987, p. 23), the primary analysis areas analyzed in the 1994 EIS for the GYA (63,700 km^2 (24,600 mi^2) (Service 1994, p. iv), information derived from theoretical models by Carroll *et al.* (2006, p. 25) and Oakleaf *et al.* (2006, p. 554), our 17 years of field experience managing wolves in Wyoming, and locations of persistent wolf packs and breeding pairs since recovery has been achieved (Service *et al.* 1999–2011, Figure 1). Collectively, this evidence leads us to concur with the Oakleaf *et al.* (2006, p. 559) model's predictions that the most important habitat attributes for wolf pack persistence are forest cover, public land, high elk density, and low livestock

density. Therefore, we believe that Oakleaf's calculations of the amount and distribution of suitable wolf habitat available for persistent wolf pack formation, in the parts of Wyoming analyzed, represents the most scientifically accurate prediction of suitable wolf habitat in Wyoming (Oakleaf *et al.* 2006, p. 559).

Generally, Wyoming's suitable habitat is located in the northwestern portion of the State. A comparison of actual wolf pack distribution in 2009 and 2010 (Service *et al.* 2010; 2011, Figure 1) to Oakleaf *et al.'s* (2006, p. 559) prediction of suitable habitat, indicates that nearly all suitable habitat in Wyoming is currently occupied and areas predicted to be unsuitable remain largely unoccupied. Of note, the permanent WTGMA (the only portion of Wyoming predicted to have resident wolf packs post-delisting) contains 76 percent of the suitable habitat in Wyoming, which includes 81 percent of Wyoming's high-quality habitat (greater than 0.8) and 62 percent of Wyoming' medium-high-quality habitat (0.5–0.799) (Oakleaf 2011, in litt.).

Although Carroll determined there may be some additional suitable wolf habitat in Wyoming beyond the area Oakleaf analyzed, we believe it is marginally suitable at best, and is insignificant to NRM DPS, GYA, or Wyoming wolf population recovery, because it occurs in small, isolated, and fragmented areas and is unlikely to support many, if any, persistent breeding pairs. While some areas in Wyoming predicted to be unsuitable habitat by the above models have been temporarily occupied and used by wolves or even packs, we still consider these areas as largely unsuitable habitat because wolf packs in such areas have failed to persist long enough to be categorized as breeding pairs and successfully contribute toward recovery. Therefore, we consider such areas as unsuitable habitat and conclude that dispersing wolves attempting to colonize those areas are unlikely to form breeding pairs, persist long enough to raise yearlings that can disperse to facilitate demographic and genetic exchange within the NRM DPS, or otherwise contribute to population recovery.

Unoccupied Suitable Habitat—Habitat suitability modeling indicates that the GYA and central Idaho core recovery areas are atypical of other habitats in the western United States because suitable wolf habitat in these areas occurs in much larger contiguous blocks (Service 1987, p. 7; Larson 2004, p. 49; Carroll *et al.* 2006, p. 35; Oakleaf *et al.* 2005, p. 559). Such core refugia areas provide a steady source of dispersing wolves that populate other adjoining potentially suitable wolf habitat. Some habitat ranked by models as suitable adjacent to this core refugia may be able to support wolf breeding pairs, while other habitat farther away from a strong source of dispersing wolves may not be able to support persistent packs. This fact is important when considering suitable habitat as defined by the Carroll *et al.* (2006, p. 30) and Oakleaf *et al.* (2006, p. 559) models, because wolf populations can persist despite very high rates of mortality only if they have high rates of immigration (Fuller *et al.* 2003, p. 183). Therefore, model predictions regarding habitat suitability do not always translate into successful wolf occupancy and wolf breeding pairs, just as habitat predicted to be unsuitable does not mean such areas will never support wolf breeding pairs.

Strips and smaller (less than 2,600 km^2 (1,000 mi^2)) patches of theoretically suitable habitat (Carroll *et al.* 2006, p. 34; Oakleaf *et al.* 2005, p. 559) (typically, isolated mountain ranges) often possess a higher mortality risk for wolves because of their enclosure by, and proximity to, unsuitable habitat with a high mortality risk (Murray *et al.* 2010, p. 2514; Smith *et al.* 2010, p. 620). In addition, pack territories often form along distinct geological features (Mech and Boitani 2003, p. 23), such as the crest of a rugged mountain range, so useable space for wolves in isolated long narrow mountain ranges may be reduced by half or more. This phenomenon, in which the quality and quantity of suitable habitat is diminished because of interactions with surrounding less-suitable habitat, is known as an edge effect (Mills 1995, pp. 400–401). Edge effects are exacerbated in small habitat patches with high perimeter-to-area ratios (*i.e.,* those that are long and narrow, like isolated mountain ranges) and in species with large territories, like wolves, because they are more likely to encounter surrounding unsuitable habitat (Woodroffe and Ginsberg 1998, p. 2128). Because of edge effects, some habitat areas outside the core areas may rank as suitable in models, but are unlikely to actually be successfully occupied by wolf packs.

For the above reasons, we believe that the Wyoming wolf population will be centered around YNP and the GYA. This was always the intention as indicated by the GYA recovery area identified in the 1987 Recovery Plan and the primary analysis area identified in the 1994 EIS. This core population segment will continue to provide a constant source of dispersing wolves into surrounding areas, supplementing wolf packs and breeding pairs in adjacent, but less secure suitable habitat.

Currently Occupied Habitat—We calculated the currently occupied area in the NRM DPS wolf population by drawing a line around the outer points of radio-telemetry locations of all known wolf pack territories at the end of 2010 (Service *et al.* 2011, Figure 1). Since 2002, most packs have occurred within a consistent area (Service *et al.* 2003–2011, Figure 1), although the outer boundary of the entire NRM wolf population has fluctuated somewhat as peripheral packs establish in unsuitable or marginally suitable habitat and are subsequently lost (Messer 2011, pers. comm.). We define occupied wolf habitat as that area confirmed as being used by resident wolves to raise pups, or that is consistently used by two or more territorial wolves for longer than 1 month (Service 1994, pp. 6:5–6). Typically by the end of a year, only 50 percent of packs meet the criteria to be classified as breeding pairs.

The overall distribution of most Wyoming wolf packs has been similar since 2000, despite a wolf population in the State that has more than doubled (Service *et al.* 2001–2011, Figure 1; Bangs *et al.* 2009, p. 104). This distribution pattern of wolf packs only forming in mountainous forest habitat has persisted through 2010. The wolf population has saturated most suitable habitat in the State. Because packs are unlikely to persist in unsuitable habitat, significant growth in the population's distribution is unlikely. We include unoccupied areas separating areas with resident packs as occupied wolf habitat because these intervening unsuitable habitat areas are important for demographic and genetic connectivity (vonHoldt *et al.* 2010, p. 4412). While these areas are no longer capable of supporting persistent wolf packs, dispersing wolves routinely travel through these areas and packs occasionally occupy them (Service 1994, pp. 6:5–6; Bangs 2002, p. 3; Jimenez *et al.* 2011, p. 1).

Occupied habitat in Wyoming occurs only in the northwestern part of the State (see Figure 1 above). At the end of 2010, ''occupied areas'' (including both pack occupied areas and unsuitable areas between core recovery segments used only for dispersal) were estimated at approximately 46,600 km^2 (18,000 mi^2) in Wyoming (Service *et al.* 2005, Figure 1). Specifically, this occupied area extends slightly further east than the WTGMA, includes about the western-third of the Wind River Indian

Reservation, and extends south to about Big Piney, Wyoming. The occupied portion of Wyoming and the GYA is illustrated in Figure 1 above.

Since 2006, the Wyoming wolf population has stabilized at approximately 300 to 350 wolves (Service *et al.* 2011, Table 4). We believe this largely stable population level and distribution is the result of the wolf population approaching biological limits, given available suitable habitat. The remaining habitat predicted by Carroll's model is often fragmented, occurring in smaller, more isolated patches (Carroll *et al.* 2006, p. 35). These areas have only been occupied by a few breeding pairs that failed to persist (Service *et al.* 2011, Figure 1). Given the above, there is probably limited ability for the Wyoming wolf population to expand significantly beyond its current outer boundaries, even under continued protections of the Act. As demonstrated by the wolf population's demographic stability and relatively constant geographic occupancy in northwestern Wyoming, it is clear that there is sufficient suitable habitat to maintain the Wyoming wolf population well above recovery levels.

Potential Threats Affecting Habitat or Range—Wolves are one of the most adaptable large predators in the world and are unlikely to be substantially impacted by any threat except high levels of human persecution (Fuller *et al.* 2003, p. 163; Boitani 2003, pp. 328–330). Even active wolf dens can be quite resilient to nonlethal disturbance by humans (Frame *et al.* 2007, p. 316). Establishing a recovered wolf population in the NRM region did not require land-use restrictions or curtailment of traditional land uses because there was enough suitable habitat, there were enough wild ungulates, and there were sufficiently few livestock conflicts to recover wolves under existing conditions (Bangs *et al.* 2004, pp. 95–96). Traditional land-use practices in Wyoming are not a threat to wolves in the State, and thus, do not need to be modified to maintain a recovered wolf population into the foreseeable future. We do not anticipate that habitat changes in Wyoming will occur at a magnitude that will threaten wolf recovery in the foreseeable future, because the vast majority of occupied habitat is in public ownership that is managed for uses that are complementary with the maintenance of suitable wolf habitat and viable wolf populations (Carroll *et al.* 2003, p. 542; Oakleaf *et al.* 2005, p. 560).

The 63,714 km^2 (24,600 mi^2) GYA is primarily composed of public lands (Service 1994, p. iv), and represents one of the largest contiguous blocks of suitable habitat within the region. Public lands in National Parks (YNP, Grand Teton National Park, and John D. Rockefeller, Jr. Memorial Parkway), wilderness (the Absaroka Beartooth, North Absaroka, Washakie, and Teton Wilderness Areas), roadless areas, and large blocks of contiguous mountainous forested habitat, are largely unavailable or unsuitable for intensive development. Within the currently occupied portions of Wyoming, land ownership is mostly Federal (77 percent, 57 percent of which is National Park Service or wilderness) with some State (3 percent), Tribal (8 percent), and private lands (12 percent) (Lickfett 2011, in litt.).

The vast majority of suitable wolf habitat and the current wolf population are secure in mountainous forested Federal public land (National Parks, wilderness, roadless areas, and some lands managed for multiple uses by the U.S. Forest Service and Bureau of Land Management) that will not be legally available or suitable for intensive levels of human development (Service 1993, 1996, 2007; Servheen *et al.* 2003; U.S. Forest Service 2006). Furthermore, the ranges of wolves and grizzly bears overlap in many parts of Wyoming and the GYA, and mandatory habitat guidelines for grizzly bear conservation on public lands guarantee, and far exceed, necessary criteria for maintaining suitable habitat for wolves (for an example, see U.S. Department of Agriculture (USDA) 2006). Thus, northwestern Wyoming will continue to provide optimal suitable habitat for a resident wolf population.

The availability of native ungulate populations is a key factor in wolf habitat and range. Wild ungulate prey species are composed mainly of elk, white-tailed deer, mule deer, moose, and bison. Bighorn sheep, mountain goats, and pronghorn antelope also are common, but are not important as wolf prey. In total, Wyoming supports about 50,000 elk and about 90,000 mule deer in northwestern Wyoming (Bruscino 2011, in litt.). All of Wyoming's 35 elk management units are at or above the WGFD numeric objectives for those herds; however, calf/cow ratios in several herd units are below desired levels (WGFD 2010, p. 1). The State of Wyoming has successfully managed resident ungulate populations for decades. With managers and scientists collaborating to determine the source of the potential population fluctuations and appropriate management responses, we feel confident that, although different herds may experience differing population dynamics, the GYA will continue to support large populations of ungulates, and Wyoming will continue to maintain ungulate populations at densities that will continue to support a recovered wolf population well into the foreseeable future.

The presence of cattle and sheep also impact wolf habitat and range. Cattle and sheep are at least twice as numerous as wild ungulates, even on public lands (Service 1994, p. viii). Most wolf packs have at least some interaction with livestock. Wolves and livestock can live near one another for extended periods of time without significant conflict, if agency control prevents the behavior of chronic livestock depredation from becoming widespread in the wolf population. Through active management, most wolves learn that livestock cannot be successfully attacked and do not view them as prey. However, whenever wolves and livestock mix, some livestock and some wolves will be killed. Conflicts between wolves and livestock have resulted in the annual removal of 8 to 15 percent of the wolf population (Bangs *et al.* 1995, p. 130; Bangs *et al.* 2004, p. 92; Bangs *et al.* 2005, pp. 342–344; Service *et al.* 2011, Tables 4, 5; Smith *et al.* 2010, p. 620). Such active control promotes occupancy of suitable habitat in a manner that minimizes damage to private property, and fosters public support to maintain recovered wolf populations without threatening the wolf population viability.

We do not foresee a substantial increase in livestock abundance occurring across northwestern Wyoming that would result in increased wolf mortality, and in fact, the opposite trend has been occurring. In recent years, more than 200,000 hectares (500,000 acres) of public land grazing allotments have been purchased and retired in areas of chronic conflict between livestock and large predators, including wolves (Fischer 2008, in litt.). Assuming adequate regulation of other potential threat factors (discussed below), we do not believe the continued presence of livestock will in any meaningful way threaten the recovered status of the Wyoming wolf population in the foreseeable future.

Although human population growth and development may impact wolf habitat and range, we expect these impacts will be minimal, as the amount of secure suitable habitat is more than sufficient to support wolf breeding pairs well above recovery levels. We expect the region will see: Increased growth and development including conversion of private low-density rural lands to higher density urban and suburban development; accelerated road

development and increasing amounts of transportation facilities (pipelines and energy transmission lines); additional resource extraction (primarily oil and gas, coal, and wind development in certain areas); and increased recreation on public lands (Robbins 2007, entire). Despite efforts to minimize impacts to wildlife (Brown 2006, pp. 1–3), some development will make some areas of Wyoming and the GYA less suitable for wolf occupancy. In the six northwestern Wyoming counties most used by wolves, the human population is projected to increase approximately 15 percent by 2030 (from 122,787 counted in 2010 to 141,000 forecast in 2030) (Carroll *et al.* 2006, p. 536; Wyoming Department of Administration and Information Economic Analysis Division 2008, entire; U.S. Census Bureau 2010, entire). We anticipate similar levels of population growth in the other neighboring areas, because the West as a region is projected to increase at rates faster than any other region (U.S. Census Bureau Population Division 2005). As human populations increase, associated impacts will follow. However, human development will not occur on a scale that could possibly affect the overall suitability of Wyoming or the GYA for wolves, and no foreseeable habitat-related threats will prevent these areas from supporting a wolf population that is capable of substantially exceeding recovery levels.

Most types of intensive human development predicted in the future in Wyoming will occur in areas that have already been extensively modified by human activities and are unsuitable as wolf habitat (Wyoming 2005, Appendix III). Mineral extraction activities are likely to continue to be focused at lower elevations, on private lands, in open habitats, and outside of currently suitable and currently occupied wolf habitat (Robbins 2007, entire). Development on private land near suitable habitats will continue to expose wolves to more conflicts and higher risk of human-caused mortality. However, the rate of conflict is well below the level wolves can withstand, especially given the large amount of secure habitat in public ownership, much of which is protected, that will support a recovered wolf population and will provide a reliable and constant source of dispersing wolves. Furthermore, management programs (Linnell *et al.* 2001, p. 348), research and monitoring, and outreach and education about living with wildlife can somewhat reduce such impacts.

Modeling exercises can also provide insight into future land-use development patterns. While these models have weaknesses (such as an inability to accurately predict economic upturns or downturns, uncertainty regarding investments in infrastructure that might drive development such as roads, airports, or water projects, and an inability to predict open-space acquisitions or conservation easements), we nevertheless think that such models are useful in adding to our understanding of likely development patterns. Carroll *et al.* (2003, p. 541; 2006, p. 32) predicted future wolf habitat suitability under several scenarios through 2025, including potential threats such as increased human population growth and road development. Similarly, in 2005, the Center for the West produced a series of maps predicting growth through 2040 for the West (Travis *et al.* 2005, pp. 2–7). These projections are available at: *http://www.centerwest.org/futures/west/2040.html*. These models predict very little development across occupied and suitable portions of the NRM DPS, Wyoming, or GYA.

Based on these projections, we have determined that increased development will not alter wolf habitat suitability in the NRM DPS, Wyoming, or GYA nearly enough to cause the wolf population to fall below recovery levels in the foreseeable future. We acknowledge that habitat suitability for wolves will change over time with human development, activities, and attitudes, but not to the extent that it is likely to threaten wolf recovery. We do not believe future human population growth will adversely affect wolf conservation. Wolf populations persist in many areas of the world that are far more developed than this region currently is, or is likely to be, in the foreseeable future (Boitani 2003, pp. 322–323). Current habitat conditions are adequate to support a wolf population well above minimal recovery levels and model predictions indicate that development over the next 25 years is unlikely to change habitat in a manner that would threaten the wolf population (Carroll *et al.* 2003, p. 544).

Regarding connectivity between the Wyoming and the GYA wolf to the remainder of the NRM DPS, minimal change in human population growth (Travis *et al.* 2005, pp. 2–7) and habitat suitability (Carroll *et al.* 2003, p. 541; Carroll *et al.* 2006, p. 32) are expected along the Idaho-Montana border between the central Idaho wolf population and the GYA. In fact, projected development is anticipated to include modest expansions concentrated in urban areas and immediately surrounding areas (Travis *et al.* 2005, pp. 2–7). Conversely, in many surrounding rural areas, habitat suitability for wolves will be increased beyond current levels as road densities on public lands are reduced, a process under way in the entire NRM region (Carroll *et al.* 2006, p. 25; Servheen *et al.* 2003; Service 1993, 1996, 2007; Brown 2006, pp. 1–3). Wolves have exceptional dispersal abilities including the ability to disperse long distances across vast areas of unsuitable habitat. Numerous lone wolves have already been documented to have successfully dispersed through these types of developed areas (Jimenez *et al.* 2011, p. 1). History proves that wolves are among the least likely species of land mammal to face a serious threat from reduced connectivity related to projected changes in habitat (Fuller *et al.* 2003, pp. 189–190).

There is more than enough habitat connectivity between occupied wolf habitat in Canada, northwestern Montana, and Idaho to ensure exchange of sufficient numbers of dispersing wolves to maintain demographic and genetic diversity in the NRM wolf metapopulation. We have documented routine movement of radio-collared wolves across the nearly contiguous available suitable habitat between Canada, northwestern Montana, and central Idaho. No foreseeable threats put this connectivity at risk. The GYA is the most physically isolated core recovery area within the NRM DPS, but the GYA has also demonstrated sufficient levels of connectivity to other occupied habitats and wolf populations in the NRM. Within the foreseeable future, only minimal habitat degradation will occur between the GYA and the other recovery areas, as a result of delisting and management of wolves in Wyoming. Overall, we believe this will have only minimal impacts on foreseeable levels of dispersal and connectivity of wolves in the GYA and the State of Wyoming with other wolf populations in the NRM. In short, future connectivity is unlikely to be meaningfully impacted by changes in habitat and range (genetic exchange is discussed in more detail under Factor E below), to an extent that would threaten the recovered status of the Wyoming wolf population in the foreseeable future.

