



This document is scheduled to be published in the Federal Register on 09/10/2012 and available online at <http://federalregister.gov/a/2012-21988>, and on FDsys.gov

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R6–ES–2011–0039]

[FXES11130900000C6-123-FF09E30000]

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: Final rule.

SUMMARY: The best scientific and commercial data available indicate that gray wolves (*Canis lupus*) in Wyoming are recovered and are no longer in need of protection as part of an endangered or threatened species under the Endangered Species Act of

1973, as amended (Act). Therefore, we, the U.S. Fish and Wildlife Service (Service), remove the gray wolf in Wyoming from the Federal List of Endangered and Threatened Wildlife. Wyoming's gray wolf population is stable, threats are sufficiently minimized, and a post-delisting monitoring and management framework has been developed. Therefore, this final rule returns management for this species to the appropriate State, Tribal, or Federal agencies; management in National Parks and National Wildlife Refuges will continue to be guided by existing authorizing and management legislation and regulations. Finally, this action makes obsolete and removes the Yellowstone Experimental Population Area established in 1994 to facilitate reintroductions.

DATES: This rule becomes effective on September 30, 2012.

ADDRESSES: This final rule, comments received, and additional supporting information are available on the Internet at <http://www.regulations.gov>, Docket No. FWS-R6-ES-2011-0039. Additional background information is also available online at <http://www.fws.gov/mountain-prairie/species/mammals/wolf/>. Comments and materials we received, as well as supporting documentation we used in preparing this rule are available for public inspection, by appointment, during normal business hours at the 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.

FOR FURTHER INFORMATION CONTACT: Mountain-Prairie Region Office, Ecological Services Division; telephone 303–236–7400. Direct all questions or requests for additional information to: GRAY WOLF QUESTIONS, U.S. Fish and Wildlife Service, Mountain-Prairie Region Office, Ecological Services Division, 134 Union Blvd., Lakewood, CO 80228. Individuals who are hearing-impaired or speech-impaired may call the Federal Relay Service at 800–877–8337 for TTY assistance.

SUPPLEMENTARY INFORMATION:

Table of Contents

Executive Summary

Background

- Delisting Wolves in Wyoming
- Previous Federal Actions
- Reengaging Wyoming and Changes to Its Wolf Management Plan
- Species Description and Basic Biology
- Recovery Planning and Implementation
 - o Recovery Planning and the Development of Recovery Criteria
 - o Monitoring and Managing Recovery
 - o Recovery by State
 - o Recovery by Recovery Area
 - o Genetic Exchange Relative to our Recovery Criteria
 - o Conclusion on Progress Towards our Recovery Goals

Summary of Comments and Recommendations

- Technical and Editorial Comments
- The Delisting Process and Compliance with Applicable Laws, Regulations, and Policy
- Northern Rocky Mountain (NRM) Gray Wolf Recovery Goals
- The Geographic Scope of Recovery and the Impact of this Decision on Range
- General Comments on Whether to Delist
- Human-Caused Mortality
- Gene Flow and Genetic Diversity
- Adequacy of Regulatory Mechanisms
- Public Attitudes Toward Wolves
- Other Potential Threat Factors
- Cumulative Impacts of Threats
- Post-Delisting Monitoring
- Positives and Negatives of Wolf Restoration
- Native American Tribal Considerations

Summary of Factors Affecting the Species

- Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range.
 - o Suitable Habitat
 - o Unoccupied Suitable Habitat
 - o Currently Occupied Habitat
 - o Potential Threats Affecting Habitat or Range

- Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.
 - Commercial or Recreational Uses
 - Overutilization for Scientific or Educational Purposes
- Factor C. Disease or Predation.
 - Disease
 - Natural Predation
 - Human-caused Mortality
- Factor D. The Inadequacy of Existing Regulatory Mechanisms.
 - National Park Service
 - National Wildlife Refuges
 - Tribal Lands
 - Forest Service
 - State Regulatory Mechanisms
 - Environmental Protection Agency
- Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence.
 - Public Attitudes Toward the Gray Wolf
 - Genetic Considerations
 - Poison
 - Climate Change
 - Catastrophic Events

- Impacts to Wolf Pack Social Structure as a Result of Human-caused Mortality

Conclusion (Including Cumulative Impacts)

Significant Portion of the Range Analysis

Post-Delisting Monitoring

Effects of the Rule

Required Determinations

- Paperwork Reduction Act
- National Environmental Policy Act
- Executive Order 13211
- Government-to-Government Relationship With Tribes

References Cited

Authority

List of Subjects in 50 CFR Part 17

Regulation Promulgation

Executive Summary

(1) Purpose of the Regulatory Action

This rulemaking is necessary to remove gray wolves (*Canis lupus*) in Wyoming from the Federal List of Endangered and Threatened Wildlife. Delisting is appropriate because gray wolves in Wyoming are recovered and are no longer in need of protection

as part of an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). Wyoming's gray wolf population is stable, threats are sufficiently minimized, and a post-delisting monitoring and management framework has been developed. This action also makes obsolete and removes the Yellowstone Experimental Population Area established in 1994 to facilitate reintroductions.

(2) Major Provision of the Regulatory Action

This action is authorized by the Act. We are amending § 17.11(h), subchapter B of chapter I, title 50 of the Code of Federal Regulations by removing the entry for “Wolf, gray [Northern Rocky Mountain DPS]” under MAMMALS in the List of Endangered and Threatened Wildlife. We are also amending § 17.84, subchapter B of chapter I, title 50 of the Code of Federal Regulations by removing and reserving both paragraphs pertaining to experimental populations of “Gray wolf (*Canis lupus*)”: (i) and (n). In short, this action removes the gray wolf in Wyoming from the Federal List of Endangered and Threatened Wildlife and makes obsolete and removes the Yellowstone Experimental Population Area established in 1994 to facilitate reintroductions.

(3) Costs and Benefits

We have not analyzed the costs or benefits of this rulemaking action because the Act precludes consideration of such impacts on listing and delisting determinations.

Instead, listing and delisting decisions are based solely on the best scientific and commercial information available regarding the status of the subject species.

Background

Delisting Wolves in Wyoming

This rulemaking is separate and independent from, but additive to, the previous action delisting wolves in the Northern Rocky Mountain (NRM) Distinct Population Segment (DPS) (74 FR 15123, April 2, 2009; 76 FR 25590, May 5, 2011). We conclude that 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 rule is separate from prior actions 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 issued 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 United States Southwest. Later 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 established nonessential experimental gray wolf populations under section 10(j) of the Act (50 CFR 17.84(i)), in portions of Idaho, Montana, and all of Wyoming, 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.* 2012, 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.* 2012, 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 U.S. 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 15876, 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; Williams 2004b). However, we also found the 2003 Wyoming legislation and plan were not adequate to maintain Wyoming's share of a recovered NRM gray wolf population (Williams 2004c). 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)). This challenge was resolved on procedural grounds because Wyoming failed to identify a final agency action necessary for judicial review. 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 maintain Wyoming's share of a recovered NRM wolf population (71 FR 43410, August 1, 2006). Wyoming challenged this finding in Wyoming Federal District Court. This challenge was rendered 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 historical range of the originally listed NRM gray wolf in the region and the areas focused on in both NRM recovery plans (39 FR 1175 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).

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. In addition, the court concluded we acted arbitrarily in approving Wyoming's 2007 post-delisting management framework that contained a Wyoming statute allowing the Wyoming Game and Fish Commission (WGFC) to diminish Wyoming's Wolf Trophy Game Management Area (Trophy 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 order 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 the 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, entire). The final rule determined that Wyoming's existing regulatory framework did not provide adequate regulatory mechanisms to maintain Wyoming's share of a recovered NRM wolf population 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 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." 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 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, north-central 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 affected 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 (hereafter referred to as the 2011 Appropriations Act). Section 1713 of the law directed the Service to reissue its April 2009 delisting rule. The Service complied with the Appropriations Act on May 5, 2011 (76 FR 25590). Thus, gray wolves in Montana, Idaho, eastern Oregon, north-central Utah, and eastern Washington were once again delisted. The constitutionality of section 1713 of the 2011 Appropriations Act was upheld in the Montana District Court and the Ninth Circuit Court of Appeals (*Alliance for the Wild Rockies et al., v. Salazar, et al.*, case no. CV 11-70-M-DWM; *Alliance for the Wild Rockies, et al., v. Salazar, et al.*, case no. 11-35670). The Department of Interior withdrew the M-Opinion on this topic on May 4, 2011 (Department of the Interior 2011, entire).

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 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's recommendation that the entire State of Wyoming be designated as a Trophy Area, and the court found this position to be arbitrary and capricious, because it was not supported by the administrative record. The court stated that the record indicated only northwestern Wyoming, which has the vast majority of the State's suitable habitat, was biologically essential to maintaining the NRM population. However, the court did not render an opinion on whether Wyoming's current plan, including the size and location of its 2007 Trophy 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 discussions on revisions to the State's wolf management framework that would satisfy the standards of the Act and allow delisting to again move forward. These discussions led to an agreement and modification of the Wyoming wolf management plan (WGFC 2011, entire).

On October 5, 2011, we proposed to remove the gray wolf in Wyoming from the List of Endangered and Threatened Wildlife (76 FR 61782). This proposal relied on Wyoming's 2011 wolf management plan (WGFC 2011, entire) and noted that conforming changes to State law and regulations would be required to allow Wyoming's

plan to be implemented as written. Following publication of the proposal, Wyoming revised its State statutes and gray wolf management regulations (chapter 21) and developed gray wolf hunting season regulations (chapter 47) and an Addendum to the Wyoming Gray Wolf Management Plan. On May 1, 2012, we reopened the public comment period on our October 5, 2011, proposal to allow all interested parties an additional opportunity to comment on the proposed rule in light of these documents (77 FR 25664, May 1, 2012).

Reengaging Wyoming and Changes to Its Wolf Management Plan

The 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 the Trophy Area; (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.

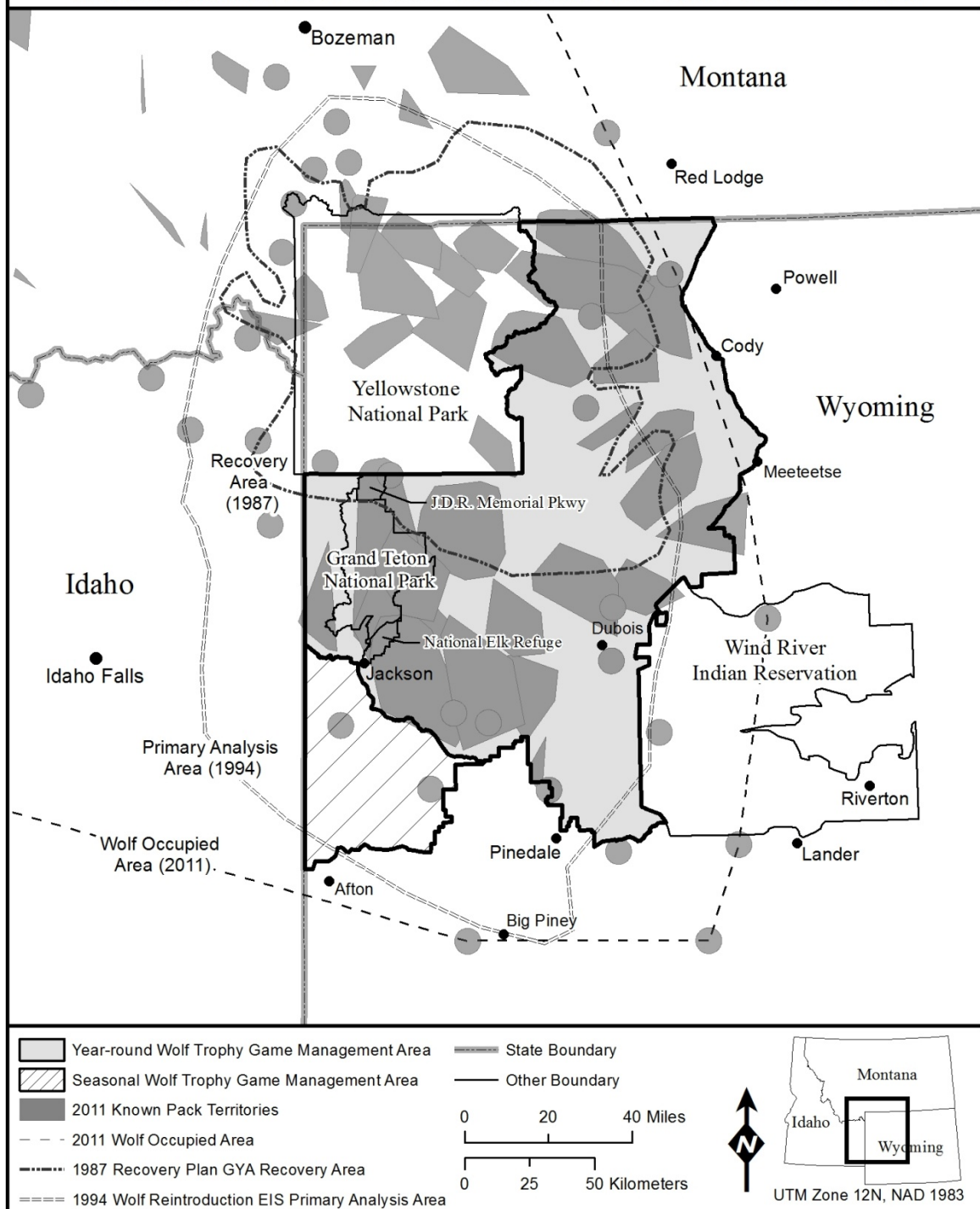
In early 2011, we began discussions with Wyoming seeking to develop a strategy to address each of these issues. In August 2011, the Service and the State of Wyoming announced the framework of an agreement that we conclude will maintain a recovered wolf population in Wyoming (WGFC 2011, appendix I). Since this agreement,

Wyoming has incorporated these changes into its regulatory framework. Below we summarize the key points in the agreement relative to the three overarching Service concerns highlighted above.