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

Commercial or Recreational Uses—This section discusses both legal and illegal killing for commercial or recreational purposes such as hunting and trapping. All other potential sources of human-caused mortality (*e.g.,* legal or illegal killing for other purposes, agency

or individual actions to address conflicts over wolf-livestock interactions, or wolf kills in the predator area of Wyoming) are discussed in the ''Human-caused predation'' section of Factor C below. First, this section discusses illegal commercial or recreational use. Next, this section focuses on legal hunting and trapping in Wyoming. Finally, this section evaluates regulated hunting and trapping in Idaho and Montana because some wolves and some packs cross State boundaries.

Since the species was listed, killing for commercial or recreational use has been prohibited. While some wolves may have been illegally killed for commercial use of the pelts and other parts, we believe such illegal commercial trafficking is rare. Furthermore, illegal capture of wolves for commercial breeding purposes is also possible, but we have no evidence that it occurs in Wyoming, the GYA, or elsewhere in the NRM DPS. We believe the prohibition against ''take'' provided by Section 9 of the Act has discouraged and minimized the illegal killing of wolves for commercial or recreational purposes. Post-delisting, we believe the State, tribal, and other Federal laws and regulations will continue to provide a strong deterrent to such illegal wolf killing by the public. State, tribal, and other Federal wildlife agencies have well-distributed experienced professional law enforcement officers to help enforce their respective wildlife regulations. Similar regulatory approaches have been effective in the conservation of other resident wildlife such as black bears, mountain lions, elk, and deer. Most hunting and trapping that will occur post-delisting, will be legal, permitted, and regulated by the State of Wyoming or the Wind River Indian Reservation.

Legal regulated harvest will be employed by all States within the GYA where the wolf is delisted. Additionally, the Wind River Indian Reservation may consider legal regulated harvest. Wolf conservation can be compatible with harvest. Wolves can maintain population levels despite very high sustained human-caused mortality rates of 22 to greater than 50 percent (Keith 1983; Ballard *et al.* 1987; Fuller 1989; Fuller *et al.* 2003, pp. 182–184; Creel and Rotella 2010). Mortality rates and population growth rates reported from 2007 to 2010 indicate that the wolf population in Wyoming outside YNP can sustain, on average, a 36 percent mortality rate from human causes (WGFC 2011, p. 12). When populations are maintained below carrying capacity and natural mortality rates remain low, human-caused mortality can replace up to 70 percent of natural mortality (Fuller *et al.* 2003, p. 186). Wolf pups can also be successfully raised by other pack members (Boyd and Jimenez 1994) and breeding individuals can be quickly replaced by other wolves (Brainerd *et al.* 2008, p. 89), which further mitigates the impact of harvest.

Regulated hunting and trapping are commonly used to manage wolves in Canada and Alaska without negative population-level effects (Bangs 2008). Furthermore, all States in the NRM DPS have substantial experience operating regulated harvest as a wildlife management tool for resident species. In 2009, Montana and Idaho conducted a wolf hunt where 257 wolves were killed. Even with this harvest, the population grew in 2009 by almost 5 percent across the NRM, including modest increases in all three States. Collectively, these factors give us every confidence that the States will run hunts such that wolf populations will not be threatened by recreational or commercial uses.

In Wyoming, wolves will be permanently managed as game animals or protected (*e.g.,* in National Parks) in about 40,000 km² (15,400 mi²) in the northwestern portion of the State (15.7 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and the Wind River Indian Reservation (Lickfett 2011, in litt.). This area is of sufficient size to support Wyoming wolf population targets, under the management regime proposed for this area.

Wolves will be managed as trophy game animals within the area of northwestern Wyoming identified as the WTGMA (see Figure 1 above). ''Trophy game'' status allows the WGFC and WGFD to regulate methods of take, hunting seasons, and numbers of wolves that could be killed. The boundary and size of the WTGMA will be established by State statute and cannot be diminished through WGFC rule or regulation. The WTGMA will be seasonally expanded approximately 80 km (50 mi) south (see Figure 1 above) from October 15 to the last day of February (28th or 29th) to facilitate natural dispersal of wolves between Wyoming and Idaho. During this timeframe, the trophy game area will be expanded by approximately 3,300 km² (1,300 mi²) (*i.e.,* an additional 1.3 percent of Wyoming) (Lickfett 2011, in litt.).

Within the WTGMA, Wyoming intends to use public harvest of wolves to reduce wolf populations to minimize conflicts with livestock, ungulate herds, and humans (WGFC 2011, pp. 1, 23). The WGFD will develop an annual hunt plan that will take into consideration, but not be limited to, the following when developing a wolf hunting program or extending wolf hunting seasons: wolf breeding seasons; short- and long-range dispersal opportunity, survival, and success in forming new or joining existing packs; conflicts with livestock; and the broader game management responsibilities related to ungulates and other wildlife (WGFC 2011, pp. 2–3, 16, 25, 53). Harvest quotas will be established through WGFD's normal season-setting process. Quotas will be based on the population status of wolves at the end of the previous calendar year, and consider estimated wolf mortality and population growth believed to have occurred during the current calendar year (WGFC 2011, pp. 23–25). All forms of wolf mortality will be considered when setting appropriate harvest levels (WGFC 2011, pp. 23–25). Seasons will close when the mortality quota is reached or if the WGFC deems it necessary to close the season for other reasons. Importantly, the WGFD will not manage wolves at the minimum population objective (WGFC 2011, p. 24). Instead, the WGFD will set harvest levels that maintain an adequate buffer above minimum population objectives to provide management flexibility (WGFC 2011, p. 24).

Wyoming wolf hunting seasons will primarily coincide with fall big game hunting seasons, but may be extended if quotas are not met (WGFC 2011, pp. 23–25, 53). That said, most hunting-related mortality will occur in October and November when human access is greatest and more big game hunters are active (MFWP 2009, p. 3, 5; WGFC 2011, p. 24). Wyoming's wolf management plan indicates that the State expects to delineate approximately 10 to 12 wolf hunting areas within the WTGMA to focus harvest in specific areas (*i.e.,* areas with high wolf–livestock conflict, high human trafficked areas, or areas where ungulate herds are below State management objectives) (WGFC 2011, pp. 1, 16). Persons who legally harvest a wolf within the WTGMA will be required to report the harvest to the WGFD within 24 hours, and check the harvested animal in within 5 days (WGFC 2011, pp. 3, 22–25). Reporting periods for harvested wolves may be extended after inaugural hunting seasons if it is determined that extended reporting periods will not increase the likelihood of overharvest

(WGFC 2011, p. 23). Similar harvest strategies have been successful for countless other wildlife species in Wyoming.

Commercial or recreational trapping is not currently being planned in Wyoming (Mills 2011, in litt.). However, an adaptive management approach, which could include trapping, may occur in the future if hunting is determined to be inadequate to achieve wolf harvest objectives (WGFC 2011, p. 25). We expect trapping will likely be limited as Wyoming's geography suggests other sources of mortality will make the State's wolf population management objectives easily achievable. If trapping is used in the future it will be conducted within the framework of the State's overall demographic targets.

In our 2009 delisting rule (74 FR 15123, April 2, 2009), we determined that Wyoming's proposed 2008 harvest strategy (that was never implemented) was well-designed, biologically sound, and, by itself, it would not have threatened Wyoming's share of the recovered NRM wolf population. Given Wyoming's strong commitment to maintain the population at or above agreed-upon population targets, their intention to consider all forms of wolf mortality when making wolf control management decisions, and numerous safeguards built into their harvest strategy, we are confident that this source of mortality will never compromise the Wyoming wolf population's recovered status.

The Wind River Indian Reservation's management plan indicates wolves will be designated as a game animal post-delisting and hunting and trapping can occur (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 9). The season timing and length, harvest quota, and other specifics will be determined by the Eastern Shoshone and Northern Arapaho Tribes (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 9). Harvest strategy will depend on the number of wolves present on Wind River Indian Reservation and the management direction the Tribes wish to take (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 9). The Tribes have not designated a specific number of individuals or packs for which they will manage (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 9). Given the small number of wolves, packs, and breeding pairs supported while Act protections were in place, we expect the area will support very modest wolf population levels and distribution. Given this, we expect very limited hunting or trapping on the Wind River Indian Reservation.

No legal hunting or trapping will occur in YNP, Grand Teton National Park, or the National Elk Refuge. In YNP, hunting pressures in adjoining areas are unlikely to impact park wolves as YNP wolves rarely leave the park during the time period when hunting would occur. The wolf population in YNP has ranged from 96 to 171 wolves since 2000. However, the YNP wolf population appears to be declining toward a long-term equilibrium at or slightly below the lower end of this range (Service *et al.* 2000–2010, Table b; Smith 2010, pers. comm.). In Grand Teton National Park and the National Elk Refuge, wolf pack home ranges typically cross outside of these Federal boundaries, thus, hunting pressures in adjoining areas would likely impact these wolves.

Hunting in Idaho and Montana may impact Wyoming wolves because some wolves and some packs cross State boundaries. Both Idaho and Montana designated wolves as game animals Statewide and each State conducted conservative wolf hunts in 2009. In total, Montana hunts took 72 wolves out of the 75 harvest quota and, in Idaho, hunts took 185 wolves out of a quota of 220. Each State closed wolf harvest in individual management zones as their individual quota was achieved. Montana closed its wolf hunt statewide November 16th. In Idaho, a few zones remained open until March 31. Despite a total harvest of 257 wolves in Montana and Idaho, the NRM population still grew in 2009 by almost 5 percent including modest increases in all three States. These hunts distributed wolf harvest across occupied habitat, took into account connectivity and possible dispersal corridors, resulted in good hunter compliance, and improved hunter attitudes about wolves (MFWP 2010, pp. 17–25; IDFG 2010, pp. 13–14; Dickson 2010). As anticipated in our 2009 delisting rule (74 FR 15123, April 2, 2009), Montana and Idaho are now planning more aggressive hunts for fall 2011 to reduce the population below current levels (which are likely at or above long-term carrying capacity of the suitable habitat).

Within the GYA, Idaho's 2011 season has a quota of 30 wolves in the Island Park hunting unit (referred to as the Upper Snake Management Zone in the 2010 annual report) (Idaho Fish and Game Commission (IFGC) 2011). Island Park's season will run from August 30th to December 31st and one wolf can be taken per tag with a limit of two tags per person (IFGC 2011). At the end of 2010, the Island Park unit was occupied by seven packs including five that were counted towards Idaho's totals and two counted towards Wyoming's population totals (Service *et al.* 2011, pp. 81–84 in the Idaho chapter). Four of these five packs were confirmed to qualify as breeding pairs (the reproductive status for other pack was not known) (Service *et al.* 2011, pp. 81–84 in the Idaho chapter). Two of the Idaho packs and both of the Wyoming packs had home ranges that spanned the Idaho-Wyoming stateline (Service *et al.* 2011, pp. 81–84 in the Idaho chapter). To help understand the potential impacts of Idaho's hunt on these wolves, it is instructive to look at the 2009 hunting season. There is no harvest data from 2010 because wolves were not hunted in 2010. During the 2009 season, this zone had a quota of five wolves with an October 1st to December 31st season and a limit of one wolf per person (Service *et al.* 2011, pp. 81–84 in the Idaho chapter). The quota for this unit was met and the unit was closed November 2nd (Service *et al.* 2011, pp. 81–84 in the Idaho chapter). Between the end of 2008 and the end of 2009 (the period impacted by the 2009 wolf hunt), the number of packs in this area increased from two to four and the number of breeding pairs in this unit remained steady at two (Service *et al.* 2008, pp. 76–80 in the Idaho chapter; Service *et al.* 2009, pp. 52–56 in the Idaho chapter).

Thus, this modest hunting level had minimal impact. While it is unclear if the 2011 quota for this unit will be achieved, it is likely this hunting season will reduce the number of wolves, packs, and breeding pairs in this area (this is the State's intention). In the long run, we believe it is likely this area will continue to support a modest number of wolves and packs (one to four packs) some of which will qualify as breeding pairs. This regulated taking in Idaho may minimally impact a small number of Wyoming wolves (*e.g.,* the two packs that are counted in Wyoming's totals that also cross into Idaho). In future years, once the initial desired population level is achieved, such impacts are expected to be minimal.

Idaho's other hunting unit in the GYA area is the southern Idaho unit. Potential hunting impacts in this unit are expected to be zero to low single digits based on past take (one wolf in 2009) and the area's limited wolf population (no confirmed resident wolves, packs or breeding pairs) (Service *et al.* 2011, pp. 71–74 in the Idaho chapter).

Trapping was not authorized in either the Island Park unit or the southern Idaho unit (IFGC 2011). Trapping was

only authorized where hunting alone was not anticipated to be effective in reducing the wolf population (IFGC 2011). Because trapping is typically reserved for more remote, inaccessible areas (IFGC 2011), we do not expect much if any future trapping in this area.

Montana's wolf quota for 2011 within the GYA is 43 wolves including 19 wolves within the Gallatin/Madison unit, 6 wolves within the Highlands/Tobacco Roots/Gravelly/Snowcrest unit, and 18 wolves within the South Central Montana unit (MFWP 2011, pp. 6–7). The South Central Montana unit also includes a subquota of 3 wolves in areas immediately adjacent to YNP in order to limit impacts to park wolves. At the end of 2010, Montana's portion of the GYA contained a minimum of 118 wolves in 19 verified packs, 6 of which qualified as breeding pairs (Service *et al.* 2011, pp. 72–82 in the Montana chapter). Two additional packs are counted in Wyoming's population, but may spend some time in Montana (Service *et al.* 2011, pp. 72–82 in the Montana chapter). Again, a review of the 2009 hunting season may assist in understanding potential impacts of Montana's hunt to wolves in Wyoming and the GYA. In 2009, the MFWP Commission developed a single unit for all of southwest Montana and authorized a quota of 12 wolves (Service *et al.* 20009, pp. 18–25 in the Montana chapter). Wolf take in this unit occurred very rapidly, and was concentrated just north of YNP (Service *et al.* 2009, pp. 18–25 in the Montana chapter). As a result, the backcountry portions of the unit were temporarily closed on October 9th, and permanently closed on October 13th, after 9 wolves were taken (Service *et al.* 20009, pp. 18–25 in the Montana chapter). Four additional wolves were taken in the remainder of the unit. From the end of 2008 to the end of 2009 (the period impacted by the 2009 wolf hunt), the minimum wolf population estimate in Montana's share of the GYA declined from 130 wolves in 18 packs, 11 of which met the breeding pair criteria, to 106 wolves in 17 verified packs, 9 of which qualified as a breeding pair. Both agency control (which increased in 2009) and hunter harvest were factors in these declines.

While it is unclear if Montana's 2011 quotas for this area will be achieved, it is Montana's intention that this hunting season will modestly reduce the number of wolves, packs, and breeding pairs in this area. In the long run, it is likely this area will continue to support a sizeable number of wolves, packs, and breeding pairs. Specifically, in our professional judgment, we believe this area will support at least 8 packs long term, a significant number of which will qualify as breeding pairs. This regulated taking in Montana, in light of the subquotas for areas adjacent to YNP, may impact some Wyoming wolves in some years, but is not expected to be a significant impact.

In summary, illegal commercial and recreational use will remain a negligible source of mortality and legal, State-regulated harvest for commercial and recreational use will be managed in a manner compatible with wolf conservation. Wolves can maintain population levels despite very high sustained human-caused mortality rates. In 2009, Montana and Idaho conducted a wolf hunt where 257 wolves were harvested, and the population still grew by almost 5 percent. Regulated hunting and trapping are commonly used to manage wolves in Canada and Alaska without population-level negative effects (Bangs 2008), and all States in the NRM DPS have substantial experience operating regulated harvest as a wildlife management tool for resident species. In Wyoming, population levels will be carefully monitored; all sources of mortality will be used to set quotas and measure progress toward them; hunting units will be closed when quotas are met, or if otherwise needed (*e.g.,* if overall population objectives are being approached); hunting units will be small to allow targeted control of authorized mortality; and populations will be managed with a buffer above minimum targets. This approach is consistent with the State's management of numerous other species. Trapping will be rare everywhere in the GYA.

On the whole, we anticipate Wyoming (like Idaho and Montana) will gradually reduce populations in the short term with moderately aggressive harvest rates, and that these harvest rates will be reduced over time. Long term, total human-caused mortality (from all sources) in portions of Wyoming under State jurisdiction may average around 36 percent as the State uses regulated harvest to maintain the wolf population in areas under Wyoming's jurisdiction modestly above their minimum population target of at least 100 wolves and at least 10 breeding pairs. Regulated harvest in portions of the GYA outside of Wyoming's jurisdiction is expected to have only minimal impacts on Wyoming's wolf population.

Overutilization for Scientific or Educational Purposes—From 1979 to 2010, the Service and our cooperating partners captured 1,963 wolves for monitoring, nonlethal control, and research purposes with less than 3 percent experiencing accidental death. If Wyoming wolves are delisted, the State, National Parks, and/or Tribes will continue to capture and radio-collar wolves for monitoring and research purposes in accordance with State, Federal, and tribal laws, wolf management plans, regulations, and appropriate agency humane animal care and handling policies. The capture or possession of wolves from within the WTGMA for scientific or educational purposes will be regulated by the WGFC under rules set in Chapter 10 and Chapter 33 of Commission Regulations. We expect that capture-caused mortality by Federal, State, and Tribal agencies, and universities conducting wolf monitoring, nonlethal control, and research will remain below 3 percent of the wolves captured, and will remain an insignificant source of mortality to the wolf population (Murray *et al.* 2010, p. 2519).

We are unaware of any wolves that have been removed from the wild for solely 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 and are not protected by the Act. However, we or the States and Tribes may get requests to place wolves that would otherwise be euthanized in captivity for research or educational purposes. Such requests have been, and are likely to continue to be, rare. Such requests will not substantially impact human-caused wolf mortality rates.

Factor C. Disease or Predation

This section discusses disease and parasites, natural predation, and human-caused predation. The human-caused mortality section discusses all sources of human-caused mortality not discussed under Factor B's commercial and recreational uses section above. The below analysis focuses on wolves in Wyoming, but considers adjoining portions of the GYA as some wolves and some packs cross State boundaries. Data for other regions is considered where it implies a threat that could someday impact Wyoming or GYA wolves.

Disease—Wolves throughout North America are exposed to a wide variety of diseases and parasites. Many diseases (viruses and bacteria, many protozoa and fungi) and parasites (helminthes and arthropods) have been reported for the gray wolf, and several of them have had significant, but temporary impacts during wolf recovery in the 48 conterminous States (Brand *et al.* 1995, p. 428; Kreeger 2003, pp. 202–214). The EIS on gray wolf reintroduction identified disease impact as an issue, but did not evaluate it further (Service 1994, pp. 1:20–21).

Infectious disease induced by parasitic organisms is a normal feature in the life of wild animals, and the typical wild animal hosts a broad multi-species community of potentially harmful parasitic organisms (Wobeser 2002, p. 160). We fully anticipate that these diseases and parasites will follow the same pattern seen for wolves in other areas of North America (Brand *et al.* 1995, pp. 428–429; Bailey *et al.* 1995, p. 445; Kreeger 2003, pp. 202–204; Atkinson 2006, pp. 1–7; Smith and Almberg 2007, pp. 17–19; Johnson 1995a, 1995b; Almberg *et al.* 2009, p. 3; 2010, p. 2058; Jimenez *et al.* 2010a, p. 1120; 2010b p. 331), and will not significantly threaten wolf population viability. Nevertheless, because these diseases and parasites, and perhaps others, have the potential to impact wolf population distribution and demographics, monitoring implemented by the States, Tribes, and National Park Service will track disease and parasite events. Should such an outbreak occur that results in a population decline, discretionary human-caused mortality (such as hunting, post-delisting) would be adjusted over an appropriate area and time period to ensure wolf population numbers are maintained above recovery levels (WGFC 2011, pp. 21–22, 24).