First, Wyoming made the existing Trophy Area permanent by incorporating it into State statute. In total, Wyoming wolves will be managed as game animals year-round or protected in about 38,500 square kilometers (km²) (15,000 square miles (mi²)) in the northwestern portion of the State (15.2 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and most of the Wind River Indian Reservation (Lickfett 2012). This area of Wyoming contains the majority of suitable wolf habitat within the State. Wolves will be designated as predatory animals in the remainder of the State (predator area). The above protected and permanent game areas (see Figure 1) include: 100 percent of the portion of the Greater Yellowstone Area (GYA) recovery area within Wyoming (Service 1987, Figure 2); approximately 79 percent of the Wyoming portion of the primary analysis area used in the 1994 Environmental Impact Statement on The Reintroduction of Gray Wolves to YNP and Central Idaho (1994 Environmental Impact Statement) (areas analyzed as potentially being impacted by wolf recovery in the GYA) (Service 1994, Figure 1.1); the entire home range for 24 of 27 breeding pairs (88 percent), 40 of 48 packs (83 percent), and 282 of 328 individual wolves (86 percent) in the State at the end of 2011 (Service *et al.* 2012, Tables 2, 4, Figure 3; Jimenez 2012a; Jimenez 2012, pers. comm.); and approximately 81 percent of the State's suitable habitat (including over 81 percent of the

high-quality habitat (greater than 80 percent chance of supporting wolves) and over 62 percent of the medium-high-quality habitat (50 to 79 percent chance of supporting wolves) (Oakleaf 2011; Mead 2012a)).

Figure 1. Wolf Trophy Game Management Area (WTGMA) Within Wyoming and Documented 2011 Greater Yellowstone Area Wolf Pack Distribution



The State of Wyoming also addressed our prior concern that the size of the Trophy Area would affect natural connectivity and genetic exchange. State wolf management regulations (chapter 21(4)(a)(ii)) commit to managing wolves in Wyoming so that genetic diversity and connectivity issues do not threaten the population. The State's wolf management plan further clarifies 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 assist in this goal, a Wyoming statute provides for a seasonal expansion of the Trophy Area approximately 80 kilometers (km) (50 miles (mi)) south for 4 and a half months during peak wolf dispersal periods (WGFC 2011, pp. 2, 8, 52). We conclude that this seasonal protection 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 (WGFC 2011, pp. 26–29; WGFC 2012, pp. 6–7). Finally, translocation of wolves between subpopulations would be used as a last resort, only if necessary to increase genetic interchange (WGFC 2012, p. 7). These efforts would be coordinated with Montana and Idaho (WGFC 2012, p. 7).

Next, Wyoming agreed to maintain a population of at least 10 breeding pairs and at least 100 wolves in portions of Wyoming outside YNP and the Wind River Indian Reservation (WGFC 2011, pp. 1–5, 16–26, 52). Importantly, this commitment does not reflect an intention by the 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 and ensure uncontrollable sources of mortality do not drop the population below this minimum population level (WGFC 2011, p. 24; WGFC 2012, pp. 3–5).

The wolf populations in YNP and on the lands of sovereign nations will provide an additional buffer above the minimum recovery goal. From 2000 to the end of 2011 (the most recent official wolf population estimates available), the wolf population in YNP ranged from 96 to 174 wolves, and between 6 to 16 breeding pairs. While a lower future population level in YNP is predicted (between 50 to 100 wolves and 5 to 10 packs with 4 to 6 of these packs meeting the breeding pair definition annually) (Smith 2012), YNP will always provide a 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 Trophy Area. For example, Wyoming removed statutory mandates for aggressive management of wolves (WGFC 2011, pp. 24, 52). Previous Wyoming law required aggressive management until the population outside the National Parks fell to six breeding pairs or below. The Service was concerned with Wyoming's previous State law, and it has been remedied.

Additionally, Wyoming agreed that wolves in the permanent Trophy Area would not be treated as predatory animals (WGFC 2011, pp. 3, 16–17, 23). Past State laws allowed depredating wolves within the Trophy Area to be treated as predatory animals under certain circumstances at the discretion of the State Game and Fish Commission (WGFC 2011, pp. 3, 16–17, 23). Wyoming modified W.S. 23–1–302(a)(ii) to ensure it does not apply to wolves in the Trophy Area. This change is a substantial improvement over current Wyoming law that will provide for a wolf population in Wyoming (outside of YNP and the Wind River Indian Reservation) that always maintains at least 10 breeding pairs and at least 100 individuals.

Furthermore, Wyoming established 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, Wyoming’s 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 constitute 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 make this delisting rule possible. Appropriate changes have been incorporated into State statute, State regulations, and the Wyoming wolf management plan.

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). Gray wolves continue to occur in large numbers in Canada and Alaska and are now well connected to the restored NRM wolf populations (Pletscher *et al.* 1991, pp. 547–548; Boyd and Pletscher 1999, pp. 1105–1106; Committee on the Status of Endangered Wildlife in Canada 2001, pp. iii, v–vi, 13, 21–22, 30–32, 38, 42, 44–46; Boitani 2003, p. 322; Sime 2007; vonHoldt *et al.* 2010, p. 4412; Jimenez *et al.* In review, p. 1).

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 wolf prey, at least to date.

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.* 2012, Tables 1–3). Packs typically occupy large territories from 518 to 1,295 km² (200 to 500 mi²). Once a given area is occupied by resident wolf packs, it becomes saturated and wolf numbers become regulated by the amount of available prey, intraspecific conflict (wolf-on-wolf 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. 243–24; Service *et al.* 2012, 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 April and range from 1 to 7 pups, but average around 5 pups (Service *et al.* 1989–2012, Tables 1–3). Most years, 80 percent of pups survive until winter (Service *et al.* 1989–2012, Tables 1–3). Wolves can live 13 years (Holyan *et al.* 2005, p. 446), but the average lifespan in YNP 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 (Boyd and Jimenez 1994, entire; Packard 2003, p. 38; Brainerd *et al.* 2008; Mech 2006, p. 1482). Consequently, wolf populations can rapidly recover from severe disruptions, such as very high levels of human-caused mortality or disease. Wolf populations have been shown to increase rapidly if mortality is reduced after severe declines (Fuller *et al.* 2003, pp. 181–183; Service *et al.* 2012, 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 coterminous United States (2003 Reclassification Rule) (68 FR 15804).

Recovery Planning and Implementation

This section includes a detailed discussion of the recovery criteria including their development, continuous evaluation, and revision as necessary. Additionally, 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—As general background, 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 become available 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.

For NRM gray wolves, we formed the Interagency Wolf Recovery Team to complete a recovery plan for the NRM population shortly after it was listed (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). 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 of public land in the NRM region.

The 1987 plan specified recovery criteria 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).

The 1994 Environmental Impact Statement reviewed the wolf recovery standards 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 because it included two adult wolves ‘capable’ of producing offspring instead of two adult wolves that had actually produced offspring. 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 1994 Environmental Impact Statement 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 two 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 long term (Service 1994, p. 6:75). We explicitly stated that 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 Environmental Impact Statement stated “The importance of movement of individuals between

subpopulations 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 subpopulations 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 opinions 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. Based on the above review and considering all available information, 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 territory (generally 500–1,300 km² (200–500 mi²)); enough pups to replace themselves; offspring that become yearling dispersers; at least four wolves at the end of the year, which is near the population low point (note that the absolute low point occurs in April just before pups are born); all social structures and age classes represented within a wolf population; and adults that can raise and mentor younger wolves.

We also determined that an equitable distribution of wolf breeding pairs and individual wolves among the three States and the three recovery areas 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. Uniform distribution is not necessary. But a well-distributed population is necessary to maintain

proportionate numbers of packs and individuals in all three recovery areas. 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 retain sizable subpopulations within easily traversable distances from one another and, thus, 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.* 2003–2012, 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 sizable wolf population in each core recovery area because they each contain manmade or natural refugia from intensive human-caused mortality (e.g., wilderness and roadless areas, National Parks, and remote Federal lands) that provide a stronghold for wolf populations 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.* 2006, p. 554; vonHoldt *et al.* 2007, p. 19).

To recap, we have expended considerable effort to develop, repeatedly reevaluate, and, when necessary, modify, these recovery goals (Service 1980; Service 1987; Service 1994, appendix 8 and 9; Fritts and Carbyn 1995; Bangs 2002, entire). The 1980 recovery plan required simply that we reestablish and maintain viable populations within its former range where feasible. The 1987 recovery plan further quantified the goals by requiring 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 northwestern Montana, central Idaho, and the YNP area. In 1994, we revised the definition of a breeding pair (redefined as an adult male and an adult female wolf that have produced at least two pups that survived until December 31 of the year of their birth, during the previous breeding season) and added a requirement that there be genetic exchange (preferably natural, but human assisted if needed) between subpopulations. In 2002, we conducted a peer review of the above information, which led us to reaffirm the conclusions reached above (i.e., the definition of wolf breeding pairs, our view of population viability, and what constitutes recovery), but moved us towards counting recovery by State in addition to by recovery area.

Finally, every NRM rulemaking conducted over the last decade has also included a peer review in which reviewers were asked to weigh in on our conclusions. The vast majority of these reviewers supported our conclusion on long term population viability assuming these criteria were maintained. In the most recent peer review, four of the five peer reviewers concurred with our conclusion that the Wyoming wolf population, whose management is to be driven by the recovery goals, would continue to be a viable population after delisting (Atkins 2011, pp. 6, 10; Atkins 2012, p. 3). Those peer reviewers who specifically addressed the recovery criteria were unanimously supportive of the criteria (Atkins 2011, appendix B). For example, Dr. Scott Mills stated that the thresholds for delisting are consistent with current state-of-the-art viability analysis science and are an appropriate standard for delisting (Atkins 2011, p. 60). Similarly, Dr. David Mech concluded that the recovery criteria still seem adequate (Atkins 2011, p. 73). None of the reviews provided by the independent peer reviewers challenged the adequacy of the recovery criteria (Atkins 2011, appendix B).

The numerical component of the recovery goal represents the minimum number of breeding pairs and individual wolves needed to achieve and maintain recovery. Because the NRM wolf population must always exceed the recovery goal of 30 breeding pairs and 300 wolves, we required that Montana and Idaho each manage for at least 15 breeding pairs and at least 150 wolves in mid-winter. 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 future 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 (note the absolute low point occurs in April just before spring litters are born), 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 approach for Wyoming that recognizes this fact, but still holds the State to the same commitment 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 a buffer above the minimum recovery goal. We conclude that the YNP wolf population can effectively buffer the rest of the Wyoming wolf population because of the amount of available habitat in the park, the sizable wolf population the park does now and will continue to support, and the relative security of the park population.

Wyoming's wolf population will be further buffered because WGFD intends to maintain an adequate buffer above minimum population objectives to accommodate management needs so that uncontrollable sources of mortality do not drop the population

in Wyoming outside of YNP and the Wind River Indian Reservation below the 10 breeding pair and 100 wolf minimum population levels (WGFC 2011, p. 24; WGFC 2012, pp. 3–5). The State of Wyoming also intends to coordinate with YNP and the Wind River Indian Reservation to contribute to the objective of at least 15 breeding pairs and at least 150 wolves statewide, including YNP and the Wind River Indian Reservation. This approach 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 minimum recovery goal; it adds an extra layer of representation, resiliency, and redundancy to the GYA's gray wolf population; and it builds public tolerance for a minimum wolf population outside YNP. Further justification for this approach to wolf management after delisting and an additional explanation of why we view this approach as superior for wolf conservation in Wyoming long term is included in Issue and Response 18 below.

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 two 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 goal further holds Montana, Idaho, and Wyoming to each maintain a population of at least 10 breeding pairs and at least 100 wolves at the end of the year. To provide that these minimum levels are not compromised, Montana and Idaho each are required to manage

for a population minimum of at least 15 breeding pairs and at least 150 wolves at the end of the year. So as not to risk relisting and to provide management flexibility, Montana and Idaho intend to manage well above these minimum required levels. In Wyoming, the State will maintain the entire minimum recovery goal of at least 10 breeding pairs and at least 100 wolves outside of YNP and the Wind River Indian Reservation. So as not to risk relisting and to provide management flexibility, Wyoming also intends to manage well above these minimum required levels. A sizable wolf population in YNP and in the Wind River Indian Reservation will further buffer the population so that minimum recovery goals are not compromised. 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.* 1989–2012, p. 1). The Working Group conducted four basic recovery tasks, 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 minimum 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.* 1989–2012, 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 minimum population estimates represent the best scientific and commercial data available regarding minimum year-end NRM gray wolf population size and trends, as well as distributional and other information.

Recovery by State—At the end of calendar year 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.* 2012, 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 at least 663 wolves and at least 49 breeding pairs were present (Service *et al.* 2012, Table 4). By the end of 2011, the NRM wolf population achieved its numerical and distributional recovery goal for 12 consecutive years, while the temporal portion of the recovery criterion has been met for 10

consecutive years (Service *et al.* 2012, Table 4; 68 FR 15804, April 1, 2003; 71 FR 6634, February 8, 2006). By the end of 2011, the NRM gray wolf population included a minimum population estimate of 1,774 wolves (including at least: 653 in Montana; 746 in Idaho; 328 in Wyoming; 18 in Washington; and 29 in Oregon) in 109 breeding pairs (including at least: 39 in Montana; 40 in Idaho; 27 in Wyoming; 2 in Washington; and 1 in Oregon). Distribution at the end of 2011 is illustrated in Figure 2. Population trends through the end of 2011 are illustrated in Figure 3.