Canine parvovirus (CPV) infects wolves, domestic dogs (*Canis familiaris*), foxes (*Vulpes vulpes*), coyotes (*Canis latrans*), skunks (*Mephitis mephitis*), and raccoons (*Procyon lotor*). The population impacts of CPV occur via diarrhea-induced dehydration leading to abnormally high pup mortality (Wisconsin Department of Natural Resources 1999, p. 61). Clinical CPV is characterized by severe hemorrhagic diarrhea and vomiting; debility and subsequent mortality is a result of dehydration, electrolyte imbalances, and shock. CPV 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; Almberg *et al.* 2009, p. 2), and exposure in wolves is thought to be almost universal. Currently, nearly 100 percent of the wolves handled by MFWP (Atkinson 2006) and YNP (Smith and Almberg 2007, p. 18; Almberg *et al.* 2009, p. 2) had blood antibodies indicating nonlethal exposure to CPV. CPV might have contributed to low pup survival in the northern range of YNP in 1999. CPV was suspected to have done so again in 2005 and possibly 2008, but evidence points to canine distemper (CD) as being the primary cause of low pup survival during those years (Smith *et al.* 2006, p. 244; Smith 2008; Almberg *et al.* 2010, p. 2058). Pup production and survival in YNP returned to normal levels after each event (Almberg *et al.* 2009, pp. 18–19). The impact of disease outbreaks to the overall NRM wolf population has been localized and temporary, as has been documented elsewhere (Bailey *et al.* 1995, p. 441; Brand *et al.* 1995, p. 421; Kreeger 2003, pp. 210–211). Despite these periodic disease outbreaks, the NRM wolf population increased at a rate of about 20 percent annually from 1996 to 2010 (Service *et al.* 2011, Table 4). Mech *et al.* (2008, p. 824) recently concluded CPV reduced pup survival, subsequent dispersal, and the overall rate of population growth in Minnesota (a population near carrying capacity in suitable habitat). It is possible that at carrying capacity CPV may affect the GYA and Wyoming wolf populations similarly, such that the overall rate of growth may be reduced.

Canine distemper (CD) is an acute, fever-causing disease of carnivores caused by a virus (Kreeger 2003, p. 209). It is common in domestic dogs and some wild canids, such as coyotes and foxes in the NRM region (Kreeger 2003, p. 209). The prevalence of antibodies to this disease in wolf blood in North American wolves is about 17 percent (Kreeger 2003, p. 209), but varies annually and by specific location. Nearly 85 percent of Montana wolf blood samples analyzed in 2005 indicated nonlethal exposure to CD (Atkinson 2006). Similar results were found in YNP (Smith and Almberg 2007, p. 18; Almberg *et al.* 2010, p. 2061). Mortality in wolves has been documented in Canada (Carbyn 1982, p. 109), Alaska (Peterson *et al.* 1984, p. 31; Bailey *et al.* 1995, p. 441), and in a single Wisconsin pup (Wydeven and Wiedenhoeft 2003, p. 7). CD is not a major mortality factor in wolves, because despite high exposure to the virus, affected wolf populations usually demonstrate good recruitment (Brand *et al.* 1995, pp. 420–421). Mortality from CD has only been confirmed on a few occasions in NRM wolves despite their high exposure to it, however, we suspect it contributed to the high pup mortality documented in the northern GYA in spring 1999, 2005, and 2008 (Almberg *et al.* 2010, p. 2061).

CD is likely maintained in the NRM region by multiple hosts and periodic outbreaks will undoubtedly occur every 2–5 years (Almberg *et al.* 2010, p. 2058). However, as documented elsewhere, CD does not threaten wolf populations, and the NRM wolf population increased even during years with localized outbreaks (Almberg *et al.* 2010, p. 2058). YNP biologists (Smith 2008, pers. comm.) believe that wolf deaths mainly occurred from CD when the YNP population was around the historic high of 170 wolves the previous winter. In 2008, wolf packs in Wyoming outside YNP (about 25 packs and 15 breeding pairs) appeared to have normal pup production (Jimenez 2008, pers. comm.), indicating the probable disease outbreak in 2008 was localized to YNP. This suggests CD mortality may be associated with high wolf density, and possibly carrying capacity. Thus, the wolf populations in the GYA may be more affected by CD and other diseases when wolves exist at high densities in suitable habitat (*i.e.,* in YNP).

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. In wolf populations in the Western Great Lakes region, it does not appear to cause adult mortality, but might be suppressing population growth by decreasing wolf pup survival (Wisconsin Department of Natural Resources 1999, p. 61). Lyme disease has not been documented in the GYA or Wyoming wolf populations.

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

Mange has been detected in, and caused mortality to, GYA wolves (Jimenez *et al.* 2010a, p. 1120; Atkinson 2006, p. 5; Smith and Almberg 2007, p. 19). The GYA wolves likely contracted mange from coyotes or fox, whose populations experience occasional outbreaks. Between 2003 and 2008, the percentage of Montana packs with mange fluctuated between 3 and 24 percent of packs. Between 2002 and 2008, the percentage of Wyoming packs

with mange fluctuated between 3 and 15 percent of packs. In these cases, mange did not appear to infest every member of the pack. For example, in 2008, manage was detected in 8 wolves from 4 different packs in YNP, one pack in Wyoming outside YNP, and a couple of packs in previously infested areas of southwestern Montana. Mange has never been confirmed in wolves in Idaho (Jimenez *et al.* 2010a, p. 1123).

In packs with the most severe mange infestations, pup survival appeared low, and some adults died (Jimenez *et al.* 2010a, pp. 1122–1123). In addition, we euthanized several wolves with severe mange for humane reasons and because of their abnormal behavior. We predict that mange in the GYA and State of Wyoming will act as it has in other parts of North America (Brand *et al.* 1995, pp. 427–428; Kreeger 2003, pp. 207–208; Jimenez *et al.* 2010, p. 1123) and not threaten wolf population viability. Wolves are not likely to be infested with mange on a chronic population-wide level (Jimenez *et al.* 2010a, p. 1123).

Dog-biting lice (*Trichodectes canis*) commonly feed on domestic dogs, but can infest coyotes and wolves (Schwartz *et al.* 1983, p. 372; Mech *et al.* 1985, p. 404). The lice can attain severe infestations, particularly in pups. The worst infestations can result in severe scratching, irritated and raw skin, substantial hair loss particularly in the groin, and poor condition. While no wolf mortality has been confirmed from dog-biting lice, death from exposure or secondary infection following self-inflicted trauma caused by inflammation and itching, appears possible. The first confirmed NRM wolves with dog-biting lice were members of the Battlefield pack in the Big Hole Valley of southwestern Montana in 2005 and 2006, and one wolf in south-central Idaho in 2006 and 2007; but these infestations were not severe (Service *et al.* 2006, p. 15; Atkinson 2006, p. 5; Jimenez *et al.* 2010b). The source of this infestation is unknown, but was likely domestic dogs. Lice have been documented in the NRM DPS since 2005, and infestations are likely to continue to be occasionally documented in the future. Lice may contribute to the death of some individual wolves, but they will not threaten the GYA or Wyoming wolf population (Jimenez *et al.* 2010b, p. 332).

Rabies, canine heartworm (*Dirofilaria immitus*), blastomycosis, brucellosis, neosporsis, leptospirosis, bovine tuberculosis, canine herpesvirus (Almberg *et al.* 2010), canine coronavirus, viral papillomatosis, hookworm, tapeworm (*Echinococcus granulosus*) (Foreyt *et al.* 2008, p. 1), lice, scaroptic mange, coccidiosis, and canine adenovirus/hepatitis have all been documented in wild gray wolves, but their impacts on future wild wolf populations are not likely to be significant (Brand *et al.* 1995, pp. 419–429; Johnson 1995a, b, pp. 5–73, 1995b, pp. 5–49; Mech and Kurtz 1999, p. 305; Wisconsin Department of Natural Resources 1999, p. 61; Kreeger 2003, pp. 202–214; Atkinson 2006, pp. 1–7; Almberg *et al.* 2010, p. 3; Jimenez *et al.* 2010a, p. 1123; 2010b, p. 332). Canid rabies caused local population declines in Alaska (Ballard and Krausman 1997, p. 242), and may temporarily limit population growth or distribution where another species, such as arctic foxes (*Alopex lagopus*), act as a reservoir for the disease. We have not detected rabies in NRM wolves. Range expansion could provide new avenues for exposure to several of these diseases, especially canine heartworm, rabies, bovine tuberculosis, and possibly new diseases such as chronic wasting disease and West Nile virus, further emphasizing the need for vigilant disease monitoring programs.

Because several of the diseases and parasites are known to be spread by wolf-to-wolf contact, their incidence may increase if wolf densities increase. However, because wolf densities are already high and may be peaking (Service *et al.* 2011, Table 1, Figure 1), wolf-to-wolf contacts will not likely lead to a continuing increase in disease prevalence. The wolves' exposure to these types of organisms may be most common outside of the core population areas, where domestic dogs are most common, and lowest in the core population areas—because wolves tend to flow out of, not into, saturated habitats. Despite this dynamic, most Wyoming and GYA wolves will continue to have exposure to most diseases and parasites in the system. Diseases or parasites have not been a significant threat to wolf population recovery to date, and we have no reason to believe that they will become a significant threat to the viability of GYA and Wyoming populations in the foreseeable future.

In terms of future disease monitoring, States have committed to monitor the NRM wolf population for significant disease and parasite problems. State wildlife health programs often cooperate with Federal agencies and universities and usually have both reactive and proactive wildlife health monitoring protocols. Reactive strategies consist of periodic intensive investigations after disease or parasite problems have been detected through routine management practices, such as pelt examination, reports from hunters, research projects, or population monitoring. Proactive strategies often involve ongoing routine investigation of wildlife health information through collection and analysis of blood and tissue samples from all or a sub-sample of wildlife carcasses or live animals that are handled. We do not believe that diseases or changes in disease monitoring will threaten recovered wolf populations in the GYA or State of Wyoming.

Natural Predation—No wild animals routinely prey on gray wolves (Ballard *et al.* 2003, pp. 259–260). From 1982 to 2004, about 3.1 percent of all known wolf morality in the NRM DPS resulted from interspecific strife (Murray *et al.* 2010, p. 2519). Occasionally wolves have been killed by large prey such as elk, deer, bison, and moose (Mech and Nelson 1989, p. 207; Smith *et al.* 2006, p. 247; Mech and Peterson 2003, p. 134), but those instances are few. Since the 1980s, about a dozen NRM wolves have died from wounds received while attacking prey (Smith *et al.* 2006, p. 247). That level of natural mortality does not significantly affect wolf population viability or stability. Since NRM wolves have been monitored, only a few wolves have been confirmed killed by other large predators. At least two adults were killed by mountain lions, and one pup was killed by a grizzly bear (Jimenez *et al.* 2009, p. 76). Wolves in the NRM region inhabit the same areas as mountain lions, grizzly bears, and black bears, but conflicts rarely result in the death of either species. Wolves evolved with other large predators, and no other large predators in North America, except humans, have the potential to significantly impact wolf populations.

Other wolves are the largest cause of natural predation among wolves. Numerous mortalities have resulted from territorial conflicts between wolves, and about 3 percent of wolf deaths are caused by territorial conflict in the NRM wolf population (Murray *et al.* 2010, p. 2519). Wherever wolf packs occur, including the NRM DPS, some low level of wolf mortality will result from territorial conflict. Wolf populations tend to regulate their own densities; consequently, territorial conflict is highest in saturated habitats like YNP. This cause of mortality is infrequent except at carrying-capacity and does not result in a level of mortality that would significantly affect a wolf population's viability in Wyoming, the GYA, or the NRM DPS.

Human-caused Predation—This section discusses all sources of human-

caused mortality except hunter harvest and trapping. Hunting and trapping are discussed in the ''Commercial and Recreational Uses'' section of Factor B above. Potential impacts of human-caused mortality to natural connectivity and gene flow are discussed in the ''Genetic Considerations'' section of Factor E below.

Humans kill wolves for a number of reasons. For example, some wolves are killed to resolve conflicts with livestock (Fritts *et al.* 2003, p. 310; Woodroffe *et al.* 2005, pp. 86–107, pp. 345–347). Occasionally, wolf killings are accidental (*e.g.,* wolves are hit by vehicles, mistaken for coyotes and shot, or caught in traps set for other animals) (Bangs *et al.* 2005, p. 346). Other wolf killings are intentional, illegal, and are never reported to authorities. A few wolves have been killed by people who stated that they believed their physical safety was being threatened. The overall NRM wolf mortality rate of 26 percent since reintroduction is comprised of: Illegal kills (10 percent), control actions to resolve conflicts (10 percent), natural causes including disease/parasites and intraspecific strife (3 percent), and accidental human causes such as vehicle collisions and capture mortality (3 percent). Eighty percent of the overall NRM wolf mortalities are human-caused (Murray *et al.* 2010; Smith *et al.* 2010; USFWS et al. 2011, p. 7). While human-caused mortality, including both illegal killing and agency control, has not prevented population recovery, it has affected NRM wolf distribution (Bangs *et al.* 2004, p. 93) preventing successful pack establishment and persistence in open prairie or high desert habitats (Bangs *et al.* 1998, p. 788; Bangs *et al.* 2009, p. 107; Service *et al.* 1989–2011, Figure 1).

Wolf populations can maintain themselves despite very high sustained human-caused mortality rates of 22 to greater than 50 percent (Keith 1983; Ballard *et al.* 1987; Fuller 1989; Fuller *et al.* 2003, pp. 182–184; Creel and Rotella 2010). Mortality rates and population growth rates reported from 2007 to 2010 indicate that the wolf population in Wyoming outside YNP can sustain, on average, a 36 percent mortality rate from human causes (WGFC 2011, p. 12). When populations are maintained below carrying capacity and natural mortality rates and self-regulation of the population remain low, human-caused mortality can replace up to 70 percent of natural mortality (Fuller *et al.* 2003, p. 186). Wolf pups can also be successfully raised by other pack members (Boyd and Jimenez 1994), and breeding individuals can be quickly replaced by other wolves (Brainerd *et al.* 2008, p. 89), which can serve to mitigate the impacts of human-caused mortality. Collectively, these factors indicate that wolf populations are quite resilient to moderate human-caused mortality, if it is adequately regulated.

As part of the interagency wolf monitoring program and various research projects, over 20 percent of the NRM wolf population has been monitored since the 1980s (Smith *et al.* 2010, p. 620; Murray *et al.* 2010, p. 2514). From 1984 through 2004, annual adult survival averaged about 75 percent, which typically allows wolf population growth (Hensey and Fuller 1983, p. 1; Keith 1983, p. 66; Fuller *et al.* 2003, p. 182; Smith *et al.* 2010, p. 620; Murray *et al.* 2010, p. 2514). Wolves in the largest blocks of remote habitat without livestock, such as central Idaho or YNP, had annual survival rates around 80 percent (Smith *et al.* 2006, p. 245; Smith *et al.* 2010, p. 620). Wolves outside of large remote areas had survival rates as low as 54 percent in some years (Smith *et al.* 2006, p. 245; Smith *et al.* 2010, p. 626). The highest mortality rates are localized in areas we consider largely unsuitable for pack persistence.

Wolf mortality resulting from control of problem wolves, which includes legal take by private individuals under defense of property regulations, was estimated to remove an average of 10 percent of adult radio-collared wolves annually since reintroduction, but that rate has steadily increased as the wolf population has expanded beyond suitable habitat and caused increased conflicts with livestock (USFWS *et al.* 2011, Table 4, 5). Defense of property take, authorized by experimental population rules (Service 1994, pp. 2:13–14; 59 FR 60252, November 22, 1994; 59 FR 60266, November 22, 1994; 70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(i) & (n)), makes up a small percentage of these control actions. Specifically, such take represented about 7 percent of problem wolves legally removed from 1995 to 2010 and about 9 percent of such removals from 2008 to 2010. In spite of these mortality rates, wolf numbers increased at a rate of about 24 percent annually 1995–2008 (the period when the population was presumed below carrying capacity). Since 2008, the NRM population has largely stabilized.

After delisting, human-caused mortality, and its authorization or regulation, will differ in various parts of Wyoming. In total, wolves will be permanently managed as game animals or protected (*e.g.,* in National Parks) in about 40,000 km^2 (15,400 mi^2) in northwestern Wyoming (15.7 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and the Wind River Indian Reservation. This area is of sufficient size to support Wyoming population targets, under the management regime proposed for this area.

Wolves will be managed as trophy game animals within the area of northwestern Wyoming identified as the WTGMA (see Figure 3). ''Trophy game'' status allows the WGFC and WGFD to regulate methods of take, hunting seasons, types of allowed take, and numbers of wolves that could be killed. The boundary and size of the WTGMA will be established by State statute and cannot be diminished through WGFC rule or regulation.

The WTGMA will be seasonally expanded approximately 80 km (50 mi) south (see Figure 3) from October 15 to the last day of February (28th or 29th) to facilitate natural dispersal of wolves between Wyoming and Idaho. During this timeframe, the trophy game area will be expanded by approximately 3,300 km^2 (1,300 mi^2) (*i.e.,* an additional 1.3 percent of Wyoming). Management within the WTGMA is described below, followed by management in other portions of Wyoming.

After delisting, Wyoming will allow property owners inside the WTGMA to immediately kill a wolf doing damage to private property (WGFC 2011, pp. 3, 4, 22, 30–31, 32). WGFC regulation defines ''doing damage to private property'' as ''the actual biting, wounding, grasping, or killing of livestock or domesticated animal, or chasing, molesting, or harassing by gray wolves that would indicate to a reasonable person that such biting, wounding, grasping, or killing of domesticated animals is likely to occur at any moment'' (WGFC 2011, pp. 22, 60). These regulations will define ''owner'' as ''the owner, lessee, immediate family, employee, or other person who is charged by the owner with the care or management of livestock or domesticated animals'' (WGFC 2011, p. 22). Wolves killed under authority of this regulation shall be reported to a WGFD representative within 72 hours (WGFC 2011, pp. 22, 31). These regulations are similar to the experimental population rules in place in Montana and Idaho after the population achieved recovery levels (70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(n)). While in place in Montana and Idaho, these rules were sufficiently protective

to allow continued population expansion (Service *et al.* 2011, Table 4). We conclude that these rules will not compromise the State of Wyoming's ability to meet the agreed-upon population objectives (at least 10 breeding pairs and at least 100 wolves outside YNP and sovereign tribal lands) assuming the State manages for an adequate buffer above these minimum levels as Wyoming intends to do (WGFC 2011, p. 24).