Figure 2: Northern Rocky Mountain Gray Wolf Distinct Population Segment Area

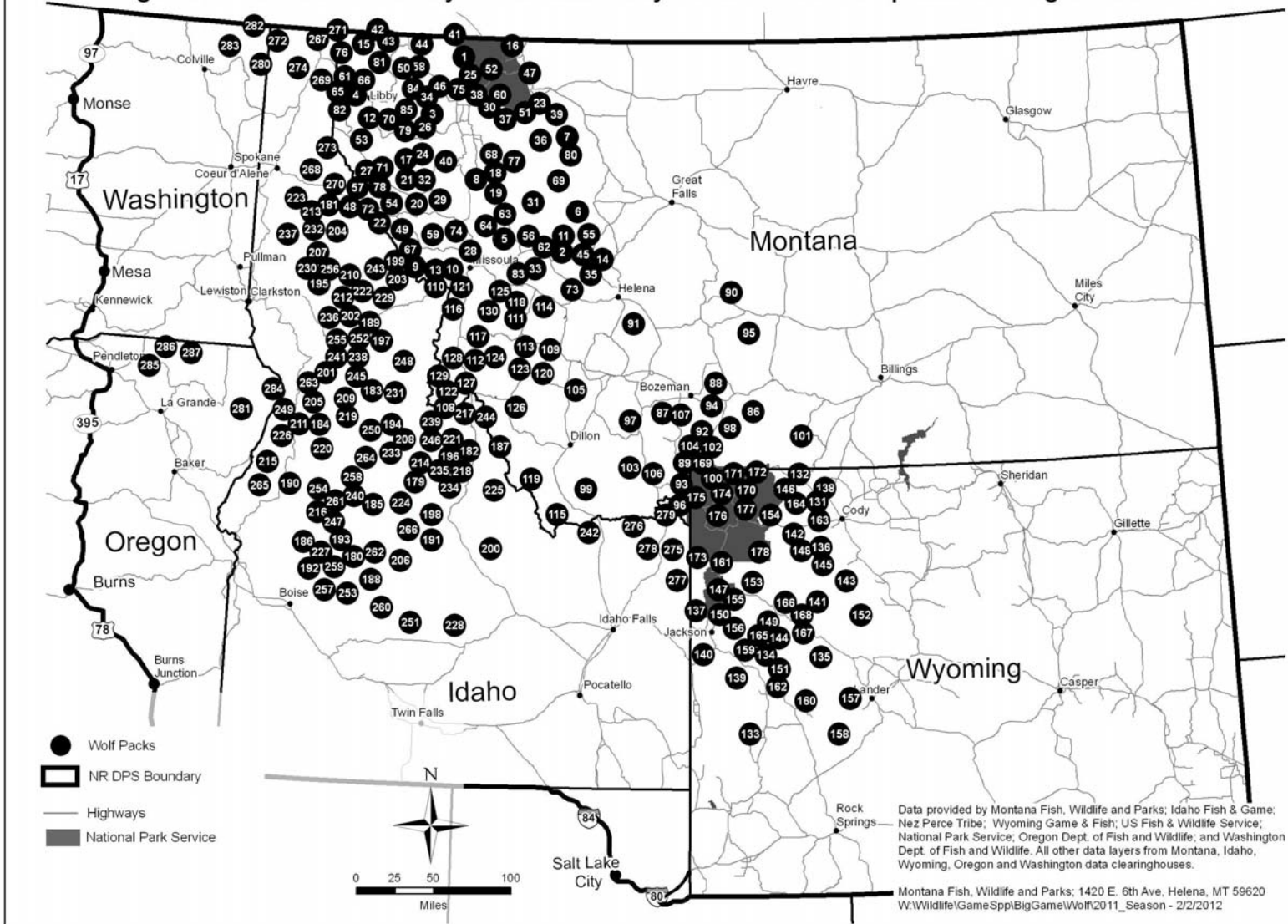
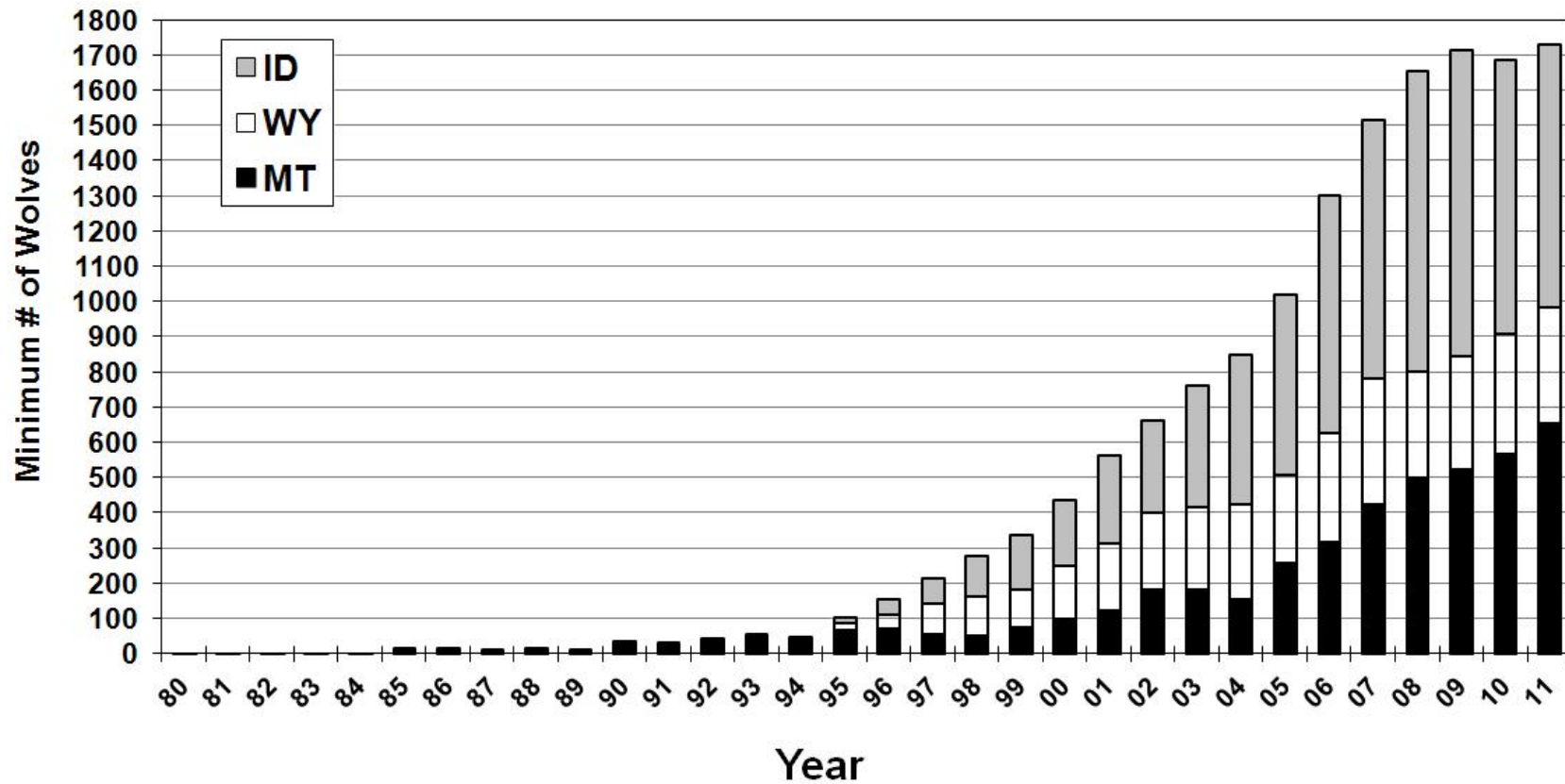


Figure 3. Northern Rocky Mountain Wolf Population Trends in Montana, Idaho and Wyoming: 1980-2011



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.* 2003–2012, 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.* 2012, 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 known wolves had grown to about 70 wolves in 7 known breeding pairs. However, from 1996 through 2004, the minimum 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.* 2012, Table 4). At the end of 2011, we estimated a minimum of 431 wolves in 25 breeding pairs in the northwestern Montana recovery area (Service *et al.* 2012, 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 naturally more fragmented (Oakleaf *et al.* 2006, p. 560; Smith *et al.* 2010, p. 622). Some of the variation in our minimum 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 since 2005 were likely responsible for more accurate minimum 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.* 2012, Table 4). By the end of 2011, this recovery area contained more than 10 breeding pairs and 100 wolves for the seventh consecutive year (2005–2011), and probably did so for the last 10 years (2002–2011) (Service *et al.* 2012, 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; vonHoldt *et al.* 2010, p. 4412; Jimenez *et al.* In review, 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; Jimenez *et al.* In review, 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, wolves have persisted in this area for over 30 years, the population is robust today, and habitat there is capable of supporting hundreds of wolves (Service *et al.* 2012, Table 4). State management, pursuant to the Montana State wolf management plan (Montana Wolf Management Advisory Council 2003), provides that this population segment will continue to thrive.

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.* 2006, 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 minimum wolf population estimate beginning in 2005 was likely due to an increased monitoring effort by Idaho Department of Fish and Game. The central Idaho population peaked in 2008 and appears to have declined since then (Service *et al.* 2012, Table 4). We estimated a minimum of 797 wolves in 43 breeding pairs in the central Idaho recovery area at the end of 2011 (Service *et al.* 2012, Table 4). This recovery area has contained at least 10 breeding pairs and at least 100 wolves for 14 consecutive years (1998–2011) (Service *et al.* 2012; 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, Jr. 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 only 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.* 2012, Figure 3; 71 FR 43410, August 1, 2006). 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.* 2010, p. 4421). We estimated a minimum of 499 wolves and 38 breeding pairs were in the GYA at the end of 2011 (Service *et al.* 2012, Table 4). By the end of 2011, this recovery area had at least 10 breeding pairs and at least 100 wolves for twelve consecutive years (2000–2011) (Service *et al.* 2012, Table 4).

Wolf numbers in the GYA were relatively stable from 2007 through 2009 with around 450 wolves and between 33 and 38 breeding pairs (Service *et al.* 2012, Table 4). In 2010 and 2011, the GYA population grew to about 500 wolves with 37 to 38 breeding pairs, primarily because numbers of wolves outside YNP in Wyoming grew while wolves in YNP have declined. Specifically, wolves in YNP declined from highs of around 170 wolves and between 11 and 16 breeding pairs in 2003, 2004, and 2007 to around 100 wolves and between 6 and 8 breeding pairs in 2009, 2010, and 2011 (Service *et al.* 1998–2012, Table 2). This decline in YNP 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, Table 2; Smith *et al.* 2006, p. 244; Smith and Almberg 2007, pp. 17–20; Almberg *et al.* 2010, p. 2058). YNP predicts wolf numbers in YNP may settle into a lower equilibrium long term (Smith 2012). 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 to 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 the subpopulations from 1995 through 2004 when the NRM region contained between 101 and 846 wolves. Dispersal data of radio-collared wolves also demonstrates genetic exchange satisfying this criteria (Boyd and Pletscher 1999, pp. 1105–1106; Jimenez *et al.* In review, entire). This issue is discussed further in Factor E below.

Conclusion on Progress Towards our Recovery Goals—Given the above, the best scientific and commercial information available demonstrates that all prongs of the

recovery criteria are met. The numeric and distributional components of the overarching recovery goal have been exceeded for 12 consecutive years, while the temporal portion of the recovery criterion has been met for 10 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 minimum management targets 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 at least 100 wolves every year since 2005 (and probably exceeded these levels every year since 2002) (Service *et al.* 2012, Table 4). Finally, the available evidence demonstrates that the NRM gray wolf population is functioning as a metapopulation with gene flow between subpopulations. Thus, we conclude that the population has recovered.

Summary of Comments and Recommendations

On October 5, 2011, we opened a 100-day comment period in which interested parties could submit comments or information on the proposal (76 FR 61782). This proposal relied heavily on Wyoming's wolf management plan and noted that conforming changes to State law and regulations would be required to allow Wyoming's plan to be implemented as written. Wyoming modified its State statutes and implementing regulations and amended its wolf management plan in early 2012. On May 1, 2012, we reopened the comment period for 15 days so the public could comment on the proposal in light of these new or revised management documents (77 FR 25664, May 1, 2012).

In total, the comment period was open from October 5, 2011, through January 13, 2012, and from May 1, 2012, through May 16, 2012 (76 FR 61782, October 5, 2011; 77 FR 25664, May 1, 2012). We also held a public hearing and an open house on the proposal on November 15, 2011, in Riverton, Wyoming (76 FR 61782, October 5, 2011). Collectively, during the 115-day comment period, we received approximately 250,000 comments. Comments were submitted by a wide array of parties, including the general public, environmental organizations, groups representing outdoor recreational interests, agricultural organizations, and Federal, State, and local governments.

In accordance with our Interagency Policy for Peer Review in Endangered Species Act Activities (59 FR 34270, July 1, 1994), the proposed rule underwent peer review. Specifically, we contracted with an independent consultant to assemble a scientific peer review to review the proposed rule and its supporting information, including the Wyoming wolf management plan. This report was delivered to the Service and posted online for public review and comment in late 2011. While the peer review report was largely supportive of the scientific basis, analysis, and conclusions of the delisting proposal, the peer review report made a number of suggestions including recommending Wyoming further clarify how it intends to meet its management objectives in the face of multiple human-caused mortality factors. Following revision to the State law, regulations and management plan, we reopened the comment period. Accordingly, the independent expert peer reviewers were provided an opportunity to revise or supplement their review during the reopened comment period.

We reviewed and considered all comments in this final decision. Substantive comments received during the comment periods and new information have been addressed below or incorporated directly into this final rule. Comments of a similar nature are grouped together under subject headings in a series of “Issues” and “Responses.”

Technical and Editorial Comments

Issue 1: Numerous technical and editorial comments and corrections were provided by respondents on various parts of the proposal. Several peer reviewers and others suggested or provided additional literature to consider in the final rule.

Response 1: We corrected and updated this final rule wherever appropriate and possible. We considered scientific publications and other literature recommended by peer reviewers and others. This information was incorporated, as appropriate, into this final rule.

Issue 2: Some comments noted that the population estimates provided would be more accurately described as minimum population estimates because the method of only counting confirmed wolves underestimates the wolf population. A few comments noted that more wolves exist in Wyoming than show up on our description of abundance and illustrations of distribution (i.e., Figures 1 and 2 in the proposed rule (76 FR 61872,

October 5, 2011)). Similarly, the peer reviewers suggested that, while these data are indicative of trends, they should not be used to characterize or quantify small year-to-year changes in the population. One peer reviewer recommended that Wyoming's monitoring protocols incorporate detection probabilities into its methodology. Other comments questioned the methods used to estimate population levels (particularly in Montana and Idaho) and suggested the resulting estimates were flawed. A few comments suggested our population estimates in Montana and Idaho were likely too optimistic given the ongoing hunts. Some comments suggested erroneous population estimates undermined the legitimacy of hunting quotas.

Response 2: We agree that end-of-year population estimates should be referred to as population minimums as we only count confirmed wolves, packs, and reproduction. Furthermore, we recognize that while our population data are a reasonably good indicator of relative changes and general trends over time, they should not be used to indicate exact year-to-year changes. We have modified our discussion of population estimates and changes over time throughout the rule to reflect these facts. Similarly, our illustration of wolf packs and their home range only illustrates confirmed packs and their home range if known. Thus, should any undocumented packs or lone wolves exist, they would not be illustrated in Figures 1 and 2. Additionally, because the population is measured in mid-winter when the wolf population is near its annual low point (note the absolute low point occurs in April just before spring litters are born), the average annual wolf population will be higher than these minimal estimates. Although there have been some criticisms of the methods Montana and Idaho employ to estimate minimum wolf abundance,

distribution, and trends, we have the utmost confidence these numbers are reliable and, if anything, underestimate actual abundance and distribution at the end of the year. The monitoring methods for each State are further described below.

Montana wolf packs are monitored year round. Common wolf monitoring techniques include direct observational counts, howling and track surveys, use of trail cameras, and public wolf reports. Montana Fish, Wildlife, and Parks seeks to document pack size and breeding pair status of known packs, to verify wolf activity in new areas that can result in new packs forming, to document dispersal to the extent possible and assess connectivity, to determine pack territories, and to identify potentially affected private landowners and livestock producers. Montana Fish, Wildlife, and Parks conducts ground tracking and aerial telemetry 1 to 2 times per month to locate radio-collared animals, determine localized use throughout the year, and document the number of wolves traveling together. Den and rendezvous sites are visited to document reproduction. Additional information is collected, such as identification of private lands used by wolves, identification of public land grazing allotments where conflicts could occur, and common travel patterns. Monthly or semimonthly telemetry flights throughout summer and fall keep track of wolf numbers and status.

At the end of the year, Montana Fish, Wildlife, and Parks compiles information gathered through field surveys, telemetry, and public reporting to estimate the minimum number of wolves in each pack, lone dispersing animals, and successful breeding pairs (an adult male and a female wolf that have produced at least two pups that survived until

December 31). The total number of packs is determined by counting the number of packs with two or more individual animals that existed on the Montana landscape on December 31. If a pack was removed because of livestock conflicts or otherwise did not exist at the end of the calendar year (e.g. as the result of disease, natural/illegal mortality, or dispersal), it is not included in the year-end total or displayed on the Montana wolf pack distribution map for that calendar year. The statewide minimum wolf population is estimated by adding up the number of observed wolves in verified packs and known lone animals as of December 31 each year. This is a minimum count and has been reported as such since wolves first began recolonizing northwest Montana in the mid-1980s. Suspected wolf packs are those that could not be verified with confidence. They are not included in the final minimum estimated count. Suspected packs may or may not persist. This information is used to make decisions to address wolf-livestock conflicts, to set wolf hunting and trapping regulations, and to set harvest quotas. We conclude that Montana's monitoring methods and resulting minimum population estimates is more than adequate to inform wolf management decisions, and as a reliable indicator of the population's recovered status.

The Idaho Department of Fish and Game and the Nez Perce Tribe use wolf observation reports from agencies and the public to locate areas of suspected wolf activity and verify wolf presence. Field crews may decide to capture and radio-collar wolves. Radio-collared wolves are then located from the air one or more times per month dependent on a host of factors including funding, personnel, aircraft availability, weather, and other priorities. At the end of the year, they then compile agency-confirmed wolf

observations to estimate the minimum number and location of adult wolves and pups that were likely alive on December 31 of that year. The Idaho Department of Fish and Game and the Nez Perce Tribe estimate minimum wolf numbers, distribution, and breeding success by radio-collaring selected packs from representative areas across the State. Wolves are captured through foothold trapping in summer or helicopter darting in winter, and monitored one or more times per month via aerial telemetry. In addition, in recent years Idaho has been placing 20 or more GPS collars on wolves each year; these collars record locations and mortality status several times per day. Pack size and movements are monitored throughout the summer and fall via telemetry. Potential dens and rendezvous sites are identified through telemetry flights (2+ locations in the same area) during summer months (May–September) or ground telemetry and ground searches. Once identified, biologists investigate on the ground to confirm reproduction and count pups.

In winter (December–January), the Idaho Department of Fish and Game and the Nez Perce Tribe increase flight frequencies to twice monthly to obtain pack counts and document breeding pairs. If four or more wolves are counted and reproduction was confirmed in summer, the pack is confirmed as a successful breeding pair unless additional information suggests otherwise (e.g., documented mortality that reduced pack size below two adults and two pups). To estimate state-wide minimum population numbers, the number of wolves detected in documented packs with complete counts is added to an estimate of wolves in documented packs without complete counts, plus the number of wolves documented in wolf groups that do not qualify as a pack, and adjusted for lone wolves. We conclude that the monitoring methods employed in Idaho and

resulting minimum population estimates are more than adequate to inform wolf management decisions and are a reliable indicator of the population's recovered status.

In Wyoming, the WGFD will continue to implement existing protocols and techniques employed by the Service and YNP, which have provided adequate documentation of wolf population status, to determine whether the recovery criteria have been met (WGFC 2011, p. 19). These methodologies are further described in the "Post-Delisting Monitoring" section of the rule below and the "Population Monitoring" section of the Wyoming Wolf Management Plan (WGFC 2011, pp. 17–21).

The above techniques have proven a reliable indicator of distribution, abundance, and trends, are more than adequate to inform wolf management decisions, and are a reliable indicator of the population's recovered status. That said, 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. Similarly, new techniques may allow for incorporation of a detection probability as part of the abundance estimation protocol.

The Delisting Process and Compliance with Applicable Laws, Regulations, and Policy

Issue 3: A few comments requested that we provide additional opportunities for public comment by holding additional public hearings or extending the public comment period. Some comments objected to the proposed delisting rule's reliance on Wyoming's wolf management plan when Wyoming laws and regulations, which trump the management plan, had not yet been revised. These comments suggested we must reopen the comment period on the proposal once these revised documents were finalized.

Response 3: We provided ample opportunity for public comment on our proposed rule. This included an initial 100-day public comment period, an informational meeting and public hearing, and an additional 15-day public comment period starting May 1, 2012 (76 FR 61782, October 5, 2011; 77 FR 25664, May 1, 2012). All opportunities to comment were announced in the **Federal Register**, posted on our Web site and in our monthly wolf reports, and publicized in local and national press releases. An informational meeting and a public hearing were both held in Riverton, Wyoming, on November 15, 2011 (76 FR 61782, October 5, 2011). Riverton was selected because of its central location and proximity to the portions of Wyoming most affected by decisions on wolf management. Given the fact that we satisfied section 4(b)(5)(E)'s statutory requirement for public hearings on this rule, the limited interest the Riverton hearing garnered (only 10 individuals offered formal testimony at the hearing), and the substantial expense related to conducting public hearings, we declined requests for additional public hearings (Thabault 2011). Furthermore, we reopened the comment period to ensure the public had an opportunity to review and comment on the proposal in light of Wyoming's final regulatory documents, including revised State statutes, revised

gray wolf management regulations (chapter 21), new gray wolf hunting season regulations (chapter 47), and an Addendum to the Wyoming Gray Wolf Management Plan (77 FR 25664, May 1, 2012). Collectively, the opportunities provided for public comment ensured all members of the public, including peer reviewers, had sufficient time to review and comment on the proposal in light of all relevant materials. All comments, whether presented at a public hearing or provided in another manner, received the same review and consideration. Approximately 250,000 comments were received during the public comment periods. This significant effort satisfies our statutory responsibility.

Issue 4: Several commenters observed that Wyoming was not a DPS, and suggested that it was a violation of the Act to attempt to delist the Wyoming wolf population alone because the Act precludes listing and delisting entities smaller than DPSs. Specifically, these comments suggested that our analysis of threats improperly focused on the Wyoming wolf population, when we should have considered threats to the entire NRM DPS. Some comments further specified that Congress's recent directive to reissue our 2009 delisting rule, which delisted the NRM DPS except Wyoming, did not grant us the authority to address Wyoming separately. These comments went on to suggest that it would be unlawful to delist wolves in Wyoming if wolves were endangered by any of the five factors in any portion of the NRM DPS at the time of this final rule. These comments went on to assert that wolves in Montana and Idaho were endangered by a variety of factors, most notably inadequate regulation of human-caused mortality affecting both population size and genetic exchange. Idaho's suspension of its 2008–2012 step-down wolf management plan and Montana's and Idaho's hunting

seasons were most often mentioned as changes in management threatening the NRM DPS. These comments suggested that all States in the NRM DPS needed to develop enforceable mechanisms to maintain the population's recovered status before delisting in Wyoming could move forward.

Response 4: The approach taken in this final rule 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). While this rulemaking focuses on Wyoming because it is the only portion of the NRM DPS that remains listed, we consider other portions of the NRM DPS as appropriate. Thus, the conclusions of the previous delisting and the information supporting this determination are incorporated by reference. This information is updated, where necessary, to consider new developments (e.g., Idaho's suspension of its 2008–2012 step-down wolf management plan and Montana's and Idaho's hunting seasons).

Overall, the best scientific and commercial information available overwhelmingly indicates wolves are recovered in Wyoming, the GYA, and throughout the NRM DPS. We strongly disagree with the assertion that wolves in Montana and Idaho are endangered or threatened by inadequate regulation of human-caused mortality or any other factor (singularly or in combination). Similarly, we reject that threats in these areas endanger wolves in Wyoming, the GYA or the NRM DPS. Despite changes in guiding

management documents, both Idaho and Montana remain committed to maintaining a healthy wolf population well above minimum recovery levels (also see response on the adequacy of the recovery goals below) (Idaho Legislative Wolf Oversight Committee 2002, pp. 4–5, 18–19; Idaho Fish and Game Commission 2011, pp. 1, 7; Idaho Fish and Game Commission 2012, pp. 8–9; Montana Wolf Management Advisory Council 2003, pp. i,1; Montana Fish, Wildlife and Parks 2012b, pp. 2–3, 8–9, 13–15, 22). State management of this recovered population in Montana and Idaho since delisting has been consistent with our expectations and does not place the population at a meaningful risk of extinction now or within the foreseeable future (Cooley 2011; Jimenez 2012b). In fact, the minimum population estimate for the NRM DPS was greater at the end of 2011 than at the end of 2010 (Service 2012, Tables 4a and 4b). This information validates our determination that State-regulated hunting and trapping has been and will continue to be conducted in a responsible manner (74 FR 15123, April 2, 2009). While we expect population decreases will occur, these reductions will be carefully managed to maintain a recovered gray wolf population throughout the northern Rocky Mountains. In consideration of all threats including those evaluated in our 2009 delisting rule and all new information available since this rule was published, we conclude that the NRM DPS continues to face an extremely low risk of extinction within the foreseeable future, does not meet the definition of threatened or endangered, and therefore, does not warrant listing under the Act.

Nevertheless, this rulemaking is separate and independent from, but additive to, the previous action delisting wolves in the NRM DPS. Wolves in the NRM DPS outside

of Wyoming are not protected under the Act; therefore, there is no regulatory need to determine whether the Act's protections should be removed for these wolves. Thus, this rule in no way reopens the status of wolves within the NRM DPS and outside of Wyoming. While we continue to monitor the status of wolves in accordance with the post-delisting monitoring plans discussed in the delisting rule, such a reopening of the wider NRM DPSs status also would be inconsistent with the Congressional direction to proceed with that delisting action. This rule does not affect the status of gray wolves in other states within the NRM DPS or the legal protections provided under state laws.

Since our previous delisting action, the State of Wyoming has addressed the only reason that wolves in Wyoming warranted continued listing under the Act—the adequacy of the State's regulatory measures. By delisting the Wyoming wolf population after wolves in the larger NRM DPS were delisted, we are doing exactly what we said we would do in our previous delisting rule. In our 2009 rule publication, the Service said 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 was also referenced in our proposed rule (76 FR 61782, Oct. 5, 2011, p. 61783). The Service is now doing just that—delisting Wyoming wolves in a separate rule following its approval of Wyoming's management framework.

Issue 5: Several comments suggested that we should prepare an Environmental Assessment or an Environmental Impact Statement pursuant to the National Environmental Policy Act.

Response 5: As a regulation adopted under section 4(a) of the Act, this delisting rule is exempt from National Environmental Policy Act procedures. The Service's decision that the National Environmental Policy Act does not apply in making 4(a) determinations is based on the reasoning in *Pacific Legal Foundation v. Andrus*, 657 F.2d 829 (6th Cir. 1981). In this case, the court determined that a National Environmental Policy Act document cannot serve the purposes of the Act, because the Secretary must make listing decisions based only on the five factors set forth in section 4(a) of the Act. The Secretary lacks the discretion to consider environmental impacts beyond those encompassed by the five factors and may use only the best scientific and commercial data in assessing the five factors. Following the *Pacific Legal Foundation* ruling and upon the recommendation of the Council on Environmental Quality, the Service officially determined that National Environmental Policy Act documents are not required for regulations adopted pursuant to section 4(a) of the Act. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244). Here, the delisting decision is based on the same five factors used in making listing determinations under section 4(a).

Issue 6: A few comments indicated we must consider the direct and indirect impacts of this decision on other threatened and endangered species. One comment indicated that delisting could result in wolf trapping (as is occurring in Idaho and now being planned in Montana), which could affect Canada lynx (*Lynx canadensis*) or wolverine (*Gulo gulo*). Another comment suggested an unchecked ungulate population

would graze on and decimate the Colorado butterfly plant (*Gaura neomexicana* var. *coloradensis*). Similarly, one comment suggested cascading ecological effects would be hindered by State efforts to reduce the wolf population, which in turn would affect water quality for the downstream Colorado pikeminnow (*Ptychocheilus lucius*) and the Razorback sucker (*Xyrauchen texanus*).