Additionally, the WGFD may issue ''lethal take permits'' authorizing property owners to kill not more than two wolves in areas experiencing chronic wolf depredation within the WTGMA (WGFC 2011, pp. 22–23). The Wyoming wolf plan defines ''chronic wolf depredation'' as ''a geographic area limited to a specific parcel of private land or a specific grazing allotment described on the permit within the WTGMA where gray wolves have repeatedly (twice or more within a 2-month period immediately preceding the date on which the owner applies for a lethal take permit) harassed, injured, maimed or killed livestock or domesticated animals'' (WGFC 2011, pp. 22–23, 60). Wolves killed under the authority of a lethal take permit shall be reported to the WGFD representative specified on the permit within 24 hours (WGFC 2011, pp. 3, 22–23). Lethal take permits shall expire 45 days after the date they are issued, but will be renewable for up to a year if wolf conflicts persist (WGFC 2011, pp. 22–23, 32). Depending upon population levels, Wyoming can suspend or cancel existing lethal take permits or halt issuance of new lethal take permits (WGFC 2011, pp. 22–23, 32). These regulations are similar to the experimental population rules in place in Montana and Idaho after the population achieved recovery levels (70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(n)). While in place in Montana and Idaho, these rules were sufficiently protective to allow continued population expansion (Service *et al.* 2011, Table 4). Additionally, we employed a similar approach on private lands in Wyoming, but not on public lands, and this was sufficiently protective to allow for continued population growth of Wyoming's wolf population outside YNP (Service *et al.* 2002–2011, Table 2a; Service *et al.* 2011, Figure 2 in Wyoming chapter).

Some other minor sources of human-caused predation may also occur inside the WTGMA. For example, accidental mortality sometimes occurs from such sources as vehicle collisions. Because these types of mortalities are rare and have little impact on wolf populations, they were authorized by our experimental population rule with little to no impact on wolf populations. Take in self-defense or defense of others is also exceedingly rare, and is expected to remain rare post-delisting. We expect take from these sources will remain rare post-delisting with little impact on the wolf population.

While wolves were listed, illegal killing removed an estimated 10 percent of the population annually. Following our previous delisting, there was no indication that illegal mortality levels changed from those occurring while wolves were delisted. After delisting, WGFD law enforcement personnel will investigate all wolves killed outside the framework established by State statute and WGFC regulation, and appropriate law enforcement and legal action will be taken. We expect illegal killing will continue at current levels post-delisting.

Within the WTGMA, WGFD may also control wolves when they determine a wild ungulate herd is experiencing unacceptable impacts or to address wolf-ungulate conflicts at State-operated elk feedgrounds (WGFC 2011, pp. 5, 39–41). Wolf control to address unacceptable impacts to wild ungulates requires a determination that wolf predation is a significant factor in the population or herd not meeting the State population management goals or recruitment levels established for the population or herd (WGFC 2011, pp. 5, 39–41). All of Wyoming's 35 elk management units are at or above the State's numeric objectives for those herds; however, calf/cow ratios in several herd units are below desired levels (WGFD 2010, p. 1). Five of the State's ten moose herds are below objectives (WGFD unpublished data). Although Wyoming has not yet put forward any proposals to control wolves to address unacceptable impacts to ungulate herds, such take is possible. WGFD may also take wolves that displace elk from feedgrounds in the WTGMA if it results in one of the following conflicts: (1) Damage to private stored crops; (2) elk commingling with domestic livestock; or (3) displacement of elk from feedgrounds onto highway rights-of-way causing human safety concerns (WGFC 2011, pp. 5, 39–41). Because Wyoming will consider all forms of wolf mortality when making ungulate-related wolf control management decisions (WGFC 2011, pp. 21, 23–24), these mortality sources will not compromise the State's ability to maintain wolf management objectives.

In the predator area, wolves will experience unregulated human-caused mortality, although mortality in this area will be monitored through mandatory reporting within 10 days of the kill (WGFC 2011, pp. 3, 8, 17, 23, 29). Wolves are unlike coyotes, in that wolf behavior and reproductive biology have resulted in wolves historically being extirpated in the face of extensive human-caused mortality. As we have previously concluded (71 FR 43410, August 1, 2006; 72 FR 6106, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15123, April 2, 2009), wolves are unlikely to survive in portions of Wyoming where they are regulated as predatory animals. This conclusion was validated in 2008 after our previous delisting became effective and most of the wolves in the predator area were killed within a few weeks of losing the Act's protection. We expect that wolf packs in the predator area of Wyoming will not persist.

Despite this anticipated mortality, the portions of Wyoming outside the predator area are large enough to support Wyoming's management goals and a recovered wolf population (Figure 1 illustrates wolf pack distribution relative to Wyoming's WTGMA). Our 2009 delisting rule confirmed this conclusion, but expressed two concerns (74 FR 15123, April 2, 2009). First, the rule expressed concern that mortality in the predator area would be high and this would inhibit natural genetic exchange. This issue is discussed in the ''Genetic Considerations'' portion of Factor E below.

The second concern expressed in our 2009 delisting rule (74 FR 15123, April 2, 2009) was that lone wolves, breeding pairs, or packs from the trophy game area may periodically and temporarily disperse into the predator area and suffer high mortality rates. The 2009 rule concluded that a large predator area ''substantially increases the odds that these periodic dispersers will not survive, thus, impacting Wyoming's wolf population'' (74 FR 15123, April 2, 2009). We continue to conclude that no wolf packs or breeding pairs will persist in the predator area of Wyoming, some packs that have entire or partial territories in the predator area will likely not persist (3 of Wyoming's 27 breeding pairs, and 6 of the State's 30 packs have entire or partial territories in the predator area), and some wolves that primarily occupy the WTGMA will be killed when dispersing into the predator area. However, Wyoming's overall management strategy has been improved to such an extent that such mortality can occur without compromising the recovered status of the population in Wyoming.

Such losses were a substantial concern when State law required WGFD to aggressively manage the population down to minimal levels. However, Wyoming has committed to remove current statutory mandates for aggressive management down to minimum levels. Furthermore, Wyoming has agreed to maintain a population that remains at or above 10 breeding pairs and at or above 100 wolves in areas under their jurisdiction. To accomplish this, Wyoming intends to maintain an adequate buffer above minimum population objectives to accommodate an annual wolf hunt and unpredicted mortality associated with control actions, as well as, to ensure that uncontrollable sources of mortality do not drop the population below this minimum population level (WGFC 2011, p. 24). Collectively, the plan assures that unregulated human-caused mortality in the predator area will not compromise the recovered status of the Wyoming wolf population.

The Shoshone and Arapaho Tribal Fish and Game Department will manage all wolves occurring on the Wind River Indian Reservation according to their approved wolf management plan (King 2007, in litt.; Shoshone and Arapaho Tribal Fish and Game Department 2007, entire). The plan allows any enrolled member on tribal land to shoot a wolf in the act of attacking livestock or dogs on tribal land, provided the enrolled member provides evidence of livestock or dogs recently (less than 24 hours) wounded, harassed, molested, or killed by wolves, and a designated agent is able to confirm that the livestock or dogs were wounded, harassed, molested, or killed by wolves (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8). ''In the act of attacking'' means the actual biting, wounding, grasping, or killing of livestock or dogs, or chasing, molesting, or harassing by wolves that would indicate to a reasonable person that such biting, wounding, grasping, or killing of livestock or dogs is likely to occur at any moment (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8). The plan also allows the tribal government to remove ''wolves of concern'' (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8). ''Wolves of concern'' are defined as wolves that attack livestock, dogs, or livestock herding and guarding animals once in a calendar year or any domestic animal twice in a calendar year (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8).

Criteria to determine when take will be initiated are: (1) Evidence of the attack, (2) reason to believe that additional attacks will occur, (3) no evidence of unusual wolf attractants, and (4) any certain animal husbandry practices have been implemented (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8). In situations with chronic wolf depredation, enrolled members may acquire written authorization from the tribes to shoot wolves on tribal land after at least two separate confirmed depredations by wolves on livestock, livestock herding or guarding animals, or dogs, and the tribes have determined that wolves are routinely present and pose a significant risk to the owner's livestock (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8). Other forms of authorized human-caused mortality include take in defense of human life, take needed to avoid conflicts with human activities, incidental take, accidental take, scientific take, or take for humane reasons (such as to aid or euthanize sick, injured, or orphaned wolves) (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 8).

These regulations are similar to experimental population rules currently in place on the Wind River Indian Reservation (70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(n)). This type of take has not proven a limiting factor for the area. Furthermore, as stated in our 2007 approval letter, suitable habitat on the Wind River Indian Reservation is occasionally used by wolves, but is not considered essential to maintaining a recovered wolf population in Wyoming, and any wolves that establish themselves on tribal lands will be in addition to those necessary for management by the State of Wyoming for maintaining a recovered wolf population (King 2007, in litt.).

In YNP, human-caused mortality has been, and is expected to continue to be, very rare because park regulations are very protective of wildlife with few exceptions for authorized human-caused mortality. Accidental mortality or defense of life mortality may occur, but as in the rest of Wyoming, we expect these sources of mortality will be exceedingly rare. Another rare, but potential source of human-caused mortality is agency action to remove habituated wolves that pose a threat to human safety after nonlethal efforts have failed to correct the behavior. In 2003, YNP developed a plan for the management of habituated wolves in YNP (YNP 2003, entire). YNP policies indicate ''removal of nuisance animals may be undertaken to reduce a threat to public health or safety'' (YNP 2003, p. 8). Further, management policies (YNP 2003, p. 8) state, ''Where visitor use or other human activities cannot be modified or curtailed, the Service may directly reduce the animal population by using several animal population management techniques * * *'' that include ''destruction of animals by NPS personnel or their authorized agents.'' This is important in YNP because the unusually high exposure wolves have to people in YNP increases the likelihood of unpredictable wolf behavior (YNP 2003, p. 9). To address such situations, YNP has developed a management plan which calls for increased public education, monitoring, aversion conditioning, and, if necessary, wolf removal (YNP 2003, pp. 4, 9–12). This approach, endorsed by the Service in 2003 (YNP 2003, p. 13), is authorized by existing experimental population rules (50 CFR 17.84(i)(3)(v)).

State, Tribal, and Federal (YNP) management in Wyoming will ensure that human-caused mortality never threatens the recovered status of the population. As discussed above, wolf populations can maintain themselves despite sustained human-caused mortality rates of between 22 to greater than 50 percent (Keith 1983; Ballard *et al.* 1987; Fuller 1989; Fuller *et al.* 2003, pp. 182–184; Creel and Rotella 2010), with Wyoming-specific data from 2007 to 2010 indicating that the wolf population in Wyoming outside YNP can sustain, on average, a 36 percent mortality rate from human causes (WGFC 2011, p. 12). While wolves were listed, total human-caused mortality rates averaged about 23 percent annually. Wolves have a very high natural resilience to regulated human-caused mortality (Fuller *et al.* 2003, pp. 182–190). For example, in 2009, more than 600 wolves died from all sources of mortality (agency control including defense of property, regulated harvest (for the first time), illegal and accidental killing, and natural causes), and the population still grew by almost 5 percent.

After delisting, most human-caused predation in Wyoming will be similar to that which was in place under either the 1994 experimental population rules (now governing most of Wyoming) or the 2005 experimental population rules (59 FR 60252, November 22, 1994; 59 FR 60266, November 22, 1994; 70 FR 1286, January 6, 2005; 73 FR 4720, January 28, 2008; 50 CFR 17.84(i) & (n)), as modified in 2008, governing management over most of Idaho and Montana in recent years. While some allowed take will be more liberal (*e.g.,* mortality in the predator area), resulting in greater overall rates of human-caused

predation post-delisting, the increase will not compromise the State's ability to maintain the population above recovery levels. All sources of mortality will be monitored and considered in State management decisions. Many sources of authorized take can be limited, if necessary, to keep the population above recovery levels (*e.g.,* the State can suspend lethal take permits, agency control actions, or hunting seasons). Finally, recognizing some mortality will occur from uncontrollable sources (*e.g.,* some wolves that primarily occupy the WTGMA will be lost when they go on routine dispersal events into the predator area), Wyoming no longer intends to aggressively manage the population down toward minimal levels (an approach we previously indicated was unacceptable), and, in fact, intends to maintain an adequate buffer above minimum population objectives. Collectively, this information indicates that human-caused predation will be managed to assure the Wyoming population's recovered status is never compromised.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

This section provides an analysis of State, tribal, and Federal regulatory mechanisms to determine if they are adequate to maintain the species' recovered status in the absence of the Act's protections. By definition, potential threats only require regulation if they represent a threat in the absence of regulation. This section focuses on likely future population levels anticipated to be maintained, noting that human-caused mortality is the most significant issue influencing these levels. In short, if human-caused mortality is adequately regulated and population targets are sufficient to allow for other potential unforeseen or uncontrollable sources of mortality, no other potential threats are likely to compromise the population's viability. This section does not go into detail about each individual threat factor or source of mortality. Instead it includes an overview with a focus on the regulatory mechanism that addresses each threat factor or source of mortality. For a more detailed discussion of any one potential threat, see the supporting discussion under the specific applicable Factor (*i.e.,* A, B, C, or E).

National Park Service—Twenty percent of the currently occupied portions of Wyoming (defined in Factor A above) and 23 percent of areas that are protected or where wolves are regulated as game animals occur within a National Park (see Figure 1 above). From 2001 to the end of 2010, the wolf population in YNP ranged from 96 to 171 wolves, and between 6 to 16 breeding pairs, with an average of 9.8 breeding pairs. While some wolves and some wolf packs also occur in Grant Teton National Park and John D. Rockefeller Memorial Parkway, these wolves and wolf packs usually have a majority of their home range in areas under the State of Wyoming's jurisdiction; thus, these wolves are only subject to National Park Service regulation when on National Park Service lands.

The National Park Service Organic Act (16 U.S.C. 1 *et seq.*) and the National Park Service management policies on wildlife generally require the agency to conserve natural and cultural resources and the wildlife present within National Parks. National Park Service 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 (NPS 2006, p. 44). No population targets for wolves will be established for the National Parks. Instead, management emphasis in National Parks after delisting will focus on continuing to minimize the human impacts on wolf populations (YNP 2003, pp. 9–12). 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 National Park Service Organic Act and National Park Service policies will continue to provide protection following the proposed Federal delisting. Natural sources of mortality (*e.g.,* disease) will occasionally impact wolf populations in National Parks, but, in light of adequate regulation of intentional human-caused mortality, impacts from these occasional events will be temporary and not threaten the population.

National Wildlife Refuges—Each unit of the National Wildlife Refuge System was established for specific purposes. The National Elk Refuge was established in 1912 as a ''winter game (elk) reserve'' (37 Stat. 293, 16 U.S.C. 673), and the following year Congress designated the area as ''a winter elk refuge'' (37 Stat. 847). In 1921, all lands included in the refuge, or that might be added in the future, were reserved and set apart as ''refuges and breeding grounds for birds'' (Executive Order (E.O.) 3596), which was affirmed in 1922 (E.O. 3741). In 1927, the refuge was expanded to provide ''for the grazing of, and as a refuge for, American elk and other big game animals'' (44 Stat. 1246, 16 U.S.C. 673a). These purposes apply to all or most of the lands now within the refuge. In accordance with the National Wildlife Refuge System Administration Act of 1966 as amended (16 U.S.C. 668dd–668ee) by the National Wildlife Refuge System Improvement Act of 1997, the Service, which manages the National Elk Refuge, recently announced a notice of intent to prepare a Comprehensive Conservation Plan for the refuge. Comprehensive Conservation Plans guide management of wildlife and their habitats on refuges (75 FR 65370, October 22, 2010). This process is ongoing.

The refuge's nearly 25,000 acres provide a winter home for one of the largest wintering concentrations of elk; in addition to the large elk herds, a free-roaming bison herd winters at the refuge (75 FR 65370, October 22, 2010). Wolves occurring on the National Elk Refuge will be monitored, and refuge habitat management will maintain the current prey base for them (Kallin 2011, pers. comm.; Smith 2007, pers. comm. as cited by WGFC 2011, p. 18). Wolf trapping or hunting will not be authorized on the refuge (Kallin 2011, pers. comm.). Because of the relatively small size of the refuge, all of the wolves and all of the packs that occur on the refuge will also spend significant amounts of time on adjacent State-managed lands. Thus, much like Grand Teton National Park and John D. Rockefeller Memorial Parkway, these wolves are only subject to National Wildlife Refuge regulation during the small portion of their time spent on the National Elk Refuge.

Tribal Lands—Wolves will be managed as game animals on the Wind River Indian Reservation. The Eastern Shoshone and Northern Arapaho Tribes govern this area and the Shoshone and Arapaho Tribal Fish and Game Department and the Service's Lander Wyoming Management Assistance Office manage wildlife occurring on the reservation. Wolf management on the Wind River Indian Reservation is guided by the Service-approved ''Wolf Management Plan for the Wind River Reservation'' (King 2007, in litt.; Shoshone and Arapahoe Tribal Fish and Game Department 2007, entire). Suitable habitat on the Wind River Indian Reservation supports a small wolf population. While this area sometimes supports packs, it has never supported a breeding pair. The Wind River Indian Reservation is not considered essential to maintaining a recovered wolf population in Wyoming, and any wolves that establish themselves on tribal lands will be in addition to those necessary for management by the State

of Wyoming for maintaining a recovered wolf population (King 2007, in litt.).

Forest Service—Federal law indicates Forest Service land shall be managed to provide habitat for fish and wildlife including wolves and their prey. Specifically, under the National Forest Management Act of 1976, as amended (16 U.S.C. 1600–1614), the Forest Service shall strive to provide for a diversity of plant and animal communities when managing national forest lands. Similarly, the Multiple Use and Sustained Yield Act (16 U.S.C. 528) indicates National Forests are to be managed for ''wildlife and fish purposes'' among other purposes, and the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701) says public lands are to be ''managed in a manner… that will provide food and habitat for fish and wildlife and domestic animals.''

Wilderness areas are afforded the highest protections of all Forest Service lands. The Wilderness Act of 1964 (16 U.S.C. 1131–1136) states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircraft; (4) there can be no other form of mechanical transport; and (5) no structure or installation may be built. The following wilderness areas occur in the WTGMA: all of the Absaroka Beartooth, Fitzpatrick, Gros Ventre, Jedediah Smith, North Absaroka, Washakie, Teton, and Winegar Hole Wilderness Areas as well as the northern half of the Bridger Wilderness Area.

Wilderness study areas are designated by Federal land management agencies (*e.g.,* USDA Forest Service) as those having wilderness characteristics and being worthy of congressional designation as a wilderness area. The following wilderness study areas occur in the WTGMA: The Dubois Badlands, Owl Creek, and Whiskey Mountain Wilderness Study Areas. Individual National Forests that designate wilderness study areas manage these areas to maintain their wilderness characteristics until Congress decides whether to designate them as permanent wilderness areas. This means that individual wilderness study areas are protected from new road construction by Forest Plans. Therefore, activities such as timber harvest, mining, and oil and gas development are much less likely to occur because the road networks required for these activities are unavailable. However, because these lands are not congressionally protected, they could experience changes in management prescription with Forest Plan revisions.

This regulatory framework has been adequate to achieve wolf recovery in Wyoming and across the entire NRM DPS without additional land use restrictions. The Forest Service has a demonstrated capacity and a proven history of providing sufficient habitat for wolves and their prey and the Forest Service lands will continue to be adequately regulated to provide for the needs of wolves and their prey.

While the Forest Service manages and regulates habitat and factors impacting habitat, the Forest Service typically defers to States on hunting decisions (43 U.S.C. 1732(b)). The primary exception to this deference is the Forest Service's authority to identify areas and periods when hunting is not permitted (43 U.S.C. 1732(b)). However even these decisions are to be developed in consultation with the States. Thus, human-caused mortality and the adequacy of the associated regulatory framework are discussed under the ''State Regulatory Mechanisms'' section below, as well as ''Commercial and Recreational Uses'' section of Factor B, and the ''Human-caused Predation'' section of Factor C.