Response 6: The Act requires that we base listing and delisting decisions solely on the best available information concerning the status of and threats to the subject species and does not give us discretion to alter listing and delisting decisions because of possible impacts to other species. Moreover, other distinct statutory provisions address the potential effects of the States' management actions on listed species, such as the Act's prohibitions against "take" of listed wildlife species or the requirement of Federal agencies to ensure their actions are not likely to jeopardize the continued existence of listed species or destroy or adversely modify a listed species' critical habitat.

Nevertheless, we conclude that this decision will not negatively affect other threatened or endangered species. While one comment mentioned trapping and its potential to affect other regional carnivores like Canada lynx (listed as threatened) and wolverine (a candidate for listing), Wyoming has not proposed a trapping season and has no plans to pursue a trapping season within the Trophy Area (Bruscino 2011b). If such a season is considered in the future, it would be regulated by the WGFD and the WGFC and would be limited as such mortality would further limit Wyoming's hunt quotas, which are already expected to be modest once desired population reductions are

achieved. Moreover, the State must comply with applicable laws in performing any trapping actions: if any potential incidental take of listed species were to occur in connection with trapping, the State must comply with the Act's prohibition against "take" or obtain an incidental take permit through the permitting provisions of section 10.

Furthermore, the other listed species mentioned by the commenter (Colorado butterfly plant, Colorado pikeminnow, and razorback sucker) occur far from occupied wolf range. For example, Colorado butterfly plant occurs in southeastern Wyoming and north-central Colorado. Similarly, neither the Colorado pikeminnow nor the razorback sucker occurs above Flaming Gorge in Wyoming's share of the Green River. Thus, any theoretical cascading ecological effects caused by the wolf delisting (e.g., increased herbivory and impacts to water quality) would be extremely unlikely to affect these species.

Northern Rocky Mountain (NRM) Gray Wolf Recovery Goals

Issue 7: Some comments expressed confusion about our minimum recovery criteria and the minimum management targets.

Response 7: The Service's current recovery goal for the NRM gray wolf population is 30 or more breeding pairs (an adult male and an adult female that raise at least two pups until December 31) comprising 300+ wolves in a metapopulation (a population that exists as partially isolated sets of subpopulations) with genetic exchange

between subpopulations (Service 1994; Fritts and Carbyn 1995). Within this overall goal, Idaho, Montana, and Wyoming are each responsible for maintaining at least 10 breeding pairs and at least 100 wolves in mid-winter. To provide that these minimums are not compromised, we required Montana and Idaho to each manage for a safety margin of at least 15 breeding pairs and at least 150 wolves in mid-winter. In Wyoming, we agreed that the State could manage for a population floor of at least 10 breeding pairs and at least 100 wolves outside YNP and the Wind River Indian Reservation in mid-winter, and allow YNP and the Wind River Indian Reservation to provide the remainder of the buffer above the minimum recovery goal. In order to meet these goals and allow for continued management flexibility, all three States intend to manage for a population comfortably above their minimum management targets.

Issue 8: Numerous comments questioned the adequacy of the NRM DPS's recovery goals referring to them in such terms as "outdated" and "unscientific." These comments further suggested that delisting based on these goals violated the Act's requirement to rely on the best available science. Some of these comments offered their own assessment of what constitutes an acceptable recovery goal (ranges from around current population levels to 6,000 wolves were most frequently mentioned). Others suggested smaller localized population levels were acceptable within a larger, connected metapopulation structure. Some comments questioned the adequacy of the NRM DPS's recovery goals by noting that these goals are lower than the Western Great Lakes population when it was listed, lower than the Western Great Lakes recovery goals, and lower than Western Great Lakes potential status review triggers. Some comments opined

that the population meets the International Union for the Conservation of Nature's (IUCN) standard for a "vulnerable" species and, therefore, concluded our recovery criteria are inadequate and that the population is still endangered.

Response 8: Our recovery and post-delisting management goals were designed to provide for the long term conservation of the NRM gray wolf population by ensuring sufficient representation, resilience, and redundancy. As we described earlier in this final rule, we have expended considerable effort to develop, repeatedly reevaluate, and, when necessary, modify, these recovery goals (Service 1980; Service 1987; Service 1994, appendix 8 and 9; Fritts and Carbyn 1995; Bangs 2002, entire).

The Service contracted for an independent peer review of our proposed delisting and four of the five reviewers concurred with our determination that the Wyoming wolf population, whose management is to be driven by the recovery goals, would continue to be a viable population after delisting (Atkins 2011, pp. 6, 10; Atkins 2012, p. 3). The dissenting reviewer's primary issue was not with the recovery criteria, but rather with Wyoming's management structure and whether the recovery criteria would be met (an issue discussed elsewhere in this rule). Those reviewers who specifically addressed the recovery criteria were unanimously supportive of the criteria (Atkins 2011, appendix B). For example, Dr. Scott Mills stated that the thresholds for delisting are consistent with current state-of-the-art viability analysis science and are an appropriate standard for delisting (Atkins 2011, p. 60). Similarly, Dr. David Mech concluded the recovery criteria still seem adequate (Atkins 2011, p. 73). None of the reviews provided by the

independent peer reviewers challenged the adequacy of the recovery criteria (Atkins 2011, appendix B).

Although numerous comments offered alternative recovery goals, we do not find the information presented to be persuasive, and do not feel revision to the recovery goals is warranted at this time. Most of these comments indicated a need for an effective population of at least 500 breeding individuals long term and a total population of ~1,500 to 6,000 individuals long term either within the NRM DPS or the western United States. However, these comments were based upon minimum viable population theories and models that assume an isolated population. This underlying premise is inappropriate within the NRM region, because NRM wolves are not isolated and are instead genetically connected to vast wolf populations north of the United States-Canadian border.

Specifically, the NRM DPS represents a 650-km (400-mi) southern range extension of a vast contiguous wolf population that numbers over 12,000 wolves in western Canada and about 65,000 wolves across all of Canada and Alaska (Committee on the Status of Endangered Wildlife in Canada 2001, pp. iii, v–vi, 13, 21–22, 30–32, 38, 42, 44–46; Boitani 2003, p. 322). This connectivity is demonstrated by the fact that recovery in the NRM DPS began when wolves from Canada naturally dispersed into the northwestern Montana recovery area and recolonized this area (Ream *et al.* 1989; Boyd *et al.* 1995; Pletscher *et al.* 1997; Boyd and Pletscher 1999). Routine dispersal of wolves has been documented among NRM wolves and adjacent Canadian populations since then demonstrating that wolves in these areas are demographically and genetically linked

(Pletscher *et al.* 1991, pp. 547–548; Boyd and Pletscher 1999, pp. 1105–1106; Sime 2007; vonHoldt *et al.* 2010, p. 4412; Jimenez *et al.* In review, entire). Connectivity to the GYA is discussed in more detail below, but is also sufficient to demonstrate and maintain the region’s metapopulation structure.

Taking into account connectivity to adjoining Canadian populations, the effective population targets mentioned above have been greatly exceeded. While some contend that these effective population targets should be achieved strictly within the NRM DPS or the western United States, we conclude that it is biologically appropriate to consider the contribution of these connected wolf populations to the NRM DPS’s long term viability. Connectivity to Canadian wolf populations has long been a central consideration in developing, revising, and validating our recovery goals (Service 1994, pp. 41–42 of appendix 9; Bangs 2002, p. 3).

Furthermore, model predictions should be used cautiously due to the poor quality of data used in most models, inaccuracies in estimating changes in demographic rates, and insufficient dispersal data (Beissinger and Westphal 1998, p. 821). To estimate a minimum viable population accurately, a population viability analysis must be able to overcome the likelihood that measures of potential threats to persistence are likely to be imprecise (Soule 1987, pp. 1-10; Boyce 1992, 1993). Reed et al. (2002, p. 7) also cautioned that model structure and data quality can affect the validity of population viability analysis models, and that population viability analysis should not be used to determine minimum viable population or to estimate specific probability of extinction.

Population viability analysis could more appropriately be used to analyze relative rates of extinction (Beissinger and Westphal 1998, p. 821) or how population growth and persistence may be affected by management actions (Reed et al. 2002, p. 7). Therefore, the available modeling data do not persuade us that the recovery criteria we are using are incorrect.

Some comments asserted that the NRM gray wolf recovery goals are inadequate because they are lower than population levels in the Western Great Lakes when that population was listed (32 FR 4001, March 11, 1967; 43 FR 9607, March 9, 1978). We do not find such arguments persuasive because listing decisions are not based on abundance and are instead based on extinction risk informed by threats and population trajectory. For example, although whitebark pine (*Pinus albicaulis*) likely numbers in the millions, the Service recently found this species to be warranted for listing due to the severe threats it faces and its resulting population trajectory (76 FR 42631, July 19, 2011). Similarly, the decisions in 1978 to list wolves in the Great Lakes as endangered and to reclassify the Minnesota population as threatened were based on ongoing threats, population trends, and the desire for additional population redundancy (Service 1978, pp. 7, 8, 10; 43 FR 9607, March 9, 1978). Neither decision cited the overall population level as an important factor to justify the threatened or endangered determination. Therefore, we do not agree with the assertion that Western Great Lakes wolf population levels at the time of listing as endangered or threatened provide any evidence that our recovery criteria for wolves within the NRM are too low.

Similarly, some comments opined the NRM gray wolf recovery goals are inadequate because they are lower than the Western Great Lakes population's recovery goals. Again, we do not find this argument compelling. The Western Great Lakes recovery plan indicated recovery would be achieved when: (1) The survival of the wolf in Minnesota is assured, and (2) at least one viable population (as defined below) of eastern timber wolves outside Minnesota and Isle Royale in the contiguous 48 States is reestablished. The recovery plan did not establish a specific numerical criterion for the Minnesota wolf population. While the plan did identify a goal "for planning purposes only" of 1,251–1,400 wolves for the Minnesota population (Service 1992, p. 28), the plan explicitly states that the region's total goals "exceed what is required for recovery and delisting of the eastern timber wolf" (Service 1992, p. 27). This planning goal was driven not by minimum estimates of viability, but instead by: Existing populations of 1,550 to 1,750 wolves in Minnesota (Service 1992, p. 4); the plan's objective to maintain existing populations (Service 1992, p. 24); and existing planning goals by other land managers within Minnesota (Service 1992, p. 27). However, population viability and sustainability are explicitly discussed in the plan. The plan states a "viable population" includes either: (1) An isolated, self-sustaining population of 200 wolves for 5 successive years; or (2) a self-sustaining population of 100 wolves within 100 miles of [the other] Western Great Lakes population (Service 1992, pp. 4, 25–26). Furthermore, the plan stated that "a healthy, self-sustaining wolf population should include at least 100 interbreeding wolves... [which would] maintain an acceptable level of genetic diversity" (Service 1992, p. 26). Based on the above, we find there is no basis for concluding that the NRM and Western Great Lakes recovery goals are somehow contradictory. Instead, we find that

the recovery criteria for the NRM and Western Great Lakes populations are similar in regards to the minimum number of wolves needed to maintain a viable population, their reliance on multiple, adjoining connected populations, and the relative proximity between subpopulations.

Furthermore, some comments asserted that our recovery goals and our relisting criteria are inadequate because they are lower than the status review triggers for Western Great Lakes wolves. However, the Western Great Lakes status review triggers were selected, not because they are indicative of population viability (again, the plan's conclusion regarding viability is discussed above), but rather because they would represent significant declines, which could be evidence of a serious problem (Service 2008, pp. 10–11; Ragan 2012). Given the above, we do not find persuasive the assertion that our recovery goals or our status review triggers are too low because they are lower than other wolf population's triggers for relisting consideration. To the extent that these comments advocate for a more responsive status review trigger in the NRMs, we offer our strongest assurance that we will consider relisting if we ever obtain sufficient evidence that the species may meet the definition of threatened or endangered and, as required 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 population.

Finally, we find unfounded the assertions that the standards of the IUCN indicate that the NRM population currently meets the IUCN's "vulnerable" standard or that IUCN

standards indicate our recovery criteria are inadequate. First, the IUCN assessed the gray wolf's status in 2010 and determined the species fell into the "species of least concern" category (Mech & Boitani 2010, p. 1). While such assessments routinely provide localized status determinations, no such determination was bestowed upon wolves in the NRM region. Furthermore, following receipt of this comment, we contacted Dr. Mech, who led the team that performed IUCN's 2010 North American gray wolf assessment. Dr. Mech disagreed with the assertion that the NRM population satisfies IUCN's "vulnerable" standard (Mech 2012). Dr. Mech went on to indicate that any application of the IUCN's standards to the NRM DPS was inappropriate without considering the large, adjoining, and connected Canadian wolf populations, and that if such populations were included in the assessment, the NRM region's wolf population would fall into the "species of least concern" category (Mech 2012). Given the available information, we conclude that the IUCN standards do not indicate that our recovery criteria warrant revision.

After evaluating all available information, we conclude that the best scientific and commercial information available continues to support the ability of these recovery goals to provide that the population does not again become in danger of extinction.

The Geographic Scope of Recovery and the Impact of this Decision on Range

Issue 9: Some comments suggested we should have pursued a single lower-48-State recovery plan instead of regional recovery plans in the NRMs, the Western Great

Lakes, and the Southwest. These comments suggested our approach to recovery planning focused only on easy to recover areas and improperly wrote off more difficult to recover regions. A few comments suggested our recovery plans were inadequate because they did not cover or include specific criteria for “significant wolf habitat” (e.g., Colorado). Some comments suggested we should reintroduce wolves across numerous regions of the country to reestablish them across their historical range. Suggested areas for reintroduction included potentially suitable habitat like the southern Rockies, the Pacific Northwest, the Sierra Nevadas, and New England, as well as unsuitable habitat like Central Park in New York City. Other comments supported the national delisting of wolves. A number of comments suggested wolves should not have been listed or recovered anywhere in the lower 48 States, because the species (*Canis lupus*) is abundant in Canada, Alaska, and across Eurasia and the reintroduced population’s subspecies (*Canis lupus occidentalis*) is abundant across western Canada and into Alaska.

Response 9: Possible future wolf recovery efforts, particularly any additional efforts outside of the NRM DPS, are beyond the scope of this rulemaking because such actions are not part of this listing (NRM DPS) and not necessary to provide for a NRM DPS that is neither endangered nor threatened throughout all or a significant portion of its range.

Nevertheless, we will clarify our position on these issues. Gray wolves were originally listed as subspecies or as regional populations of subspecies in the coterminous United States and Mexico, including populations in the Western Great Lakes region, the

NRM region, and the Southwest (32 FR 4001, March 11, 1967; 38 FR 14678, June 4, 1973; 39 FR 1171, January 4, 1974; 41 FR 17740, April 28, 1976; 41 FR 24064, June 14, 1976). When the science began to cast doubt on the validity of the subspecific taxonomy, we reclassified these listings into a single unit of the species (43 FR 9607, March 9, 1978). This approach was undertaken to “most conveniently” handle this listing, and was not intended to signal an intention to pursue recovery across the entire lower 48 States (43 FR 9607, March 9, 1978). In fact, the 1978 reclassification stated that “biological subspecies would continue to be maintained and dealt with as separate entities” (43 FR 9607, March 9, 1978). Accordingly, regional recovery plans were developed and implemented in the Western Great Lakes in 1978 (revised in 1992) (Service 1978, entire; Service 1992, entire), the NRM region in 1980 (revised in 1987) (Service 1980, entire; Service 1987, entire), and the Southwest in 1982 (this plan is currently being revised) (Service 1982a, entire). This approach was an appropriate use of our discretion to determine how best to proceed with recovery actions. These recovery efforts covered all gray wolf populations confirmed in the lower 48 States since passage of the Act, and either have worked, or are working, to conserve all of the genetic diversity remaining in wolves south of Canada after their widespread extirpation (Leonard *et al.* 2004, entire). Although we have satisfied our recovery planning and implementation responsibilities, and any additional recovery planning and implementation (beyond that already underway) would be discretionary, this issue is being evaluated further by the Service on a larger, national scale and will likely be addressed in a separate action in the future.

Similarly, the Act does not require us to restore wolves to a majority of their U.S. historical range or to a majority of the available suitable habitat. Instead, the Act requires that we work to recover species to levels that no longer meet the definition of threatened or endangered. For some species, this level may require range expansion, but the amount of expansion is driven by a species' biological needs affecting viability and sustainability, and not by an arbitrary percent of a species' historical range or suitable habitat. Many other species may be recovered in portions of their historical range by removing or addressing the threats to their continued existence. Other species may be recovered by a combination of range expansion and threats reduction. There is no set formula on how recovery must be achieved. Within the NRM DPS, each of the States and each of the recovery areas meaningfully contributes to the population's viability by providing resiliency, redundancy, and representation (these terms are described further later in this rule; see also Shaffer and Stein 2000, entire). Across the lower 48 States, 2 other wolf populations (Western Great Lakes DPS and Mexican wolf) provide additional resiliency, redundancy, and representation (Shaffer and Stein 2000, entire). To the extent that additional restoration beyond that required by the Act is desired by some members of the public, we recommend working with State or Tribal wildlife agencies and other land managers to achieve these objectives.

Conversely, we do not agree with comments that the gray wolf should not have been listed because of its abundance outside of the lower 48 States. When Congress created the Act, it sought to provide for "the possibility of declaring a species endangered within the United States where its principal range is in another country, such as Canada

or Mexico, and members of that species are only found in this country insofar as they exist on the periphery of their range” (H.R. Rep. No. 93-412, at 10 (1973)). Moreover, in authorizing the listing of DPSs under the Act, Congress recognized “that there may be instances in which the Service should provide for different levels of protection for populations of the same species. For instance, the U.S. population of an animal should not necessarily be permitted to become extinct simply because the animal is more abundant elsewhere in the world” (S. Rep. No. 96-151, 96th Cong., 1st Sess. (1979), reprinted in A Legislative History of the Endangered Species Act, 97th Cong., 2d Sess. 1397 (1982)). Recovering gray wolves in multiple populations within the lower 48 States satisfies this Congressional intent.

Issue 10: A number of comments provided other reasons why our approach to designating and delisting in the NRM DPS was erroneous, having accomplished recovery over only a small portion of the species’ historical range. Some comments suggested the NRM DPS was too expansive and should not have included unrecovered habitat (e.g., eastern Montana and southern or eastern Wyoming). These comments expressed the concern that our decision to delist this expansive DPS would preclude wolf recovery in these areas. Others thought the NRM DPS should include additional surrounding areas and that recovery and recolonization should occur across the entire DPS before delisting is allowed to move forward (e.g., northern Colorado should be included in the DPS, but delisting anywhere should be precluded until Colorado is also recovered). Other comments suggested areas like southern and eastern Wyoming once supported viable wolf populations and represented “a significant portion of range.” A number of

comments disputed our designation of most of these areas as unsuitable habitat, stated that we have failed to show that these areas could not biologically support wolves, and suggested that our definition of suitable habitat improperly focused on regulatory, sociological, economic, and political factors, instead of purely biological factors. A few comments noted that wolves and wolf packs can and do occasionally occupy these areas. Some comments asserted that recovery in these historically occupied areas was important to preserve unique localized adaptations that contribute to the species' long term persistence. These comments opined that wolves are endangered in this "significant portion of range" and, therefore, must continue to be listed as endangered statewide.

Response 10: As described in our 2009 final rule, we determined the NRM DPS was biologically based, appropriate, and developed in accordance with the Act and the Distinct Vertebrate Population Segment Policy (74 FR 15123, April 2, 2009). In essence, the boundaries included all gray wolves that were reasonably assumed to be part of the NRM population at the time of its designation (74 FR 15123, April 2, 2009). No animals that have dispersed within the United States beyond the boundaries of the DPS have ever returned, meaning those animals are, essentially, lost to and no longer part of the population. The DPS boundaries are also further supported by the fact that they are consistent with over 30 years of recovery efforts in the NRMs in that: (1) The DPS approximates the U.S. historical range of the originally listed NRM gray wolf subspecies (39 FR 1171, January 4, 1974; Service 1980, p. 3; Service 1987, p. 2); (2) the DPS boundaries are inclusive of the areas focused on by both NRM recovery plans (Service 1980, pp. 7–8; Service 1987, p. 23) and the 1994 Environmental Impact Statement

(Service 1994, Ch. 1 p. 3); and (3) the DPS is inclusive of the entire Central-Idaho and Yellowstone Nonessential Experimental Population areas (59 FR 60252, November 22, 1994; 59 FR 60266, November 22, 1994; 50 CFR 17.84 (i) & (n)).

We based our definition of suitable habitat on the best scientific and commercial information available regarding pack persistence (this issue is discussed in more detail in Factor A below). Although wolves historically occupied the entire area of the DPS, these distant peripheral areas (e.g., eastern Montana and southern or eastern Wyoming) have been modified for human use and are no longer suitable habitat to support wolf packs and wolf breeding pairs. These distant peripheral areas do not support extant wolf populations and do not play a meaningful role in achieving or sustaining recovery. Although some short term occupancy and use of some peripheral areas does occur, it is minimal and, consistent with our assessment of suitability, wolves have not persisted in these areas even under the Act's protective regime. The purpose of the Act is to conserve endangered species and the ecosystems on which they depend. We have recovered NRM wolf populations in areas where portions of the ecosystem on which they depend still exist or could be restored. Large portions of the historical range (e.g., eastern Montana and southern or eastern Wyoming) where the ecosystem historically supported wolves have been removed and replaced by human uses including agriculture, livestock, and urbanization. Wolf recovery in these portions of the species' historical range is unnecessary, because there is more than enough suitable habitat (e.g., mainly public lands containing abundant wild ungulates) to support many times over the minimum

requirements of a recovered and viable wolf population. Therefore, additional recovery efforts in these areas are beyond what the Act requires.

Issue 11: Numerous comments expressed concern that this action, if finalized, would reduce wolf dispersal into surrounding areas. Many of these comments specifically objected to the impact Wyoming's large predator area would have on dispersal across southern Wyoming to Colorado and Utah. One comment opined that Colorado represented a significant portion of the NRM gray wolf range. Some comments stated that Mexican wolf recovery was on the brink of failure, in part due to inbreeding depression, and that Wyoming's predator designation would exacerbate the genetic isolation of the Mexican wolf population. While most of these comments focused on the impact of the predator area, some comments expressed concern related to State management intending to reduce population levels, which would in turn reduce the number of dispersing wolves and further inhibit recolonization of nearby unoccupied areas (e.g., Washington and Oregon).

Response 11: First, additional wolf restoration from NRM gray wolf stock is not necessary in any of the surrounding areas to achieve or maintain recovery of the NRM DPS because the NRM DPS is of more than adequate size and includes more than adequate habitat to achieve and maintain a recovered wolf population. This conclusion makes restoration in these areas irrelevant to this final decision. Because Colorado and Utah are both beyond the range of the NRM gray wolf population and unnecessary for viability or recovery of the NRM gray wolf population, areas like Colorado and Utah do

not represent a significant portion of the NRM gray wolf's range. Additionally, listing and delisting decisions are based solely on the status of the subject species, and, because the NRM DPS is a separate listing from other U.S. wolves (a separate "species" as defined in section 3(16) of the Act), impacts to surrounding areas are beyond the scope of this rulemaking. Furthermore, as discussed above, the Act does not require that we recover the wolf everywhere it existed historically or even every place that currently can support wolves. Instead, the Act requires that we achieve sufficient recovery to provide for the viability of the subject species. This goal has been achieved in the NRM DPS and the Western Great Lakes DPS. This goal is still a work in progress in the Southwest. To the extent that additional restoration beyond that required by the Act is desired by some members of the public, we recommend working with State or Tribal wildlife agencies and other land managers to achieve these objectives.

In fact, State leadership is facilitating wolf restoration in Oregon and Washington. Despite not being identified as a focus for wolf recovery in any one of the Service's existing recovery plans, both States are allowing and facilitating wolf restoration (Oregon Department of Fish and Wildlife 2010, entire; Wiles *et al.* 2011, entire). As of this writing, Washington now has seven confirmed packs and four additional suspected packs including five confirmed and three suspected packs within the delisted NRM DPS and two confirmed and one suspected packs west of the DPS (Cooley 2012). Similar trends are also occurring in Oregon, which has four confirmed packs within the delisted NRM DPS and a few dispersers outside of the DPS (Cooley 2012). State protections are the primary mechanism contributing to wolf recovery in eastern Oregon and eastern

Washington because Federal protections have been removed in these areas. Wolf restoration in the delisted eastern portions of these States will likely contribute to recovery in the remainder of these States. We expect dispersal into Oregon and Washington to continue unimpeded by this decision.

Wolf restoration into Colorado and Utah has been slower with only a few confirmed dispersers and no confirmed packs forming or reproducing to date. In order for dispersal into surrounding unoccupied habitat to be biologically meaningful, both a male and a female disperser must cross expansive areas of suitable and unsuitable habitat, enter the same area and find each other before continuing on to other areas, and survive long enough to reproduce and successfully raise young. Unlike dispersal into Oregon and Washington, wolves must cross greater distances to get to Colorado and Utah, and dispersing wolves traversing unsuitable habitat, even under the Act's protections, tend to have lower survival rates (Smith *et al.* 2010, p. 627; Jimenez *et al.* In review, entire). These obstacles precluded natural recolonization even when Federal protections were in place. After delisting, we expect existing trends to continue (i.e., occasional dispersers with the odds being against pack formation and reproduction).

Regarding Mexican wolf conservation, at this point in time, we are managing the Mexican wolf population without infusion of genes from other sources and do not see isolation from other wolves as a negative (Brown 2012). If infusion of genes from northern wolves is determined to be beneficial in the future, we would want to carefully evaluate both the process and the effect (Brown 2012).

General Comments on Whether to Delist

Issue 12: We received comments from many people expressing either support for, or opposition to, delisting. Many of these comments (including people on both sides of the issue) stated a belief that their opinion was the majority and that we should do a better job of listening to the wants and desires of the American people. Some suggested that their comment should count more or less than other similar comments.

Response 12: The decision whether to finalize this action is not a vote. Listing and delisting decisions must be made based solely on the best scientific and commercial data available. In this case, the best scientific and commercial data available demonstrate that the Wyoming wolf population and the greater NRM gray wolf DPS is recovered, is likely to remain recovered, and is unlikely to again become threatened with extinction within the foreseeable future. Therefore, we are finalizing our proposal.

Issue 13: Some comments objecting to the delisting noted that the results of an independent scientific peer review, contracted by the Service to review the proposed delisting and the supporting documents, found issues with the Wyoming Gray Wolf Management Plan. This report stated, “The Plan, as written, does not do an adequate job of explaining how wolf populations will be maintained, and how recovery will be maintained” (Atkins 2011, p. iii). A few comments questioned the objectivity of the peer review suggesting we selected reviewers that we knew would support our proposal.

Response 13: Following the release of the first peer review report (Atkins 2011, entire), Wyoming developed a series of documents to clarify its management authorities, responsibilities, and intentions. Wyoming specifically considered and responded to concerns expressed by peer reviewers when developing these documents (Atkins 2012, p. 4; WGFC 2012, p. 1). In this regard, Wyoming's management intentions and processes are more clearly defined and laid out today because of this review (Atkins 2012, p. 4; WGFC 2012, entire). Thus, we conclude that management of wolves after delisting has been improved and has a greater likelihood of always meeting minimum management targets as a result of this review. Additionally, the final rule was improved through careful consideration of all comments and information provided. We appreciate the work of the peer reviewers on this issue.

Although not unanimous, most of the reviewers ultimately supported our conclusion that the Wyoming wolf population is likely to be maintained above recovery levels (Atkins 2012, Table 1). While our rulemaking process does not depend on the "vote" of the peer reviewers, and instead reflects our determination of what the best scientific and commercial information available indicates, on the whole, we view the final peer review report (Atkins 2012, entire) as an endorsement of our conclusions (caveats noted).