State Regulatory Mechanisms—Portions of the Wyoming WTGMA under State jurisdiction will be managed according to the WGFC 2011 Wyoming Gray Wolf Management Plan (WGFC 2011, entire). This plan is consistent with an agreement between the Service and the State of Wyoming (WGFC 2011, appendix I). While the below summary reflects this plan, conforming changes to Wyoming State law and WGFC regulations are necessary to implement this plan. We expect these statutory and regulatory changes will be made within the next several months. If the statutory or regulatory changes deviate significantly from the changes in law that we expect Wyoming to make, we may need to reopen the comment period to provide the public an opportunity to review and comment once these changes are finalized. Should Wyoming fail to make the changes necessary to support a recovered wolf population, delisting will not occur and this proposal will be withdrawn.

Within Wyoming's WTGMA (see Figure 1 above), wolves will be managed as a game animal, which allows the WGFC and WGFD to regulate methods of take, hunting seasons, types of allowed take, and numbers of wolves. The boundary and size of the WTGMA and its seasonal expansion, as set forth in the agreement between the Service and the State and reflected in Wyoming's revised wolf management plan, will be established by State statute, which cannot be changed through WGFC rule or regulation. This area is of sufficient size to support Wyoming population targets, assuming implementation of Wyoming's management plan for this area. In consideration of, and to address, Service concerns about genetics and connectivity, Wyoming included a seasonal expansion of the WTGMA in their management plan. From October 15 through the end of February, the WTGMA will expand approximately 80 km (50 mi) south (see Figure 1 above). This seasonal expansion will benefit natural dispersal (for a more detailed discussion of genetic connectivity, see the ''Genetic Considerations'' section of Factor E below).

Wolves that occur in the remainder of Wyoming under State jurisdiction will be classified as predators. Predatory animals are regulated by the Wyoming Department of Agriculture under Title 11, Chapter 6 of the Wyoming Statutes. Under these regulations, wolves in predator areas can be killed with very few restrictions. As we have previously concluded (71 FR 43410, August 1, 2006; 72 FR 6106, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15123, April 2, 2009), wolves are unlikely to survive in portions of Wyoming where they are regulated as predatory animals. However, portions outside the predator area are large enough to support Wyoming's management goals and a recovered wolf population (this issue is discussed further in the ''Human-caused Predation'' section of Factor C above as well as the ''Genetic Considerations'' portion of Factor E below).

Within the WTGMA, wolves will be managed by the WGFC and the WGFD. The WGFC will direct the management of wolves, and the WGFD will assume management authority of wolves (WGFC 2011, p. 1). The State of Wyoming has a relatively large and well-distributed professional fish and game agency that has the demonstrated skills and experience to successfully manage a diversity of resident species, including large carnivores. The WGFD and WGFC are similarly qualified to manage a recovered wolf population. State management of wolves will follow the classic State-led North American model for wildlife management which has been extremely successful at restoring, maintaining, and expanding the distribution of numerous populations of other wildlife species, including other large predators, throughout North America (Geist 2006, p. 1; Bangs 2008).

Within the WTGMA, Wyoming has agreed to maintain a population of at least 10 breeding pairs and at least 100 wolves in areas under State jurisdiction. This minimum population objective is incorporated into Wyoming's wolf management plan and will be institutionalized in Wyoming State statute and regulation. To ensure this target is never inadvertently compromised, Wyoming intends to maintain an adequate buffer above minimum population objectives (WGFC 2011, p. 24). Additionally, Wyoming is planning that any future population reduction will be gradual to ensure population targets are not compromised while the State gathers information on the vulnerability of wolves under a State management regime. All sources of mortality will be considered in management decisions. These objectives have been institutionalized into Wyoming's wolf management plan, will be reflected in all WGFD and WGFC planning decisions, and will be reflected in WGFC regulations.

Wolves taken outside the framework established by State statute and WGFC regulation will be considered to have been taken illegally and will be investigated by WGFD law enforcement personnel (WGFC 2011, p. 25). Appropriate law enforcement and legal action will be taken, which could include fines, jail terms, and loss of hunting privileges (WGFC 2011, p. 25). We believe that these measures constitute adequate regulatory mechanisms to address the threat of illegal killing of wolves.

Given the State of Wyoming's demonstrated capacity to manage similar wildlife, their commitment to manage wolves at or above agreed-upon minimum population levels, along with an overall approach that we conclude will allow the State to meet its objectives, we view the State of Wyoming's proposed management strategy as an adequate regulatory mechanism. However, as noted above, additional statutory and regulatory changes must occur for this plan to be implemented as currently designed. We expect these changes will be made over the next several months and prior to any final delisting of gray wolves in Wyoming.

Because some GYA wolves and some GYA packs cross State lines, Montana's and Idaho's regulatory framework are also discussed here. Furthermore, management in these States can impact dispersal across the entire region.

Montana statutes and administrative rules categorize the gray wolf as a ''Species in Need of Management'' under the Montana Nongame and Endangered Species Conservation Act of 1973 (MCA 87–5–101 to 87–5–123). Montana law defines ''species in need of management'' as ''The collection and application of biological information for the purposes of increasing the number of individuals within species and populations of wildlife up to the optimum carrying capacity of their habitat and maintain those levels. The term includes the entire range of activities that constitute a modern scientific resource program, including, but not limited to research, census, law enforcement, habitat improvement, and education. The term also includes the periodic or total protection of species or populations as well as regulated taking.'' Classification as a ''Species in Need of Management'' and the associated administrative rules under Montana State law create the legal mechanism to protect wolves and regulate human-caused mortality (including regulated public harvest) beyond the immediate defense of life/property situations. Some illegal human-caused mortality likely still occurs, and is to be prosecuted under State law and Commission regulations. Montana's Fish, Wildlife, and Parks Commission determine harvest quotas annually.

The IFGC has authority to classify wildlife under Idaho Code 36–104(b) and 36–201. The gray wolf was classified as endangered by the State until March 2005, when the IFGC reclassified the species as a big game animal under Idaho Administrative Procedures Act (13.01.06.100.01.d). As a big game animal, State regulations adjust human-caused wolf mortality to ensure recovery levels are exceeded. Title 36 of the Idaho statutes has penalties associated with illegal take of big game animals. These rules are consistent with the legislatively adopted Idaho Wolf Conservation and Management Plan (IWCMP) (Idaho 2002) and big game hunting regulations currently in place. The IWCMP states that wolves will be protected against illegal take as a big game animal under Idaho Code 36–1402, 36–1404, and 36–202(h). The IFGC determines harvest quotas annually.

Montana, Idaho, and Wyoming are committed to implement wolf management in a manner that also encourages connectivity among wolf populations (Groen *et al.* 2008, entire; WGFC 2011, pp. 26–29, 52, 54). Both Montana's and Idaho's 2009 and 2011 hunts consider and minimize impacts to natural connectivity. Additionally, the States have committed to implement agency-managed genetic exchange (moving individual wolves or their genes into the affected population segment), should it ever be needed (Groen *et al.* 2008, entire; WGFC 2011, pp. 26–29, 52, 54).

Montana's and Idaho's regulatory frameworks are sufficient to ensure impacts in Montana and Idaho to the Wyoming wolf population will be minimal. Should management needs be identified in future years, both States have regulatory authority to modify management to meet this population need. All three States have a strong incentive to maintain the NRM DPS and its subpopulations well above minimal population levels.

Environmental Protection Agency— The Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 *et seq.*) provides for Federal regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered (licensed) by the Environmental Protection Agency. Before the Environmental Protection Agency may register a pesticide, the applicant must show, among other things, that using the pesticide according to specifications ''will not generally cause unreasonable adverse effects on the environment.'' No poisons can currently be legally used to poison wolves in the United States because of Environmental Protection Agency restrictions. However, sodium cyanide (only in M–44 devices) and Compound 1080 (sodium fluoroacetate used only in livestock protection collars) are legal toxicants for use on other non-wolf canids. Sodium cyanide was reregistered for use in M–44 devices in 1994 (Environmental Protection Agency 1994, entire). Compound 1080 (sodium fluoroacetate) was registered for use in livestock protection collars in 1995 (Environmental Protection Agency 1995, entire). The Large Gas or Denning Cartridge was registered for use in 2007 (Environmental Protection Agency 2007, entire).

All three products have label restrictions imposed by the Environmental Protection Agency consistent with a Service 1993 Biological Opinion to protect endangered species (Environmental Protection Agency 1994, p. 4; Environmental Protection Agency 1995, pp. 27, 32–38). It is a violation of Federal law to use a pesticide in a manner inconsistent with its labeling, and the courts consider a label to be a legal document (Environmental Protection Agency 2011, p. 1). The Environmental Protection Agency's regulation of these and other toxicants has been adequate to prevent any meaningful impacts to wolf populations in Wyoming, the GYA, or the NRM DPS.

These restrictions constitute an adequate regulatory mechanism of this potential issue.

Collectively, the above regulatory framework will be considered adequate to maintain recovered wolf populations and to prevent relisting once Wyoming makes the necessary changes to State law and regulation required to implement Wyoming's wolf management plan. Before delisting occurs, this regulatory framework will be formally established in management plans, regulations, and statute. These regulations will protect wolf populations (in the case of the National Park Service) or manage them adequately above population targets to ensure potential unforeseen or uncontrollable sources of mortality do not compromise population targets. While no wolves are expected to persist in the predator area, this area is not necessary for wolf conservation in Wyoming. Impacts could also occur in adjacent portions of Montana and Idaho, but these impacts are expected to be minor (few wolf packs are transboundary) and can be regulated through limits on human-caused mortality, if necessary. Additionally, agency capacity and past practice with wolves and other game species provide confidence that targets will be met. Finally, while not relied upon, we believe the threat of relisting provides additional certainty the objectives will never be compromised.

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

This section discusses public attitudes toward wolves, genetics, poison, climate change, catastrophic events, and potential impacts of human-caused mortality to pack structure. This analysis focuses on Wyoming, but considers information from beyond Wyoming when such information helps inform our understanding of an issue and its potential impact to wolves in Wyoming or the GYA.

Public Attitudes Toward the Gray Wolf—Human attitudes toward wolves were the main reason the wolf was listed under the ESA because those attitudes resulted in Federal, State, and local governments promoting wolf extirpation by whatever means possible, including widespread poisoning, even in National Parks (see also Poisoning section below). Those attitudes were largely based on the real and perceived conflicts between humans and wolves, primarily in the context of livestock and pet depredation, hunting of ungulates, and concerns for human safety.

Public hostility toward wolves led to the government-sanctioned persecution that extirpated the species from the NRM DPS in the 1930s. Negative attitudes toward wolves remain deeply ingrained in some individuals and continue to affect human tolerance of wolves. Many papers recently addressed the concept of recent human tolerance of wolves and how those attitudes might affect wolf restoration (Kellert *et al.* 1996, p. 977; Kellert 1999; p. 167; Zimmermann *et al.* 2001, p. 137; Ench and Brown 2002, p. 16; Williams *et al.* 2002, p. 1; Ericsson and Heberlein 2003, p. 149; Fritts *et al.* 2003, pp. 289–316; Bruskotter *et al.* 2007, p. 211; Karlsson and Sjostrom 2007, p. 610; Stronena *et al.* 2007, p. 1; Herberlein and Ericsson 2008, p. 391; Bruskotter *et al.* 2009, p. 119; Wilson and Bruskotter 2009, p. 353; Bruskotter 2010b, p. 1; Bruskotter *et al.* 2010a, p. 941; Bruskotter *et al.* 2010b, p. 30; Houston *et al.* 2010, p. 2; Treves and Martin 2010, p. 1; Treves *et al.* 2010, p. 2; for additional references see USFWS 1994, Appendix 3; 76 FR 26086, May 5, 2011).

These public attitudes began to shift in the mid-20th century because of increased urbanization and increasing national concerns about environmental issues. However, huge decreases in wolf abundance due to wolf extirpation in the last century, lack of first-hand experience with wolves and the damage they can cause, and increasing urbanization has resulted in most Americans holding favorable attitudes towards wolves. These same societal shifts in human attitudes have occurred in other parts of the world (Boitani 2003, p. 321). The huge shift in human attitudes and the resulting treatment of wolves compared to 100 years ago is evident by the shift in policies throughout North America and other parts of the world from extirpation to restoration (Boitani 2003, pp. 322–323; Boitani and CuCiucci 2010, pp. 19–21). Today, a majority of Americans view wolves favorably for a multitude of reasons. Wolves are considered beneficial to ecosystem health. And it is now considered appropriate to reverse wolf extirpation, a perceived historic wrong (Houston *et al.* 2010, p. 27).

Despite the variety of opinions, research is scarce on what factors increase human tolerance of wolves and how those translate into conservation success by preventing excessive rates of human-caused mortality (Bath and Buchanan 1980; Williams *et al.* 2002; Ericsson *et al.* 2003; Fritts *et al.* 2003). The groups most supportive of wolf conservation are often members of environmental organizations and urban residents. These individuals often view wolf reintroduction as restoring an ecological balance. However, favorable attitudes toward wolves decrease as people experience, or think they might soon experience, living with wolves (Huston *et al.* 2010, p. 1).

Typically, the groups most likely to oppose wolf recovery are livestock producers, hunters, and rural residents within or near potential wolf habitat. These individuals face a higher probability of directly suffering competition or damage from wolves. Numerous public attitudes surveys indicate human attitudes toward wolves improve when there is local participation in wildlife management through regulated harvest and defense of life and property regulations. Surveys also show improvement in attitudes when people can pursue traditional activities, like hunting and grazing, without restrictions (For references see Service 1994, Appendix 3; Williams *et al.* 2002; IDFG 2008; Houston *et al.* 2010; 76 FR 26086, May 5, 2011). Wolf conservation can be successful even in areas with high human density, if management policies factor-in human concerns (Linnell *et al.* 2001, p. 345).

A 1994 summary of human values surveys (USFWS 1994, Appendix 3) found that the overriding concern of those living with wolves is the financial and emotional loss that occurs when wolves kill livestock. Further illustrating the connection between financial cost/benefit and attitudes, one survey found Alaskan trappers (who legally harvest wolves for their pelts) had the most accurate knowledge of wolves and viewed wolves the most favorably (Kellert 1985). Toward this end, compensation programs for wolf-livestock depredations have benefited attitudes toward wolves. Wyoming intends to continue such programs in trophy game portions of the State.

Allowing landowners to defend their property may have also ameliorated some of the concern related to potential wolf-livestock conflicts. For example, from 1995 through 2004, the highest rate of illegal killing occurred in northwestern Montana, where wolves were listed as endangered and legal protection was highest, compared to central Idaho and the GYA where wolves were managed under more liberal experimental population regulations. However, the difference in habitat security might also explain the differences in rates of human-caused mortality (Smith *et al.* 2010, p. 630). Upon delisting, Wyoming intends to implement regulations similar to our experimental population regulations. State management provides a larger and more effective local organization and a

more familiar means for dealing with these conflicts (Mech 1995, pp. 275–276; Williams *et al.* 2002, p. 582; Bangs *et al.* 2004, p. 102; Bangs *et al.* 2009, pp. 112–113). We anticipate this approach will continue to benefit public attitudes post-delisting.

Additionally, hunter's perceptions of wolves vastly improve when opportunity for hunting is allowed (IDFG 2007, p. 54). IDFG and MFWP biologists (Dickson 2010; Maurier 2010, pp. 1–2; IDFG 2007, pp. 43–47) reported that many big game hunters coming through mandatory hunter check stations in 2008 were extremely agitated and angry about wolves. In 2009, when wolves were delisted and there was a fair-chase hunting season, few hunters complained. In 2010, when the court order had relisted wolves, local frustration and negative opinions about wolves erupted to previously unforeseen levels. Hunters and most hunter organizations were again very upset and frustrated; some went as far as to call for illegal killing by shooting, and a few even called for poisoning wolves.

Similarly, in Wisconsin in 2006 (before wolves were delisted for 19 months in 2007–2008), 17 illegal kills were discovered, including 9 killed during the 9-day firearm deer season. When wolves were delisted in 2007 and lethal control of problem wolves was allowed by the State, illegal kills decreased to 11 overall with only 1 during the firearm deer season, and 5 of these were deemed to be accidental shootings outside of regular wolf range. Notably, the wolf population steadily increased throughout this period (Wydeven 2010). Although the small sample size does not allow any firm conclusions, we believe this example illustrates that local human tolerance of wolves is the most critical factor in long term wolf conservation. Keeping a large, recovered wolf population listed under the ESA fuels negative attitudes rather than resolving them (Bangs *et al.* 2009, pp. 112–113).

Regulated public harvest has also been successfully used for a host of other species to garner local public tolerance for restoration efforts (Geist 2006, p. 285). The success of this approach is illustrated by the conservation of mountain lions and black bears, which were also once persecuted throughout most of North America. These species were recovered by State and tribal fish and game agencies and hunters with much less controversy than the recovery of wolves. The recovery of those other species included regulated public harvest from the beginning of restoration efforts. Likewise, the Canadian Provinces restored wolf populations throughout large portions of their historic range by ''harvesting'' them back to fully recovered levels (Pletscher *et al.* 1991, p. 545). In 2009 and 2010, Sweden used hunters to cap the population at 220 wolves, in part, to promote public tolerance for wolf restoration (Liberg 2010, pers. comm.).

We believe public tolerance of wolves will improve as wolves are delisted and hunters start to see wolves as a trophy animal with value. We believe this process has already begun in other delisted areas; however, it will likely take time for the full effects of this increased control over the resource and the related sense of ownership before tangible benefits in improved public opinion and less extreme rhetoric are realized. Public acceptance is highest where wolves never disappeared and where wolf populations are typically healthy (or perhaps just with much longer periods of exposure to wolves) (Houston *et al.* 2010, pp. 19–20). However, it has not been determined whether this is due more to increased knowledge and experience dealing with wolves or relaxed local management policies (including liberal public harvest and defense of property regulations) to address local conflicts.

The State of Wyoming has developed a strategy that will not only provide for wolf recovery, but also allow consideration of the diverse opinions and attitudes of its citizens. Wyoming's plan promotes wolf occupancy of suitable habitat in a manner that minimizes damage to private property, allows for continuation of traditional western land-uses such as grazing and hunting, and allows for direct citizen participation in, and funding for, State wolf management (in the form of State defense of property and hunting regulations). With the continued help of private conservation organizations, Wyoming and the Tribes will continue to foster public support to maintain a recovered wolf population. The WGFD has staff dedicated to providing accurate and science-based public education, information, and outreach (WGFC 2011, pp. 41–42). Wyoming's comprehensive approach to wolf management provides us with confidence that human attitudes toward wolves should not again threaten wolves in Wyoming.

As noted above, wolf conservation is dependent on human tolerance (Boitiani 2003, p. 317; Fritts *et al.* 2003, p. 289) and on the rate of human-caused mortality (Fuller *et al.* 2003, pp. 184–185) far more than any other factor. Regarding the former, State management will likely improve tolerance of wolves as the public appreciates increased State control (less Federal control), and increased management flexibility, including hunting. When one considers that current human attitudes were sufficient to achieve wolf restoration, and that we expect State management to improve these attitudes, we no longer view this as a threat to wolves in Wyoming.