Regarding the selection of the peer reviewers, a third-party contractor, Atkins Global, selected the reviewers based on qualifications and experience related to gray wolf

life history and biology, predator/wildlife management, population viability, genetics, and subpopulation integration within metapopulations (Atkins 2011, pp. 9–10).

Reviewers selected were also free from any conflict of interest and independent of the Service; the Idaho Department of Fish and Game; Montana Fish, Wildlife, and Parks; and all Wyoming State agencies. These peer reviewers were not selected to achieve a certain position, nor did they reach a consensus. Instead, the diversity of perspectives, experience, and qualifications achieved the desired outcome of ensuring a comprehensive and critical evaluation of the available information, our proposal, and our conclusions. This process and the report it generated benefitted the rulemaking process, improved this final rule, and more than satisfied applicable peer review standards.

Issue 14: A number of comments accused us of accepting a Wyoming management plan that was nearly identical to the previously rejected plan. A few comments noted that we previously determined the old regulatory framework would meaningfully affect the NRM DPS's resiliency, redundancy, and representation, and decrease the ability to conserve the species. Other comments maintained that previous Wyoming post-delisting regulatory frameworks were adequate and rejected on political, rather than, scientific grounds. Some of these comments pointed to the November 18, 2010, Wyoming District Court ruling as evidence that the previous wolf management plan was sound (*Wyoming et al., v. U.S. Department of the Interior, et al.*, 2010 U.S. Dist. LEXIS 122829). A few comments accused us of changing the requirements for Wyoming after an agreement was reached and expressed frustration with our unwillingness to defend the 2008 NRM DPS delisting, which included Wyoming (73 FR

10514, February 27, 2008). Others suggested that previous issues with the State's post-delisting regulatory framework have been resolved and delisting must again proceed. More specific criticisms related to this issue are discussed in more detail in subsequent comments below.

Response 14: While Wyoming's approach to wolf management may seem similar to previously rejected Wyoming wolf plans, Wyoming's revised approach to wolf management provides substantially more protection for wolves over previous versions. The April 2009 rule noted three primary areas of concern with Wyoming's previous management plan including: (1) The size and permanency of Wyoming's Trophy Area; (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 (74 FR 15123, April 2, 2009). Our conclusions on several of these issues were challenged in the Wyoming District Court. Although the Wyoming District Court disagreed with our determinations on several of these issues, it did not determine the previous Wyoming wolf management framework was adequate and did not order us to accept the plan. Instead, it ordered us to reconsider our position on Wyoming's approach to wolf management in light of several conflicts within the record (including our position that a statewide Trophy Area should be pursued in Wyoming). Subsequent to this order, the Service and the State reinitiated discussions on revisions to Wyoming's 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 rule. Through this process, Wyoming improved its management plan in each of the major areas of concern outlined above.

In 2008, we determined Wyoming's Trophy Area was adequate (73 FR 10514, February 27, 2008). However, a 2009 Montana District Court decision correctly noted that Wyoming had retained the ability to diminish the size of this unit and to revise its boundaries in a manner the Service had previously determined to be unacceptable (71 FR 43410, August 1, 2006; *Defenders of Wildlife, et al., v. Hall, et al.*, 565 F.Supp.2d 1160 (D. Mont. 2008)). In response, the State statute was revised, and the existing Trophy Area was made permanent in 2012. As discussed in more detail in subsequent sections of this rule, the permanent Trophy Area is of sufficient size to support a recovered wolf population in Wyoming, under the management regime developed for this area. Furthermore, in response to concerns about gene flow and genetic connectivity, the Wyoming statute was revised to expand the trophy game portion of the State approximately 80 kilometers (km) (50 miles (mi)) south for 4 and a half months during peak wolf dispersal periods. This additional protected area will benefit natural dispersal. The adequacy of this area to meet the wolf population's biological needs is discussed in more detail in subsequent comments.

Another major difference between the previous management plan and the current one is Wyoming's firm commitment to the minimum recovery goals. Wyoming's

previous wolf management framework contained 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 outside of YNP. The revised approach commits Wyoming to maintaining a population satisfying the entire minimum recovery goal outside of YNP and the Wind River Indian Reservation, and to maintain a buffer above these minimum levels, in order to provide that the minimum targets are not compromised (WGFC 2011, p. 24; WGFC 2012, pp. 3–5). These statewide totals will be further buffered by wolves in YNP, which have ranged from 96 to 174 wolves and from 6 to 16 breeding pairs from 2000 to the end of 2011 (the most recent official wolf population estimates available). In the future, YNP wolf populations are predicted to settle between 50 to 100 wolves and 5 to 10 packs with 4 to 6 of these packs meeting the breeding pair definition annually (Service *et al.* 2000–2010, Table b; Smith 2012). This wolf management strategy is a vast improvement over the previous agreement and provides adequate assurances that the minimum recovery goal will not be compromised. Wyoming’s numeric minimum management targets are discussed in more detail in subsequent comments.

Additionally, Wyoming’s management framework has corrected what we had concluded was an overly aggressive management regime. After our 2008 delisting became effective, the State issued regulations that treated the entire Trophy Area as a chronic depredation area and allowed significant take across the entire region until the population outside YNP was reduced to 6 breeding pairs. This, and related concerns, have been addressed. The State statute now mandates that limits on human-caused

mortality be put in place to ensure that minimum agreed-upon management targets and minimum recovery levels are not compromised.

Other significant improvements include a commitment to monitor and manage to provide adequate levels of genetic exchange; defense-of-property regulations that are similar to our nonessential experimental population rules; and a change in the State statute that ensures wolves in the permanent trophy game portions of Wyoming will not be treated as predatory animals.

Given the above changes, we conclude that Wyoming's revised wolf management framework is adequate and will maintain the population's recovered status.

Issue 15: Many commenters expressed their opinion that NRM and Wyoming wolves remained endangered, were teetering on the edge of extinction, or would again become endangered if the Act's protections were removed. One comment indicated this decision would jeopardize the wolf population and, thus, violated section 7 of the Act. Many comments objected to removing protections regardless of extinction risk. Other commenters suggested delisting was in order and that they supported compromise, but that this did not represent an acceptable compromise. A number of commenters noted a desire to continue to be able to hear wolves in the wild and for their grandchildren to be able to have the same experience. Several comments opined that delisting could cause irreversible harm. Many comments asserted we had abandoned sound science in our decision-making process, and had instead taken anti-wildlife policies by yielding to

political and stakeholder pressure. A few comments asserted that political pressure was responsible for our agreement with Wyoming's plan. Other comments noted our support for hunting as evidence of our anti-wolf bias. A few comments suggested allowing us to make this decision was a conflict of interest, and asserted that we get a major portion of our budget from hunting-related revenue. Some of these comments offered specific legal or policy arguments supporting their position (these comments are discussed in more detail below), while others were based on moral or ethical positions or general distrust for our agency. Many comments suggested we should reengage Wyoming to negotiate a better deal for wolves. Many other comments viewed Wyoming's approach to managing the wolf population as a good compromise balancing the needs of ranchers, hunters, wolves, and other wildlife. Many comments supported delisting, suggesting wolf populations are well above recovered levels, that delisting is long overdue, and that State management will maintain the wolf population's recovered status.

Response 15: By nearly any measure, the NRM gray wolf population and all of its subpopulations are recovered and will remain recovered under the management frameworks now in place in Wyoming, Idaho, and Montana. Wolves are no longer in danger of extinction either now or in the foreseeable future and will not meet the definitions of a threatened or an endangered species if delisting occurs. We are proud to say that successful recovery efforts and State, Tribal, and Federal management after delisting ensures that the public will continue to be able to hear NRM wolves howl in the wild for countless future generations to come. In short, the regulatory frameworks now

in place give us great confidence that this success story for American conservation and the Act will be maintained.

The most recent official minimum population estimate shows that the NRM wolf population contains more than 1,774 adult wolves and more than 109 breeding pairs. Most of the suitable habitat is now occupied and likely at, or above, long term carrying capacity (excluding Oregon and Washington, which are only beginning to be reoccupied). This population has exceeded recovery goals for 10 consecutive years. Although population decreases are expected in Idaho, Montana, and Wyoming, we expect that these reductions will be carefully managed so that populations are maintained well above recovery levels (perhaps around 1,000 wolves will be maintained across the NRM DPS long term). Our expectation for gradual reductions was verified in 2009 and 2011 (the first 2 years of State management including a hunting season) where the population remained relatively stable (technically, slight increases were documented each year) even in the face of substantial mortality levels. Measurable declines across the region are expected to begin to occur in 2012. In Wyoming, we expect the total statewide population will be reduced between 10 to 20 percent in 2012 with continued gradual reductions thereafter, if appropriate. Given the species' reproductive capacity, such declines are not irreversible; instead, populations would rebound rapidly if human-caused mortality is reduced.

The basis for our determination, as required by the Act, is the best scientific and commercial information available, which indicates that the Wyoming, GYA, and NRM

gray wolf populations are recovered and do not meet the definition of threatened or endangered. This decision is not based on political and stakeholder pressure, nor has our support for hunting biased our decision. Furthermore, very little of the Service's budget and none of the Endangered Species program's budget comes from hunting revenue. While we respect the moral and ethical reasons some members of the public may have for disapproving of this decision, delisting is the appropriate decision based on the statutory requirements of the Act. Additionally, delisting a recovered species is a non-discretionary duty and not subject to the provisions of section 7(a)(2) of the Act.

Issue 16: Some comments expressed concern that if the Service accepted the Wyoming Gray Wolf Management Plan, as written, it would set a precedent allowing Idaho and Montana to change their management plans.

Response 16: We have no indication that Idaho or Montana have a desire to change their management plans to mirror Wyoming's. Both States appreciate the sovereignty they now enjoy to manage wolves as a recovered species under State jurisdiction and are unlikely to reopen this issue. Furthermore, both States recognize that a change as significant as, for example, designating wolves as predators in large portions of the States could trigger a status review under our post-delisting monitoring criteria because such an action could be perceived as significantly increasing the threat to the wolf population (depending on the specifics). Idaho and Montana have expressed a strong interest in avoiding a Service status review and any relisting consideration.

Human-Caused Mortality

Issue 17: Many comments expressed concern about the amount of human-caused mortality and possible direct and indirect impacts. Some questioned the amount of human-caused mortality that the population can withstand in the short term (as populations are being reduced from current levels) and in the longer term once minimum management targets are achieved. Many comments took issue with statements taken from the Wyoming wolf management plan that indicated Wyoming wolves could tolerate up to 36 percent annual mortality. One commenter expressed concern that Wyoming has only a narrow margin for error because the number of wolves in the Trophy Area are only a little above minimum management targets. This comment asserted that our data from the last 5 years indicated that the population had stabilized with less than 20 percent mortality associated with livestock depredation control efforts, but that Wyoming may exceed these and other human-caused mortality rates after delisting. Some comments suggested that we must set firm standards for acceptable levels of human-caused mortality in different circumstances. Numerous comments indicated that the many sources of human-caused mortality allowed by the Wyoming regulatory framework could easily and routinely exceed tolerable levels of mortality. Several comments suggested management assumptions were incorrect in that hunting-related mortality was not compensatory for other human-caused mortality, was more likely additive or “super-additive,” and that overall population impacts would exceed direct reported mortality levels because of impacts to pack structure and reproduction. Some of these comments asserted hunting would cause psychological trauma or other indirect effects to surviving

wolves. Other comments indicated that wolves have proven resilient to human-caused mortality, that our description of wolf susceptibility to human-caused mortality was exaggerated, and that such mortality would be limited and adequately regulated. Some comments asserted wolves will become less susceptible to human-caused mortality as they “relearn their fear of man.” Many of these comments emphasized the ability of wolves to respond quickly to population reductions noting, for example, reports of wolf packs with more than one female with pups.

Response 17: Human-caused mortality is the most significant factor affecting the long term conservation status of the wolf population in Wyoming, the GYA, and the entire NRM DPS. Therefore, managing this source of mortality remains the primary factor for maintaining a recovered wolf population into the foreseeable future. The best available information indicates that 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 as they will be in Wyoming. For example, 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 (Service *et al.* 2012, Table 4; Smith *et al.* 2010, p. 620; also see Figure 3 above). Similarly, in 2009 and in 2011, more than 600 NRM wolves died each year from all sources of mortality (agency control including defense of property, regulated harvest, illegal and accidental killing, and natural causes), and the population showed little change (technically, slight increases in minimum population levels were documented each year) (Service *et al.* 2012, tables 4a, 4b).

While some authors have suggested human-caused mortality is additive or “super-additive,” and have predicted significant impacts to wolf populations from modest levels of human-caused mortality (Creel and Rotella 2010; Atkins 2011, p. 81; Vucetich and Carroll In review), other researchers disagree (Gude *et al.* 2011). Overall, the literature indicates wolf populations can maintain themselves despite human-caused mortality rates of 17 to 48 percent (Fuller *et al.* 2003, pp. 182–184 [22 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent]). Furthermore, wolf populations have been shown to increase rapidly if mortality is reduced after severe declines (Fuller *et al.* 2003, pp. 181–183; Service *et al.* 2012, Table 4).

After delisting, Wyoming will gradually reduce the wolf population, manage for a buffer above the State’s minimum management targets, and adaptively manage human-caused mortality. Regarding the adaptive management strategy, Wyoming will limit mortality as necessary in the following order: first, Wyoming will limit control actions for unacceptable impacts to ungulates; next the State will limit harvest levels; then it will limit control for damage to private property; and, finally, it will limit lethal take permits (WGFC 2012, p. 7). We believe that the third and fourth sources of mortality noted above will rarely need to be limited because all other sources of mortality will not likely exceed what the population can withstand, leaving some modest level of surplus wolves for harvest. However, all of these sources of human-caused mortality can be limited, if necessary. Harvest will be limited with an adaptive approach determining what the

population can withstand in a given year and across years. While we expect Wyoming to reduce the wolf population in the Trophy Area and remove most resident wolves within the predator portion of the State, we conclude that the wolf population can tolerate the level of mortality expected in the short term before leveling off at a longer term equilibrium. Given the biological resilience of wolves to controlled and managed human-caused mortality, these strategies provide that Wyoming's minimum management targets will not be compromised. When combined with wolves occurring in adjoining jurisdictions and across the NRM DPS, we have high confidence that recovery will not be compromised in Wyoming, the GYA, or across the NRM DPS.