Furthermore, to the extent any impact from human tolerance (or lack thereof) is realized, it will affect human-caused mortality. Wyoming's plan provides assurance that human-caused mortality will be adequately regulated to ensure recovery is never compromised. Thus, we no longer consider human attitudes to be a threat to the gray wolf in Wyoming.

Genetic Considerations—Overall, NRM wolves are as genetically diverse as their vast, secure, healthy, contiguous, and connected populations in Canada (Forbes and Boyd 1997, p. 1089; vonHoldt *et al.* 2007, p. 19; vonHoldt *et al.* 2008, p. 267) and, thus, genetic diversity is not a wolf conservation issue in the NRM DPS at this time (Hebblewhite *et al.* 2010, p. 4383; vonHoldt *et al.* 2010, pp. 4412, 4416, 4421). This current genetic health is the result of deliberate management actions by the Service and its cooperators since 1995 (Bradley *et al.* 2005, p. 1504). Furthermore, genetic data collected from 1995 to 2004 demonstrate that all subpopulations within the NRM DPS maintained high genetic diversity during the first 10 years after reintroduction (vonHoldt *et al.* 2010, p. 4423, Hebblewhite *et al.* 2010, p. 4384). Genetic diversity has likely changed little since 2004. Below we analyze whether genetics will become a threat to wolves in Wyoming or the GYA within the foreseeable future.

Wolves have an unusual ability to rapidly disperse long distances across virtually any habitat and select mates to maximize genetic diversity. Only extremely large bodies of water or vast deserts appear to restrict wolf dispersal (Linnell *et al.* 2005). Wolves are among the least likely species to be affected by inbreeding when compared to nearly any other species of land mammal (Fuller *et al.* 2003, pp. 189–190; Paquet *et al.* 2006, p. 3; Liberg 2008, p. 1). Wolves avoid inbreeding by dispersing to find unrelated mates (Bensch *et al.* 2006, p. 72; vonHoldt *et al.* 2007, p. 1). This social pattern is a basic function of wolf populations and occurs regardless of the numbers, density, or presence of other wolves (Mech and Boitani 2003, pp. 11–180; Jimenez *et al.* 2011, p. 14).

As a general rule, genetic exchange of at least one effective migrant (*i.e.,* a breeding migrant that passes on its genes) per generation is viewed as sufficient to prevent the loss of alleles and minimize loss of heterozygosity within subpopulations (Mills 2007, p.193). This level of gene flow allows for local evolutionary adaptation while minimizing negative effects of genetic drift and inbreeding depression (Mills 2007, p. 193). The northwestern Montana and central Idaho core recovery areas are well-connected to each other and to large wolf populations in Canada through dispersal (Boyd *et al.* 1995, p. 136; Boyd and Pletscher 1999, pp. 1100–1101; Hebblewhite *et al.* 2010, p. 4383; vonHoldt *et al.* 2010, pp. 4422–4423; Jimenez *et al.* 2011, p. 23).

The GYA is the most isolated core recovery area within the NRM DPS (Oakleaf *et al.* 2005, p. 554; vonHoldt *et al.* 2007, p. 19). From 1992 to 2008, we documented five radio-collared wolves naturally entering the GYA, two of which are confirmed to have bred (Service *et al.* 2011, p. 2; Jimenez *et al.* 2011, p. 23). The first wolf dispersed from northwestern Montana to the eastern side of the GYA in 1992 when only 41 wolves and 4 breeding pairs were in the region (Pletscher *et al.* 1997, p. 464). Because this dispersal predated the 1995–1996 reintroductions, this wolf did not breed as there were no other wolves present for it to breed with. In 2002, a central Idaho wolf dispersed to the eastern side of the GYA and became the breeding male of the Greybull pack near Meeteetse, Wyoming. In 2006, another central Idaho wolf dispersed to the northern edge of the GYA (south of Bozeman, Montana); it is unknown if this wolf bred. In 2007, two wolves from central Idaho dispersed to the eastern side of GYA. One of these dispersers joined a pack near Dubois, Wyoming; its reproductive status is unknown. The other 2007 disperser joined a pack near Sunlight Basin, Wyoming, and bred. Because only 20 to 30 percent of the NRM wolf population has been radio-collared, it is reasonable to assume that approximately three times the documented number of radio-collared wolves dispersed into the GYA. On average, about 35 percent of dispersing wolves reproduce (Jimenez *et al.* 2011, p. 12). Because a wolf generation is approximately 4 years, dispersal data indicates that more than one effective migrant per generation has likely entered into the GYA wolf population. Specifically, these data indicate we may have averaged around one-and-a-half effective migrants per generation since reintroduction, with a large portion of this dispersal occurring in recent years when the central Idaho population was above 500 wolves.

Genetics data have only been analyzed from 1995 to 2004 when the NRM gray wolf population was between 101 and 846 wolves (including a minimum population estimate of 14 to 452 wolves in central Idaho) and still growing (average 27 percent annual growth rate). During this period, the NRM region demonstrated a minimum of 3.3 to 5.4 effective migrants per generation among all three subpopulations (vonHoldt *et al.* 2010, p. 4412). Within this range, the 3.3 effective migrants per generation reflect natural dispersal, while the 5.4 effective migrants per generation include human-assisted migration (Stahler 2011, in litt.). Within the GYA, natural dispersal data demonstrates that six wolves in four packs appear to have descended from one central Idaho disperser (the 2002 disperser discussed in the above paragraph who was the breeding male of the Greybull pack near Meeteetse, Wyoming) (vonHoldt *et al.* 2010, p. 4412, Supporting Table S5; Stahler 2011, in litt.). These data demonstrate a minimum of 0.42 natural effective migrants entering the GYA per generation during the 10-year study period (Stahler 2011, in litt.). Because only about 30 percent of the NRM wolf population was sampled, the minimum estimate of effective migrants per generation was likely a significant underestimate (Hebblewhite *et al.* 2010, p. 4384; vonHoldt *et al.* 2010, pp. 4422–4423; Stahler 2011, in litt.). While additional analysis may be needed to determine how much of an underestimate this represents (Stahler 2011, in litt.), Hebblewhite *et al.* (2010, p. 4384) suggest this estimate is ''almost certainly low by at least half.''

Both of the above information sources (documented dispersal rates and genetic analysis) reflect past dispersal patterns when the population was at different levels and the Act's protections remained in place. Post-delisting, populations will no longer be growing, may go through a period of population reduction before leveling off, and management will likely result in higher mortality rates for both dispersers and resident wolves. Thus, past dispersal data is unlikely to be reflective of future effective migration rates. Below we discuss factors likely to influence future effective migration post-delisting.

A more detailed look at dispersal data, although reflective of the situation while listed, may provide insights into likely dispersal after delisting. NRM gray wolf dispersal data from 1995 to 2008 indicated that: wolves routinely dispersed at all population levels and from packs of all sizes (10 percent of the wolf population dispersed annually); some dispersers moved long distances despite the occurrence of empty suitable habitat nearby (23 percent of these dispersers traveled greater than or equal to 100 miles, a distance that separates routinely occupied areas in the GYA and central Idaho); wolves dispersed in all directions (19 percent of dispersers traveled east as would be necessary to get from central Idaho to the GYA); dispersal occurred year round, but peaked in winter (more than half of all dispersal occurred in the 4 months of November through February); dispersal was a long, meandering process (dispersal events averaged 5.5 months); disperser survival rates were lower than for resident wolves (70 versus 80 percent); and 35 percent of dispersing wolves reproduced (Jimenez *et al.* 2011, pp. 9–12). While these data could be used to model likely future effective migration, natural changes to the wolf population and post-delisting management across the NRM region will impact these variables and impact the resulting projections. Below we discuss factors that are likely to change these variables in future years.

Several geographic and biological factors influence migration in the GYA. For example, physical barriers (such as high-elevation mountain ranges that are difficult to traverse in winter) appeared to discourage dispersal through Grand Teton National Park's western boundary. As most wolves disperse in winter, they tended to travel through low-elevation valleys where wild prey concentrations were highest due to lower snow depths. Limited social openings in YNP wolf packs also directed wolves dispersing from Idaho and Montana around YNP. To date, the high density and reproductive output of wolves in YNP has created a unidirectional flow of dispersing wolves out of the Park (vonHoldt *et al.* 2007, p. 270; vonHoldt *et al.* 2010, p. 4413; Wayne and Hedrick 2010). This is because young dispersing wolves seek to establish territories in less saturated habitats, and wolves from outside YNP are unable to establish residency inside areas that appear saturated. The lack of dispersal into YNP is likely to change as the wolf population continues its decline into a lower long-term equilibrium (Smith 2010, pers. comm.). We expect that at lower YNP population densities, wolves from outside YNP will be increasingly successful at dispersing into YNP.

Population levels across the NRM DPS could impact natural rates of gene

flow. For example, because 10 percent of wolves disperse annually, an Idaho wolf population of around 500 wolves long term (a level we continue to think is likely) will produce many more dispersers than a population closer to minimum recovery targets. While the wolf population will almost certainly be reduced post-delisting, all three States in the NRM metapopulation plan to manage wolf populations comfortably above minimum recovery levels to allow for wolf hunting opportunities, in anticipation of uncontrollable sources of mortality, and to ensure relisting never occurs. Based on the available suitable habitat including remote or protected areas, management direction being employed or planned by the States, and State projections, we conclude that the overall NRM population is likely to be maintained well above recovery levels (perhaps around 1,000 wolves across the NRM DPS). Overall, we believe State management of population levels alone is unlikely to reduce the overall rate of natural dispersal enough to threaten adequate levels of effective migration. However, if the population is maintained near the minimum recovery target of 150 wolves per State, a scenario we view as extremely unlikely, we would expect dispersal to noticeably decrease. As discussed below, if genetic exchange drops below one effective migrant per generation, the States will implement a human-assisted migration program (*i.e.*, translocating wolves).

Human-caused wolf mortality is another key factor in determining whether dispersers become effective (*i.e.,* a breeding migrant that passes on its genes). In short, wolves must be able to traverse suitable and unsuitable habitat between the key recovery areas and survive long enough to find a mate in suitable habitat and reproduce. While managed under the Act, dispersers had a 70 percent survival rate. However, State and tribal wolf management is likely to reduce survival of dispersing wolves. Across the NRM DPS, we expect mortality rates to increase post-delisting due to hunting, slightly more liberal defense of property allowances and, in Wyoming, control of wolves on State-managed elk feeding grounds and removal in the predator area of the State.

As noted above, wolves can maintain population levels despite sustained human-caused mortality rates of 22 to greater than 50 percent (Keith 1983; Ballard *et al.* 1987; Fuller 1989; Fuller *et al.* 2003, pp. 182–184; Creel and Rotella 2010). In Wyoming outside YNP, mortality rates and population growth rates from 2007 to 2010 suggest that the Wyoming wolf population can sustain, on average, a 36 percent mortality rate from human causes (WGFC 2011, p. 12). Because States intend to initially reduce wolf populations and ultimately maintain level populations in balance with prey populations, it seems reasonable to assume that there will be high mortality across the entire region for the next several years, but that the population will stabilize within a sustainable level over the long term. Furthermore, we expect human-caused mortality will likely continue to be low in remote and protected areas, and will increase in unsuitable habitat which dispersers must traverse to move between subpopulations.

The management approaches of all three NRM States take into account and limit hunting impacts during important dispersal periods, including the breeding, denning, and pup rearing periods (later winter through early fall). Across Montana, Idaho, and Wyoming, most hunting-related mortality will occur in October and November when big game seasons are scheduled and most big game hunters are in the field. In Montana in 2009, 78 percent of harvested wolves were opportunistically harvested by hunters who were primarily hunting elk, deer, or both (MFWP 2009, p. 3). In both 2009 and 2011, Montana's wolf seasons were scheduled to run through the end of December, or when quotas were met (MFWP 2011, entire). In 2009, Idaho's wolf season was open until December 31st or until the quota was met, but was extended through the end of March for all units that did not meet their quota. The 2009 hunting season was not extended in any areas important for dispersal. In 2011, Idaho's wolf hunting season runs through March for most units, but ends December 31st for those areas thought important for dispersal (*i.e.,* the Beaverhead and Island Park units) (IFGC 2011, entire). Such considerations are consistent with States' commitments to preserve genetic diversity by ensuring the continuation of natural dispersal among the subpopulations through effective management of the timing and location of human-caused mortality (Groen *et al.* 2008, entire). Additionally, State management restricts problem wolf control to recent depredation events, which are uncommon during peak dispersal periods.

The State of Wyoming has indicated their hunting seasons will occur primarily in conjunction with fall hunting seasons, but may be extended beyond that period, if necessary, to achieve management objectives (WGFC 2011, pp. 2–3, 16, 25, 53). Wyoming will develop a hunt plan each year that will take into consideration, but will not be limited to, the following when considering extending their hunting program: wolf breeding seasons; short- and long-range dispersal opportunity, survival, and success in forming new or joining existing packs; conflicts with livestock; and the broader game management responsibilities related to ungulates and other wildlife (WGFC 2011, pp. 2–3, 16, 25, 53).

In Wyoming, survival of dispersing wolves will also be reduced in portions of the State where wolves will be classified as predators. In the predator area, human-caused mortality will be unregulated; therefore, wolf survival rates will decline. This finding is consistent with past Service findings (71 FR 43410, August 1, 2006; 72 FR 6106, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15123, April 2, 2009), and was validated in 2008 when most of the wolves in the predator area were killed within a few weeks of temporarily losing the Act's protection. However, we believe roaming dispersers will be less prone to unregulated removal than resident packs, whose locations and ranges are easily detected.

In total, wolves will be permanently protected or managed as game animals in about 39,900 km^2 (15,400 mi^2) (15.7 percent of Wyoming) in northwestern Wyoming, including YNP, Grand Teton National Park, John D. Rockefeller Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and the Wind River Indian Reservation. The permanent WTGMA incorporates nearly all of Wyoming's current wolf packs and includes the vast majority of the State's suitable habitat. Additionally, the WTGMA will be seasonally expanded approximately 80 km (50 mi) south along the western border of Wyoming (see Figure 1 above) from October 15 to the end of February (28th or 29th). During this period of peak dispersal, the trophy game area will be expanded by approximately 3,300 km^2 (1,300 mi^2) (*i.e.,* an additional 1.3 percent of Wyoming). Maintenance of genetic exchange and connectivity were the primary considerations in Wyoming's agreement to increase protection for wolves within this area during winter months. This seasonal expansion will benefit natural dispersal.

Within the WTGMA, Wyoming may also control wolves to address wolf-ungulate conflicts at State-operated elk feeding grounds (WGFC 2011, pp. 5, 39–41). Wyoming maintains 22 winter elk feeding grounds including 10 within the permanent WTGMA, 3 within the seasonal WTGMA, and 9 within the

permanent predator area. These areas attract and could potentially hold dispersing wolves. Many dispersing wolves in Wyoming, and even some established breeding pairs, temporarily leave their primary territories to visit the elk feed grounds in winter. As noted above, within the predator area, take would occur without limit and would be unregulated. Within the WTGMA, WGFD may take wolves that displace elk from feeding grounds in the WTGMA if such displacement results in one of the following conflicts: (1) Elk damage to private stored crops; (2) elk commingling with domestic livestock; or (3) elk displaced from feeding grounds moving onto highway rights-of-way and causing human safety concerns. Such take will likely further reduce survival of dispersing wolves (WGFC 2011, pp. 5, 39–41).

Human-caused mortality may also provide a potential benefit to genetic exchange. Specifically, State management practices will periodically create localized disruptions of wolf pack structure or modified wolf density in select areas of suitable habitat that will create social vacancies or space for dispersing wolves to fill. This outcome will likely increase reproductive success rates for dispersers that enter the GYA.

Generally, genetic connectivity across the NRM DPS has increased with time, and it will remain a high-priority issue for the Service and our partner wildlife agencies. A process to identify, maintain, and improve linkage of wildlife movement areas between the large blocks of public land in the region is ongoing (Servheen *et al.* 2003, p. 3). This interagency effort involves 9 State and Federal agencies working on linkage facilitation across private lands, public lands, and highways (Interagency Grizzly Bear Committee 2001, pp. 1–2; Brown 2006, pp. 1–3). Key partners include the Forest Service, National Park Service (NPS), Bureau of Land Management, U.S. Geological Survey, and States of Idaho, Montana, Washington, and Wyoming. To date, this effort has included: (1) Development of a written protocol and guidance document on how to implement linkage zone management on public lands (Public Land Linkage Taskforce 2004, pp. 3–5); (2) production of several private land linkage management documents (Service 1997; Parker and Parker 2002, p. 2); (3) analyses of linkage zone management in relation to highways (Geodata Services Inc. 2005, p. 2; Waller and Servheen 2005, p. 998); and (4) periodic workshops discussing implementation of management actions for wildlife linkage. The objective of this work is to maintain and enhance movement opportunities for all wildlife species across the region. Although this linkage work is not directly associated with the wolf population, it will benefit wolves after delisting.

Recognizing there is some uncertainty concerning the level of genetic exchange that will occur post-delisting, Wyoming has agreed to monitor for gene flow and take adaptive measures, as appropriate, to achieve a long-term goal of at least one effective migrant per generation. Wyoming, in coordination with Montana and Idaho, intends to collect genetic samples continuously, and test the samples every 3 to 5 years to search for dispersers and their offspring (WGFC 2011, pp. 26–29). Success in achieving the objective of one effective migrant per generation will be measured over multiple generations (WGFC 2011, pp. 26–29). If the desired level of genetic connectivity is not documented, Wyoming, in coordination with Idaho and Montana, will review genetic monitoring protocols and revise them, if necessary, to improve the State's ability to detect effective migrants (WGFC 2011, pp. 26–29).

Furthermore, population management will be modified if strategies implemented by the State of Wyoming are identified as a meaningful factor that is preventing the connectivity objective from being met. In addition, outside experts will be consulted, as necessary or appropriate, to assist in identifying appropriate changes to regional management. Specifically, Wyoming will: (1) Conduct an evaluation of all sources of mortality, in coordination with other partners as appropriate, with a focus on those within Wyoming's jurisdiction (and the jurisdiction of other partners, as appropriate), to determine which sources of mortality, and the extent to which those sources, are most meaningfully impacting genetic connectivity; and (2) modify population management objectives, in coordination with other partners, as appropriate, based on the above evaluation, as necessary, to achieve the desired level of gene flow (WGFC 2011, pp. 26–29). The extent of actions taken will depend on the level of gene flow as it relates to the genetic connectivity objectives. For example, if the data indicates gene flow is close to the objective, minor modifications to management will be implemented (WGFC 2011, pp. 26–29). However, if very low levels of gene flow are documented over numerous generations, more extreme management measures will be implemented (WGFC 2011, pp. 26–29). This adaptive approach will implement specific and appropriate remedial actions as directed by the available data (WGFC 2011, pp. 26–29).

Human-assisted migration will be used, as necessary, to maintain levels of genetic exchange and connectivity for both the GYA (including Wyoming) and the larger NRM metapopulation (Groan *et al.* 2008, p. 2; WGFC 2011, pp. 26–29). Human intervention in maintaining recovered populations is necessary for many conservation-reliant species and a well-accepted practice in dealing with population concerns (Scott *et al.* 2005). The 1994 wolf reintroduction EIS indicated that intensive genetic management might become necessary if any of the subpopulations developed genetic or demographic problems (Service 1994, pp. 6–74). The 1994 EIS stated that other wildlife management programs rely upon such agency-managed genetic exchange, and that the approach should not be viewed negatively (Service 1994, pp. 6–75). Human-assisted genetic exchange is a proven technique that has created effective migrants in the NRM DPS. An example of successful managed genetic exchange in the NRM population was the release of 10 wolf pups and yearlings translocated from northwestern Montana to YNP in the spring of 1997. Two of those wolves became breeders and their genetic signature is common throughout YNP and the GYA (vonHoldt *et al.* 2010, p. 4422). Wolves could easily be moved again in the highly unlikely event that inbreeding or other problems ever threatened wolves in the GYA or any other area. Agency-managed genetic exchange could focus on such proven established methods, or use other novel means of introducing genes into a recovery area (*e.g.*, artificial insemination of wolves). At this time, such approaches remain unnecessary.

Maintenance of the GYA at very low population levels is unlikely to be a meaningful concern in its own right. Overall, we expect the GYA population will be managed for a long-term average of around 300 wolves across portions of Montana, Idaho, and Wyoming. While exact numbers are difficult to predict and may fluctuate by area and by year, the following information provides some perspective. In Wyoming, the State will maintain a population above 100 wolves and 10 breeding pairs on lands under State jurisdiction and, in most years, will maintain a population buffer above this minimum population level. The wolf population in YNP has ranged from 96 to 171 wolves since 2000. However, the YNP wolf population appears to be declining toward a long-term equilibrium at, or

slightly below, the lower end of this range (Service *et al.* 2000–2010, Table b; Smith 2010, pers. comm.). In Montana's share of the GYA, minimum population estimates have ranged from 55 to 130 wolves since recovery was achieved in 2002 (Service *et al.* 2003–2011, Table 1b). During this period, the GYA constituted between 20 to 42 percent of Montana's statewide wolf population estimate. At the end of 2010, this area included a minimum population estimate of 118 wolves. Montana's planned quota for this area in the 2011 hunting season is 43 wolves. In Idaho's share of the GYA, minimum population estimates have ranged from 0 to 40 wolves since recovery was achieved in 2002 (Service *et al.* 2003–2011, Table 2). At the end of 2010, this area included a minimum population estimate of 40 wolves. Idaho's planned 2011 hunt includes a quota of 30 wolves in this area (IFGC 2011, entire). Collectively, these data suggest a long-term average of around 300 wolves in the GYA, including sizable populations in YNP, portions of Wyoming under State jurisdiction, and portions of the GYA in Montana and Idaho.

In all but the most extreme cases, small wolf populations are unlikely to be threatened solely by the loss of genetic diversity (Boitani 2003, p. 330). Review of the scientific literature shows that, throughout the world, truly isolated wolf populations that are far smaller and far less genetically diverse than the GYA population have persisted for many decades and even centuries (Fritts and Carbyn 1995, p. 33; Boitani 2003, pp. 322–23, 330–335; Fuller *et al.* 2003, pp. 189–190; Liberg 2005, pp. 5–6; 73 FR 10514, February 27, 2008; Boitani and Giucci 2010, pp. 19–21). As with all models, theoretical predictions rely upon the quality and accuracy of input data. In most cases, theoretical predictions of genetic factors impacting wolf population viability have proven poor predictors of actual status of very small wolf populations (Fritts and Carbyn 1995; Boitani 2003; Fuller *et al.* 2003, pp. 189–190). For example, a wolf population on Isle Royale National Park that started from 2 or 3 founders in 1949 and remained very small (less than 50 wolves, long-term effective population size 3.8) has persisted until the present time (Boitani 2003, p. 330) and maintains comparable demographic properties to outbred populations of wolves (Fuller *et al.* 2003). While some have speculated that YNP's small founder population, maintenance at low levels, and relative isolation might eventually affect population dynamics, this now appears doubtful (Ware 2009, abstract; Raikkonen *et al.* 2010). In the Kenai Peninsula of Alaska, the wolf population has remained relatively stable for the past 30 years despite being isolated, small (less than 200 wolves), liberally hunted and trapped, and exposed to typical wolf diseases and parasites. The Kenai population is not threatened (Peterson *et al.* 1994, p. 1) and remains genetically fit (Talbot and Scribner 1997, pp. 20–21). Such information leads us to believe actual wolf population persistence in small isolated situations is a better predictor of future outcomes than theoretical models. Regardless, the GYA wolf population will never be as small or as isolated as the Kenai population.

The GYA wolf population will not be threatened by lower genetic diversity in the foreseeable future because of the current high level of genetic diversity in the NRM DPS, proven connectivity between subpopulations, wolf dispersal capabilities, the strong tendency of wolves to outbreed by choosing unrelated mates, and the likely long-term population and distribution levels of wolves in the NRM DPS. In addition to these natural factors, the States of Montana, Idaho, and Wyoming have committed to monitor for natural genetic connectivity, modify management as necessary to facilitate natural connectivity, and, if necessary, implement a human-assisted migration program to achieve at least one effective migrant per generation. In fact, in our professional judgment, even if no new genes entered into the GYA (a near impossibility), genetic diversity is likely many decades, and perhaps a century or more, away from becoming an issue and even then, it would be unlikely to threaten the GYA population.

Poison—Poisoning is a potentially significant factor in maintenance of the wolf population as it can be an effective and inexpensive method to kill wolves. Wolf extirpation in the United States and many other areas of the world occurred primarily through extensive use of poisons. Wolf populations began to recover in many areas only when certain poisons were banned, despite continued human-caused mortality by shooting and trapping (Fritts *et al.* 2003, p. 311; Fuller *et al.* 2003, pp. 162–163, 189; Boitani 2003, p. 329). Poison was once commonly used by Federal and State agencies and the public throughout the western United States for control of coyotes and other predators. However, many poisons (such as strychnine, Compound 1080, cyanide, and other toxins) for predatory animal management were banned or their use severely limited (Executive Order 11643; Fagerstone *et al.* 2004).

Today, no poisons can legally be used against wolves in the United States because of Environmental Protection Agency restrictions (described above). While steps could be taken to allow registration and limited use, the process is complex, time consuming (5–10 years), and would likely never allow widespread use for a host of reasons, including public disdain for poisoning predators (Fritts *et al.* 2003, p. 311; Fagerstone *et al.* 2004, p. 76) and concerns over secondary nontarget poisoning. Furthermore, within the WTGMA, poison is prohibited by Wyoming Statute 23–3–304(a). Sodium cyanide (only in M–44 devices), Compound 1080 (sodium fluoroacetate used only in livestock protection collars), and denning cartridges (active ingredients of sodium nitrate and charcoal) are legal toxicants for use on other canids. In all three cases, Environmental Protection Agency label restrictions preclude use on wolves (Environmental Protection Agency 1994, pp. 2, 4; Environmental Protection Agency 1995, pp. 28–29; Environmental Protection Agency 2007, p. 3). Poisons (including strychnine, Compound 1080, cyanide, and Temic (an agricultural poison used for insect control)) have occasionally illegally killed dogs and wolves in the NRM region. Such illegal killing has been exceedingly rare and has not affected the wolf population's recovery (Murray *et al.* 2010, p. 2514; Service *et al.* 2011, Table 4, Figure 1). We believe this source of mortality will remain rare into the foreseeable future.

We believe that only a concerted agency-driven or otherwise large-scale campaign to employ poison could threaten the recovered wolf population in Wyoming, the GYA, or the larger NRM DPS. However, this circumstance is highly unlikely in the foreseeable future. Even in unregulated areas like the predator area, widespread poisoning is unlikely in the foreseeable future, as these types of highly toxic and dangerous poisons would have to be legally registered and widely available. Overall, we believe this potential threat is strictly theoretical in nature and is unlikely to ever again threaten this wolf population.

Climate Change—Next to humans, wolves had the largest natural distribution of any land mammal in recent history. Wolves are extremely adaptable and prey on every type of ungulate in their worldwide northern hemisphere range. In North America, wolves once ranged from central Mexico to the Arctic Ocean and from coast to coast. It would be virtually impossible that environmental, habitat, or prey species changes due to the

environmental effects of climate change could affect such an adaptable, resilient, and generalist predator.

While there is much debate about the rates at which carbon dioxide levels, atmospheric temperatures, and ocean temperatures will rise, the Intergovernmental Panel on Climate Change (IPCC), a group of leading climate scientists commissioned by the United Nations, concluded there is a general consensus among the world's best scientists that climate change is occurring (IPCC 2001, pp. 2–3; IPCC 2007, p. 4). The twentieth century was the warmest in the last 1,000 years (Inkley *et al.* 2004, pp. 2–3), with global mean surface temperature increasing by 0.4 to 0.8 degrees Celsius (0.7 to 1.4 degrees Fahrenheit). These increases in temperature were more pronounced over land masses as evidenced by the 1.5 to 1.7 degrees Celsius (2.7 to 3.0 degrees Fahrenheit) increase in North America since the 1940s (Vincent *et al.* 1999, p. 96; Cayan *et al.* 2001, p. 411). According to the IPCC, warmer temperatures will increase 1.1 to 6.4 degrees Celsius (2.0 to 11.5 degrees Fahrenheit) by 2100 (IPCC 2007, pp. 10–11).

The magnitude of warming in the NRM region has been greater, as indicated by an 8-day advance in the appearance of spring phenological indicators in Edmonton, Alberta, since the 1930s (Cayan *et al.* 2001, p. 400). The hydrologic regime in the NRM region also has changed with global climate change, and is projected to change further (Bartlein *et al.* 1997, p. 786; Cayan *et al.* 2001, p. 411; Stewart *et al.* 2004, pp. 223–224). Under global climate change scenarios, the NRM region may eventually experience milder, wetter winters and warmer, drier summers (Bartlein *et al.* 1997, p. 786). Additionally, the pattern of snowmelt runoff may also change, with a reduction in spring snowmelt (Cayan *et al.* 2001, p. 411) and an earlier peak (Stewart *et al.* 2004, pp. 223–224), so that a lower proportion of the annual discharge will occur during spring and summer.

Even with these changes, environmental, habitat, or prey changes resulting from climate change should not threaten the Wyoming wolf population. Wolves are habitat generalists, and next to humans are the most widely distributed land mammal on earth. Wolves live in every habitat type in the Northern Hemisphere that contains ungulates, and once ranged from central Mexico to the Arctic Ocean in North America. The NRM region is roughly in the middle of historic wolf distribution in North America. Because historic evidence suggests gray wolves and their prey survived in hotter, drier environments, including some near-desert conditions, we expect wolves could easily adapt to the warmer and drier conditions that are predicted with climate change, including any northward expansion of diseases, parasites, new prey, or competitors or reductions in species currently at or near the southern extent of their range.

Environmental or habitat changes resulting from changing climatic conditions have the potential to impact wolf prey. Declining moose populations in the southern GYA may result from global warming (Service 2008), a conclusion that has been reached in other parts of the southern range of moose in North America. Climate change has affected elk nutrition, elk herd demographics, and the proportion of migratory and nonmigratory elk in the GYA, but not to the extent that such wolf prey could disappear (Middleton *et al.* 2011, Chapter 1). However, the extent and rate to which most ungulate populations will be impacted is difficult to foresee with any level of confidence. One logical consequence of climate change could be a reduction in the number of elk, deer, moose, and bison that die overwinter, thus maintaining a higher prey base for wolves (Wilmers and Getz 2005, p. 574; Wilmers and Post 2006, p. 405). Furthermore, increased over-winter survival would likely result in overall increases and more resiliency in ungulate populations, thereby providing more prey for wolves.

Catastrophic Events—Here we analyze a number of possible catastrophic events including fire, volcanic activity, and earthquake. Fire is a natural part of the Yellowstone system; however, 20th century forest management that included extensive wildfire suppression efforts, promoted heightened potential for a large fire event. The 1988 fires, the largest wildfire in YNP's recorded history, burned a total of 3,213 km² (793,880 acres) or 36 percent of the Park. However, large mobile species such as wolves and their ungulate prey usually are not meaningfully adversely impacted. Surveys after the 1988 fires found that 345 dead elk, 36 deer, 12 moose, 6 black bears, and 9 bison died in GYA as a direct result of the conflagration (YNP 2011, p. 3). YNP's fire management policy (YNP 2004, entire) indicates natural wildfires should be allowed to burn, so long as parameters regarding fire size, weather, and potential danger are not exceeded. Those fires that do exceed the standards, as well as all human-caused fires, are to be suppressed (YNP 2004, entire). Regarding impacts to wolves, YNP concluded ''wolves are adapted to landscapes strongly influenced by fire, the primary forest disturbance agent within the GYE, are highly vagile, and are adaptable to changing ecological conditions * * * [and] fires will provide significant long-term benefits to gray wolves by maintaining natural ecosystem processes'' (YNP 2004, Appendix I). Future fires are likely in the GYA system. Overall, we agree wolves are adaptable and will benefit from fires in the long term. Long-term, wildfires often lead to an increase in ungulate food supplies and an increase in ungulate numbers. While minor, localized, short-term impacts are likely, fire will not threaten the viability of the wolf population in either the GYA or Wyoming.

The GYA has also experienced several exceedingly large volcanic eruptions in the past 2.1 million years. The three super eruptions occurred 2.1 million, 1.3 million, and 640,000 years ago (Lowenstern *et al.* 2005, pp. 1–2). Such a similar event would devastate the GYA ecosystem. While one could argue ''we are due'' for such an event, scientists with the Yellowstone Volcano Observatory maintain that they ''see no evidence that another such cataclysmic eruption will occur at Yellowstone in the foreseeable future * * * [and that] recurrence intervals of these events are neither regular nor predictable'' (Lowenstern *et al.* 2005, p. 6). We share this view and do not consider such an event likely within the foreseeable future.

More likely to occur is a nonexplosive lava flow eruption or a hydrothermal-explosion. There have been 30 nonexplosive lava flows in YNP over the last 640,000 years, most recently 70,000 years ago (Lowenstern *et al.* 2005, p. 2). During such an eruption, flows ooze slowly over the surface, moving a few hundred feet per day for several months to several years (Lowenstern *et al.* 2005, p. 2). Any renewed volcanic activity at YNP would most likely take this form (Lowenstern *et al.* 2005, p. 3). In general, such events would have localized impacts and be far less devastating than a large eruption (although such an event could also cause fires; fire as a threat is discussed above). Hydrothermal explosions, triggered by sudden changes in pressure of the hydrothermal system, also occasionally impact the region. More than a dozen large hydrothermal-explosion craters formed between about 14,000 and 3,000 years ago (Lowenstern *et al.* 2005, p. 4). The largest hydrothermal-explosion crater documented in the world is along the

north edge of Yellowstone Lake in an embayment known as Mary Bay; this 2.6-km (1.5-mile) diameter crater formed about 13,800 years ago (Lowenstern *et al.* 2005, p. 4). We do not consider either a nonexplosive lava flow eruption or a hydrothermal-explosion likely within the foreseeable future, but even if one of these did occur, the impact to wolves or their prey would likely be localized, temporary, and would not threaten the viability of the wolf population in either the GYA or Wyoming.

Earthquakes also occur in the region. The most notable earthquake in YNP's recent history was a magnitude 7.5 in 1959 (Lowenstern *et al.* 2005, p. 3). Similarly, a magnitude 6.5 earthquake hit within YNP in 1975 (Lowenstern *et al.* 2005, p. 3). The 1959 earthquake killed 28 people, most of them in a massive landslide triggered by the quake (Lowenstern *et al.* 2005, p. 3). Such massive landslides and other earthquake-related impacts could also affect wildlife. But as with other potential catastrophic events, the impact of a large earthquake to wolves or prey would likely be localized, temporary, and would not threaten the viability of the wolf population in either the GYA or Wyoming.

The habitat model/population viability analysis by Carroll *et al.* (2003, p. 543) analyzed environmental stochasticity and predicted it was unlikely to threaten wolf persistence in the GYA. We also considered catastrophic and stochastic events that might reasonably occur in the State of Wyoming, the GYA, or the NRM DPS within the foreseeable future, to the extent possible. Most catastrophic events discussed above are unlikely to occur within the foreseeable future. Other events that might occur within the foreseeable future would likely cause only localized and temporary impacts that would not threaten the viability of the wolf population in either the GYA or Wyoming.

Impacts to Wolf Pack Social Structure as a Result of Human-caused Mortality—When human-caused mortality rates are low, packs contain older individuals. Such larger complex pack structures are most common in National Parks and large, remote wilderness areas. These types of social structures will continue unaltered in those areas after wolves are delisted. In 2010, approximately 20 percent of the estimated 1,651 wolves in the NRM DPS lived primarily in National Parks or Wilderness areas. However, wolves in much of the NRM DPS constantly interact with livestock and people. In these areas, wolves experience higher rates of human-caused mortality, which alters pack structure but does not reduce population viability or their ability to reproduce (Brainerd *et al.* 2008, p. 89) or produce dispersers (Jimenez *et al.* 2011, p. 1).

Wolf packs frequently have high rates of natural turnover (Mech 2007, p. 1482) and quickly adapt to changes in pack social structure (Brainerd *et al.* 2008, p. 89). Higher rates of human-caused mortality outside protected areas will result in different wolf pack size and structure than in protected areas. However, wolf populations in many parts of the world, including most of North America, experience various levels of human-caused mortality and the associated disruption in natural processes and wolf social structure, without ever being threatened (Boitani 2003, pp. 322–323). Therefore, while human-caused mortality may alter pack structure, we have no evidence that indicates this issue is a significant concern for wolf conservation.

Since 1987, we have removed more than 1,000 problem wolves in the NRM region and have monitored the effect of removing breeding adults and other pack members on wolf pack structure and subsequent breeding. Those effects were minor and would certainly not affect wolf population recovery (Brainerd *et al.* 2008, p. 89). Although defense of property laws in Wyoming are similar to current nonessential experimental regulations, human-caused mortality may increase slightly after delisting. In addition, regulated hunting will be allowed, which will increase wolf mortality rates. History has proven that adequate wolf reproduction and survival can occur to sustain wolf populations, despite prolonged periods of high rates of human-caused mortality (Bointani 2003, pp. 322–323). The Wyoming wolf population will be managed so that human-caused mortality will not threaten the population.

Conclusion (Including Cumulative Impacts)

According to 50 CFR 424.11(d), we may delist a species if the best available scientific and commercial data indicate that: (1) The species is extinct; (2) the species is recovered and is no longer endangered or threatened; or (3) if the original scientific data used at the time the species was classified were in error. The second criterion (*i.e.,* the species has recovered and is no longer endangered or threatened) applies for wolves in Wyoming.

Wolves in Wyoming and across the NRM DPS are recovered. All prongs of the recovery criteria are satisfied. The numeric and distributional components of the overarching recovery goal have been exceeded for 11 consecutive years. Furthermore, Montana, Idaho, and Wyoming have each individually met or exceeded the minimum per-State recovery targets every year since at least 2002, and met or exceeded the step-down management goals every year since at least 2004. Each of the recovery areas (which were originally used to measure progress towards recovery) has been documented at or above 10 breeding pairs and 100 wolves every year since 2005 (and probably exceeded these levels every year since 2002) (Service *et al.* 2011, Table 4). Finally, the available evidence demonstrates the NRM gray wolf population is functioning as a metapopulation with gene flow between subpopulations. Thus, we consider the population recovered.

Still, however, before we can delist, we must consider the threats currently facing the species and the threats that are reasonably likely to affect the species in the foreseeable future following the delisting. Under section 3 of the Act, a species is ''endangered'' if it is in danger of extinction throughout all or a significant portion of its range and is ''threatened'' if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. 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. The information must include evidence sufficient to suggest that the potential threat is likely to materialize and that it has the capacity (*i.e.,* it should be of sufficient magnitude and extent) to affect the species' status such that it meets the definition of endangered or threatened under the Act.

Most of the factors evaluated above in the ''Summary of Factors Affecting the Species'' are not expected to meaningfully impact the wolf population in Wyoming, the GYA, or the NRM region. As long as populations are maintained above minimal recovery levels, wolf biology (namely the species' reproductive capacity) and the availability of large, secure blocks of suitable habitat will maintain strong source populations capable of withstanding all other foreseeable threats. In terms of habitat, the amount and distribution of suitable habitat in public ownership provides, and will continue to provide, large core areas that contain high-quality habitat of sufficient size to anchor a recovered wolf population. Our analysis of land-

use practices shows these areas will maintain their suitability well into the foreseeable future. While disease and parasites can temporarily impact population stability, as long as populations are managed above recovery levels, these factors are not likely to threaten the wolf population at any point in the foreseeable future. Natural predation is also likely to remain an insignificant factor in population dynamics into the foreseeable future. Additionally, we conclude that other natural or manmade factors like public attitudes towards wolves, climate change, catastrophic events, and impacts to wolf pack social structure are unlikely to threaten the wolf population within the foreseeable future. While poisoning is a potentially significant factor in the maintenance of the wolf population, no poisons can be legally used to poison wolves in the United States and we do not foresee or anticipate a change in poison regulation that would allow more widespread wolf poisoning.

Human-caused mortality is the most significant issue to the long-term conservation status of the wolf population in Wyoming, the GYA, and the entire NRM DPS. Therefore, managing this source of mortality (*i.e.,* overutilization for commercial and recreational purposes as well as human-caused predation) remains the primary challenge to maintaining a recovered wolf population into the foreseeable future. Fortunately, wolf populations have an ample natural resiliency to high levels of human-caused mortality, if population levels and controllable sources of mortality are adequately regulated. For example, in 2009, more than 600 NRM wolves died from all sources of mortality (agency control including defense of property, regulated harvest, illegal and accidental killing, and natural causes), and the population still grew by almost 5 percent. From 1995 to 2008, the NRM wolf population grew by an average of about 20 percent annually, even in the face of an average annual human-caused mortality rate of 23 percent (Smith *et al.* 2010, p. 620). Overall, wolf populations can maintain themselves despite sustained human-caused mortality rates of 22 to greater than 50 percent (Keith 1983; Ballard *et al.* 1987; Fuller 1989; Fuller *et al.* 2003, pp. 182–184; Creel and Rotella 2010). Mortality rates and population growth rates reported from 2007 to 2010 indicate that the wolf population in Wyoming outside YNP can sustain, on average, a 36 percent mortality rate from human causes (WGFC 2011, p. 12). Furthermore, after severe declines, wolf populations can more than double in just 2 years if mortality is reduced; in the NRM DPS, increases of nearly 100 percent per year have been documented in low-density suitable habitat (Fuller *et al.* 2003, pp. 181–183; Service *et al.* 2011, Table 4).

Human-caused mortality can include both controllable sources and sources of mortality that will be difficult to limit. Controllable sources of mortality are discretionary and can be limited by the managing agency. They include permitted take in chronic depredating areas, sport hunting, and agency action to address impacts to ungulates. Sources of mortality that will be difficult to limit, or may be uncontrollable, occur regardless of population levels and include things like defense of property mortality, illegal take, accidental mortality (such as vehicle collisions), and mortality in the predator area of Wyoming.

The original recovery goal called for a three-part metapopulation of at least 30 breeding pairs and at least 300 wolves equitably distributed between Montana, Idaho, and Wyoming. We have determined that Wyoming's share of this recovery goal will be satisfied by Wyoming's commitment to maintain at least 10 breeding pairs and at least 100 wolves in areas primarily within the State's jurisdiction. All sources of mortality will be considered in management decisions to ensure the management objectives are met. Furthermore, Wyoming intends to maintain an adequate buffer above minimum population objectives to accommodate management needs and ensure uncontrollable sources of mortality do not drop the population below this minimum population level. Thus, in most years, the minimum recovery goal for the State of Wyoming will be exceeded in areas under Wyoming's jurisdiction alone, allowing YNP and the Wind River Indian Reservation to provide an additional buffer above the minimum recovery target. Additionally, Wyoming is planning a gradual population reduction to ensure population targets are not compromised while the State gathers information on the vulnerability of wolves under a State management regime. This graduated approach to population reductions and long-term stabilization of the population, with an adequate buffer above minimum population targets, provides us with confidence that the population in areas under State jurisdiction will be maintained at-or-above 10 breeding pairs, and at-or-above 100 wolves.

All three States within the NRM DPS are required to manage comfortably above the minimum recovery level of at least 10 breeding pairs and at least 100 wolves. In Montana and Idaho, we required the Statewide population level to be managed at least 50 percent above this target. Because Wyoming, unlike Montana and Idaho, has a large portion of its wolf population in areas outside the State's control (*e.g.,* YNP and the Wind River Indian Reservation), we developed an alternative approach to achieve the desired safety margin above the minimum recovery goal. Specifically, the wolf populations in YNP and the Wind River Indian Reservation will provide the remaining buffer above the minimum recovery goal intended by the step-down management objective employed in Montana and Idaho (*i.e.,* population targets 50 percent above minimum recovery levels). From 2001 to the end of 2010, the wolf population in YNP ranged from 96 to 171 wolves, and between 6 to 16 breeding pairs, with an average of 9.8 breeding pairs. However, recent population levels may be higher than the long-term carrying capacity of YNP, as the park predicts their wolf numbers may decline further and settle into a lower equilibrium long term (Smith 2010, pers. comm.). Regardless, YNP will always represent a large core refugium that contains a substantial number of overwintering wild ungulates and few livestock with low levels of human-caused mortality. These factors guarantee that the area will remain a secure stronghold for the Wyoming wolf population. Thus, YNP will always provide a large, secure wolf population providing a safety margin above the minimum recovery goal.

The Wind River Indian Reservation will further buffer the population, although the area's contribution to recovery levels has always been, and is likely to remain, very modest. The Wind River Indian Reservation typically contains a small number of wolves (single digits), which sometimes form packs that count toward Tribal population totals. None of these packs have ever met the breeding pair definition.

In total, Wyoming wolves will be permanently managed as game animals or protected (*e.g.,* in National Parks) in about 40,000 km^2 (15,400 mi^2) in the northwestern portion of the State (15.7 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and the Wind River Indian Reservation (Lickfett 2011, in litt.). This area (see Figure 1) includes: 100 percent of the

portion of the GYA recovery area within Wyoming (Service 1987, Figure 2); approximately 79 percent of the Wyoming portion of the primary analysis area that the 1994 reintroduction EIS focused on (Service 1994, Figure 1.1); the entire home range for 24 of 27 breeding pairs in Wyoming and 24 of 34 packs in the State (Service *et al.* 2011, Figure 3); and approximately 76 percent of the State's suitable habitat (including 81 percent of the high-quality habitat (greater than 0.8) and 62 percent of the medium-high-quality habitat (0.5–0.799) (Oakleaf 2011, in litt.)). Although wolves will not persist in the predator area, these protected and managed portions of Wyoming are of sufficient size to support a recovered wolf population in Wyoming.

Genetic diversity is not a wolf conservation issue in the NRM DPS at this time because the NRM wolves are as genetically diverse as the vast, secure, healthy, contiguous, and connected populations in Canada. However, the GYA is the most isolated core recovery area within the NRM DPS. Thus, the States have agreed to monitor for natural genetic connectivity, modify management as necessary to facilitate natural connectivity, and, if necessary, implement a human-assisted migration program to achieve at least one effective migrant per generation. These factors, and wolves' natural dispersal and reproductive capacity, ensures the GYA wolf population will not be threatened by low genetic diversity in the foreseeable future.

Further buffering the genetic and general health of the GYA population is the fact that we expect the GYA population will be managed for a long-term average of around 300 wolves across portions of Montana, Idaho, and Wyoming. This total will be subdivided across the GYA, including sizable populations in YNP, portions of Wyoming under State jurisdiction, and portions of the GYA in Montana and Idaho. This added representation, resiliency, and redundancy across the entire GYA provides further assurance that this wolf population will not become threatened again within the foreseeable future.

We considered all potential threats, including all sources of mortality, currently facing the species and those reasonably likely to affect the species in the foreseeable future throughout Wyoming and the GYA. Collectively, the available information indicates that the Wyoming wolf population, in addition to the GYA wolf population, is recovered, is likely to remain recovered, and is unlikely to again become threatened with extinction within the foreseeable future. Thus, in accordance with 50 CFR 424.11(d), we propose to delist wolves in Wyoming. This rulemaking is separate and independent from, but additive to, the previous action delisting of wolves in the remainder of the NRM DPS (all of Idaho, all of Montana, eastern Oregon, eastern Washington, and north-central Utah) (74 FR 15123, April 2, 2009; 76 FR 25590, May 5, 2011).

This proposed rule is premised on agreed upon and anticipated changes to Wyoming State law and WGFC regulations necessary to implement the Wyoming wolf management plan. We expect these statutory and regulatory changes will be made within the next several months. Depending on the exact nature of the changes, we may need to reopen the comment period to provide the public an opportunity to review and comment once these changes are finalized. Should Wyoming fail to make the changes necessary to support a recovered wolf population, delisting will not occur and this proposal will be withdrawn.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires us to implement a system in cooperation with the States, to monitor for at least 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 primary goal of post-delisting monitoring is to ensure that the recovered species does not deteriorate, and if an unanticipated decline is detected, to take measures to halt the decline to avoid relisting the species as threatened or endangered. If relisting is ever warranted, as directed by section 4(g)(2) of the Act, we will make prompt use of the Act's emergency listing provisions if we determine the wolf faces a significant risk to its well-being.

Wolves have been monitored in the NRM DPS for over 20 years. The NRM region was intensively monitored for wolves even before wolves were documented in Montana in the mid-1980s (Weaver 1978; Ream and Mattson 1982, pp. 379–381; Kaminski and Hansen 1984, p. v). Numerous Federal, State, and Tribal agencies, universities, and special interest groups assisted in those various efforts. Since 1979, wolves have been monitored using standard techniques including collecting, evaluating, and following up on suspected observations of wolves or wolf signs by natural resource agencies or the public; howling or snow tracking surveys conducted by the Service, cooperators, volunteers, and interested special interest groups; and by capturing, radio-collaring, and monitoring wolves. We only consider wolves and wolf packs as confirmed when Federal, State, or Tribal agency verification is made by field staff that can reliably identify wolves and wolf signs.

At the end of the year, we compile agency-confirmed wolf observations to estimate the number and location of adult wolves and pups that were likely alive on December 31 of that year. These data are then summarized by packs to indicate overall population size, composition, and distribution. This level of wildlife monitoring is intensive and provides relatively accurate estimates of wolf population distribution and structure (Service *et al.* 2011, Table 1–4, Figure 1–4). The USFWS Annual Reports have documented all aspects of the wolf management program including staffing and funding, legal issues, population monitoring, control to reduce livestock and pet damage, research (predator-prey interactions, livestock/wolf conflict prevention, disease and health monitoring, publications, etc.) and public outreach.

Post-delisting, Wyoming will likewise monitor and report on wolf populations. The WGFD will monitor breeding pairs and total number of wolves in Wyoming in order to document their number, distribution, reproduction, and mortality (WGFC 2011, pp. 17–21). The WGFD will be responsible for monitoring these parameters in areas under State jurisdiction. The Shoshone and Arapahoe Tribal Fish and Game Department and the Service's Lander Fish and Wildlife Conservation Office will continue to monitor wolves on the Wind River Indian Reservation; the National Park Service will continue to monitor wolves inside YNP and Grand Teton National Park; and the Service will continue to monitor wolves on the National Elk Refuge (Shoshone and Arapahoe Tribal Fish and Game Department 2007, p. 9; WGFC 2011, pp. 17–21). These agencies have agreed to share information regarding the status of wolves within their respective jurisdictions in Wyoming (WGFC 2011, pp. 17–21). These agencies will continue to use the monitoring techniques and strategies that have been used to estimate the NRM wolf population for more than 20 years. We fully recognize and anticipate that monitoring techniques may change through time as new knowledge becomes available and as the parties responsible for monitoring gain additional experience at wolf management and conservation. For

example, we anticipate parties responsible for monitoring may use other survey methods and data that are biologically equivalent to the breeding pair definition (Mitchell *et al.* 2008, entire). Information from the Service, the National Park Service, the Wind River Indian Reservation, and the State of Wyoming will be published by WGFD in an annual wolf report. Similar reports have been published annually since 1989 by the Service and our partners (Service *et al.* 1989–2008).

For the post-delisting monitoring period, the best source of that information will be the State's annual report or other wolf reports and publications. We intend to post those annual State wolf reports on our Web site (*http://www.fws.gov/mountain-prairie/species/mammals/wolf/*) by approximately April 1 of each following year. We also intend to annually publish an assessment of the status of the wolf population in the NRM DPS during the post-delisting monitoring period. This assessment will consider the numbers of packs, breeding pairs, and total numbers of wolves in mid-winter by State and by recovery area as well as any changes in threats. This information will inform whether a formal status review is necessary.

Specifically, the following scenarios will lead us to initiate a formal status review to determine if relisting is warranted:

(1) If the wolf population falls below the minimum recovery level of 10 breeding pairs and 100 wolves in Wyoming statewide (including YNP and the Wind River Indian Reservation) at the end of any one year;

(2) If the wolf population segment in Wyoming in areas under the State's jurisdiction (*i.e.,* excluding YNP and the Wind River Indian Reservation) falls below 10 breeding pairs or 100 wolves at the end of the year for 3 consecutive years;

(3) If the wolf population in Wyoming falls below 15 breeding pairs or 150 wolves, including YNP and the Wind River Indian Reservation, for 3 consecutive years; or

(4) If a change in State law or management objectives would significantly increase the threat to the wolf population.

Status review or relisting decisions will be based on the best scientific and commercial data available. If a formal status review is triggered during the post-delisting monitoring period by these triggers or the triggers noted for the remainder of the DPS in our 2009 delisting rule (74 FR 15123, April 2, 2009), the review will evaluate the status of the entire NRM DPS to determine if relisting is warranted. In the unlikely event such a review is ever necessary, the review would attempt to identify why a particular area is not meeting its population objectives. For example, if the wolf population in Wyoming falls below 15 breeding pairs or 150 wolves including YNP and the Wind River Indian Reservation for 3 consecutive years when the Wyoming wolf population under State jurisdiction is at least 10 breeding pairs and 100 wolves, the status review would focus on factors impacting wolves in YNP and the Wind River Indian Reservation. Adaptive management strategies may be recommended in this review, but Wyoming would not be required to contribute more than 10 breeding pairs and 100 wolves outside YNP and the Wind River Indian Reservation.

All such reviews will be made available for public review and comment, including peer review by select species experts. If relisting is ever warranted, as directed by section 4(g)(2) of the Act, we will make prompt use of the Act's emergency listing provisions if necessary to prevent a significant risk to the well-being of the NRM DPS. Additionally, if any of these scenarios occur during the mandatory post-delisting monitoring period of at least 5-years, the post-delisting monitoring period will be extended 5 additional years from that point.

Effects of the Proposed Rule

This proposal, if made final, would remove the protections of the Act for all gray wolves in Wyoming. This rulemaking is separate and independent from, but additive to, the previous action delisting wolves in the remainder of the NRM DPS (all of Idaho, all of Montana, eastern Oregon, eastern Washington, and north-central Utah) (74 FR 15123, April 2, 2009; 76 FR 25590, May 5, 2011). Additionally, this proposal, if made final, would remove the special regulations under section 10(j) of the Act designating Wyoming as a nonessential experimental population area for gray wolves. These regulations currently are found at 50 CFR 17.84(i) and 17.84(n).

The Service is also proposing actions for wolves in the eastern United States that are separate from this proposed rulemaking. For more information on those actions, please see our **Federal Register** publications of May 5, 2011 (76 FR 26086) and August 26, 2011 (76 FR 53379). Both today's proposed rule and the eastern United States proposed rule would, if finalized, amend the listing for ''Wolf, gray'' under ''MAMMALS'' in the List of Endangered and Threatened Wildlife. The remaining protections of the gray wolf under the Act do not extend to gray wolf-dog hybrids.

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must: (1) Be logically organized; (2) Use the active voice to address readers directly; (3) Use clear language rather than jargon; (4) Be divided into short sections and sentences; and (5) 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 proposed rule, your comments should be as specific as possible. For example, you should tell us the specific 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.

Paperwork Reduction Act

The OMB regulations at 5 CFR part 1320 implement provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). The OMB regulations at 5 CFR 1320.3(c) define a collection of information as the obtaining of information by or for an agency by means of identical questions posed to, or identical reporting, recordkeeping, or disclosure requirements imposed on, 10 or more persons. Furthermore, 5 CFR 1320.3(c)(4) specifies that ''ten or more persons'' refers to the persons to whom a collection of information is addressed by the agency within any 12-month period. For purposes of this definition, employees of the Federal Government are not included. We may not conduct or sponsor and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.

This rule does not contain any collections of information that require approval by OMB under the Paperwork Reduction Act. As proposed under the Post-Delisting Monitoring section above, gray wolves in Wyoming will be monitored by Wyoming Game and Fish Department, Sovereign Tribal Nations in Wyoming, the National Park Service, and the Service. We do not anticipate a need to request data or other information from 10 or more persons during any 12-month period to satisfy monitoring information needs. If it becomes necessary to collect information from 10 or more non-Federal individuals, groups, or

organizations per year, we will first obtain information collection approval from the OMB.

National Environmental Policy Act

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

Executive Order 13211

Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As this rule is not expected to significantly affect energy supplies, distribution, or use, this action is not a significant energy action and no Statement of Energy Effects is required.

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), Executive Order 13175, and 512 DM 2, we intend to coordinate this rulemaking with the affected Tribes (Eastern Shoshone and Northern Arapahoe Tribes). We will endeavor 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) understand their concerns with those changes. We intend to fully consider their comments during the development of a final rule. If requested, we will conduct additional consultations with Native American tribes and multitribal organizations subsequent to a final rule in order to facilitate the transition to State and tribal management of gray wolves within Wyoming.

References Cited

A complete list of references cited is available: (1) On the Internet at *http://www.regulations.gov* or *http://www.fws.gov/mountain-prairie/species/mammals/wolf/* or (2) upon request from the Denver Regional Office, Ecological Services Office (see **FOR FURTHER INFORMATION CONTACT** above).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

Accordingly, we propose to further amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as proposed to be amended at 76 FR 53379, August 26, 2011, as follows:

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

§ 17.11 [Amended]

2. Amend § 17.11(h) by revising the entries for ''Wolf, gray'' under MAMMALS in the List of Endangered and Threatened Wildlife as follows:

a. Remove the words ''TX, and WY'' from the first entry and add in their place the words ''and TX''; and

b. Remove the last entry, ''Wolf, gray [Northern Rocky Mountain DPS],'' in its entirety.

§ 17.84 [Amended]

3. Amend § 17.84 by removing and reserving both paragraphs pertaining to ''Gray wolf (*Canis lupus*)'': (i) and (n).

Dated: September 23, 2011.

Daniel M. Ashe,

Director, U.S. Fish and Wildlife Service.

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