Issue 18: Numerous commenters asserted that Wyoming's wolf management framework remains flawed, in that it fails to clearly commit to managing for at least 15 breeding pairs in the State. A few comments noted that we previously stated this was a requirement, rejected Wyoming's 2003 regulatory frameworks for failing to commit to this minimum management target, and that the courts took issue with past Wyoming plans and our approval of Wyoming's 2007 regulatory framework for not clearly committing to this standard. Several comments noted that Wyoming's "commitment" to maintain at least 15 breeding pairs and at least 150 wolves statewide, in cooperation with YNP and the Wind River Indian Reservation, was nothing more than a non-enforceable promise. A few comments questioned whether YNP can adequately buffer the Wyoming wolf population, citing predictions that the YNP wolf population was declining into a lower long term equilibrium. One peer reviewer expressed concern that, by removing the statewide goal for Wyoming, the State's incentive to conserve wolves in protected areas

is removed, and that such wolves would be vulnerable to killing when they left these areas.

Response 18: After careful consideration, we decided differences in State management authority warranted a different approach to wolf management in Wyoming versus Montana and Idaho. Nearly all wolf populations in Montana and Idaho occur in areas under State jurisdiction. Therefore, it makes sense for these States to manage for a statewide total. In Wyoming, a substantial portion of the wolf habitat and wolf population occurs in YNP, where the State has no jurisdiction (Oakleaf 2011). Thus, it would be more difficult to manage for a statewide total. In essence, the decision to split numeric targets by management authority is similar to the decision to split the overall NRM goal by State, just at a more localized level. Given this difference, we decided that a different solution was appropriate.

The recovery goal requires at least 10 breeding pairs and at least 100 wolves per State. The new approach and agreement provides that this goal is met in Wyoming outside YNP and the Wind River Indian Reservation (large areas outside of State jurisdiction). Wyoming is firmly committed to a population at least at these levels as reflected in State statute, regulations, and its management plan. In order to meet these goals and allow for continued management flexibility, Wyoming intends to manage for a population above its minimum management targets. Furthermore, the wolf populations in YNP and on the tribal lands of sovereign nations will provide an additional buffer above the minimum recovery goal intended by the previous management objective of at

least 15 breeding pairs and at least 150 wolves statewide. From 2000 to the end of 2011 (the most recent official wolf population estimates available), the wolf population in YNP has ranged from 96 to 174 wolves, and between 6 to 16 breeding pairs. While a lower future population level in YNP is predicted (between 50 to 100 wolves and 5 to 10 packs with 4 to 6 of these packs meeting the breeding pair definition annually) (Smith 2012), YNP will always provide a secure wolf population providing a safety margin above the minimum recovery goal.

We conclude that the YNP wolf population can effectively buffer the rest of the Wyoming wolf population because of the significant amount of available habitat in the park, the sizable wolf population the park does now and will continue to support, and the relative security of the park population. YNP is the most protected population in the NRM DPS and least likely to be meaningfully affected by human-caused mortality. This security from human-caused mortality, the most significant threat factor facing wolves in the NRM DPS, was critical in accepting the YNP population as a buffer even though it may occasionally fall below 5 breeding pairs (although it will likely not fall below 50 wolves). In our opinion, this sizable and secure park population is a superior buffer to the simple 50 percent buffer used in the other States, and is more appropriate to the Wyoming situation given differences in management authority. Overall, while this approach represents a new strategy to maintain this recovered population, it is consistent with our overarching goal because it will maintain the statewide Wyoming wolf population well above minimum recovery levels. Furthermore, based on Wyoming's management approach (i.e., the State's commitment to maintain at least 10 breeding pairs

and at least 100 wolves, which the State intends to satisfy by managing for a buffer above these minimums) and our understanding of the YNP wolf population's likely future abundance (50 to 100 wolves and 5 to 10 packs and 4 to 6 breeding pairs), the original 15-breeding-pair and 150-wolf-minimum management targets will rarely, if ever, be compromised.

While some have asserted that this new approach removes Wyoming's incentive to conserve wolves resident to protected areas and that many of these wolves could be killed when they ventured from these protected areas, we conclude that this concern is unwarranted. The peer reviewer who raised this point expressly noted concern for Grand Teton National Park wolves. However, these wolves occur within the Trophy Area and are counted in the State's totals, so Wyoming still has an incentive to consider impacts to these wolves when making management decisions. The same applies for wolves in the John D. Rockefeller, Jr. Memorial Parkway and the National Elk Refuge. While this criticism could theoretically be relevant to YNP wolves, most YNP packs rarely leave the park and most of those packs that routinely leave the park occur on the northern part of YNP, where they occasionally enter adjoining portions of southern Montana. Montana has already taken steps to limit impacts to YNP wolves in these adjoining areas. Most other YNP wolf packs are not expected to be as vulnerable to human-caused mortality in adjoining areas most years, because they generally spend less time in these adjoining areas. Furthermore, as discussed in Factor B below, all three States have an incentive to maintain a healthy YNP wolf population. For example, a healthy wolf population in YNP brings economic benefits to all three States through increased tourism.

Furthermore, there is a regulatory incentive to maintain the YNP population, since we will initiate a status review if the Wyoming statewide population, including YNP, falls below 15 breeding pairs or below 150 wolves routinely or for 3 consecutive years. Wyoming's wolf management plan confirms Wyoming's intention to coordinate with YNP to maintain a statewide total of at least 15 breeding pairs and at least 150 wolves (WGFC 2011, p. 1).

Furthermore, we have previously noted potential pitfalls with applying a simple requirement to maintain at least 15 breeding pairs and at least 150 wolves statewide in Wyoming, and conclude that the new approach is more likely to maintain the population's recovered status in Wyoming than the statewide approach employed in Montana and Idaho. Under the 15 breeding pair statewide approach, if the YNP wolf population increased to, for example, 12 breeding pairs after delisting, Wyoming could have reduced the wolf population outside the park to 3 breeding pairs. However, such a robust population in YNP would have an increased likelihood of intraspecific strife and disease, likely resulting in a population decline similar to those observed in YNP in 2005 and 2008. This park population decline (i.e., falling from 12 breeding pairs to, say, 5 breeding pairs), in combination with an allowable population reduction outside the park (to as low as 3 in the above example), could compromise the minimum recovery goal of at least 10 breeding pairs statewide. Recent analysis of this information contributed to our conclusion that a different approach was warranted in Wyoming.

The new strategy precludes this possibility by maintaining the population at least at the minimum recovery goals outside YNP and the Wind River Indian Reservation, and allows the wolf population in YNP and on the Wind River Indian Reservation to provide the additional buffer above the minimum recovery goal. In addition to preventing an unacceptable population decline, this approach is also desirable to the extent that it increases the public's understanding and expectation that some modest wolf population and wolf distribution will, and must, be maintained outside of the National Parks in order to maintain delisting and State management authority. We conclude that this public understanding of Wyoming's responsibility will result in increased public tolerance for wolves outside of National Parks. Such public tolerance will benefit wolf conservation. Finally, this approach is desirable for the WGFD, because it gives the State a consistent minimum goal that will not fluctuate across years. Such a steady goal will be easier to consistently satisfy.

Issue 19: Many comments criticized Wyoming's commitment to maintain at least 10 breeding pairs and at least 100 wolves outside YNP and the Wind River Indian Reservation. Some indicated this commitment was too low and that the area can support more wolves. Many comments expressed general concern that State management would result in significant wolf population reductions (a 40 to 60 percent reduction was most often cited). Several peer reviewers thought these goals should be met within the Trophy Area instead of across all of Wyoming given the insecurity of wolves in the predator area. Some comments complained that at the time of the draft proposal, Wyoming's commitment to these targets was not reflected in binding statutes or regulations. A few

comments expressed concern that reporting mortality could occur 24 hours to 10 days after the event, during which significant mortality could occur, compromising management objectives. Numerous comments, including the peer reviewers, recommended that the Wyoming Gray Wolf Management Plan clearly commit to maintain a “sizable” buffer above minimum population targets. Other commenters recommended that Wyoming develop a specific numeric buffer and that this buffer needed to be enshrined in statute or regulation before delisting could occur. The peer reviewers also expressed concern over the potential rate of wolf population reduction, and recommended that the Wyoming Gray Wolf Management Plan provide a better explanation of the adaptive processes (including use of monitoring data) that will guide wolf population reductions. Many comments indicated a gradual population reduction was unlikely since Wyoming’s regulatory framework authorizes numerous, competing sources of human-caused mortality. Other comments suggested State commitments to maintain numeric management objectives must be binding and enforceable. Some noted that when we accepted commitments short of this standard in the past, the States failed to meet the commitments.

Response 19: Consistent with our agreement with the State, both Wyoming statutes and regulations now require Wyoming to maintain at least 10 breeding pairs and at least 100 wolves outside YNP and the Wind River Indian Reservation at the end of the year. Wolves in the predator area will count towards these goals (i.e., they will be reported at the end of the year should they persist through that period), but will not be relied upon by the WGFD when making wolf management decisions (e.g., when setting

hunting quotas) necessary to ensure the State maintains at least minimum management targets (WGFC 2012, p. 3). This approach was demonstrated this year when the WGFD and the WGFC developed hunting quotas that provide Wyoming with a substantial cushion above the minimum management targets solely within the Trophy Area and allow any resident wolves that persist in the predator area to further buffer these minimum requirements.

While Wyoming can support more wolves than the agreement requires, the Act does not require managing the species at carrying capacity. Instead, it requires achieving and maintaining recovery and providing reasonable assurance of long term viability so that the population does not again become threatened or endangered. We have determined that Wyoming's approach to wolf management after delisting will achieve these goals and, when considered in the region's larger management scheme, will maintain recovery in Wyoming, the GYA, and across the NRM DPS.

Wyoming intends to meet its statutory and regulatory standards by managing for a buffer above minimum management targets (WGFC 2012, pp. 3–5). The population will be routinely and continuously monitored to detect changes in population abundance, distribution, and demographic makeup. All mortality within the Trophy Area will be reported within 72 hours (W.S. 23–1–304(d)(iv); W.S. 23–3–115(c)) including: Take authorized by lethal take permits, which must be reported within 24 hours (chapter 21, section 7(b)(v)); harvest, which must be reported within 24 hours (chapter 47, section 4(f)(i)); and defense of property take, which must be reported within 72 hours (W.S.

23-1-304(d)(iv); W.S. 23-3-115(c); chapter 21, section 6(a)). Mortality in the predator area (which after the first year will likely be limited) must be reported within 10 days (W.S. 23-1-304(d)(iii); WGFC 2011, p. 29).

Should Wyoming's wolf population approach minimum management objectives, the State will sequentially limit: control actions for unacceptable impacts to ungulates; harvest levels; control for damage to private property; and lethal take permits (WGFC 2012, p. 7). Regarding hunting specifically, the addendum notes that Wyoming would employ an iterative, adaptive, and public process whereby season structures, hunt areas, and quotas are evaluated and adjusted based on the response of the wolf population to prior management actions (WGFC 2012, pp. 4-7). Furthermore, the addendum notes Wyoming's authority to revise, reduce, or close hunting seasons if necessary (WGFC 2012, pp. 6-7). Such flexibility allows the State to adaptively respond to population problems should its assumptions on susceptibility to human-caused mortality prove overly optimistic. Overall, we conclude that this approach of managing, monitoring, and regulating and limiting human-caused mortality, including adjustments throughout the year as necessary, so that minimum management targets will be achieved, the population's recovered status will not be compromised, and the population will not again become endangered within the foreseeable future throughout all or a significant portion of its range.

We decided against requiring Wyoming to provide a specific numeric buffer above these minimum management targets. While Wyoming will, and must, maintain a

buffer to consistently meet its minimum management targets, the buffer necessary to achieve this goal will change over time. For example, current information indicates approximately 140 wolves have a 95 percent chance of producing at least 10 breeding pairs (Bruscino 2012, p. 5). Similarly, Wyoming anticipates hunting and other sources of mortality will reduce the Trophy Area's wolf population to around 170 wolves and around 15 breeding pairs at the end of 2012 (well above Wyoming's management goals) (Mills 2012, pers. comm.). While these models are a reasonable short term predictor of population response, they are based on population data while the Act's protections were in place. After delisting, management differences will likely alter population dynamics and change the usefulness of the currently available data to predict the number of wolves needed to meet or exceed the State's breeding pair target. For example, higher mortality rates may result in fewer packs successfully raising pups through the end of the year and qualifying as breeding pairs.

The exact difference between current minimum estimates and likely future outcomes are not known and probably will not be known with any certainty until after the new management regime is implemented (likely for several years). Given this fact, we concluded that a firm commitment to the underlying minimum management target was sufficient, recognizing the State would monitor the population after delisting and adjust management over time based on this new data, including learning what the population can withstand (in terms of the amount, timing, and intensity of human-caused mortality) and how to consistently meet or exceed the State's minimum management targets long term. This approach is more appropriate biologically than us developing an arbitrary,

mandatory buffer based on current data that is unlikely to be an accurate predictor of long term population response after delisting.

Regarding the rate of reduction, Wyoming has consistently indicated it intends to pursue a gradual population reduction during this learning phase. To this end, Wyoming's 2012 hunting quota (52 wolves) is anticipated to reduce the Trophy Area wolf population by about 11.5 percent and result in a Trophy Area wolf population of around 170 wolves and 15 breeding pairs at the end of 2012 (Mills 2012, pers. comm.). This initial goal is comfortably above the minimum agreed-upon population targets and is consistent with the stated intention of a gradual population reduction. In future years, hunting quotas will be set later in the year to allow full consideration of recruitment and mortality events that occurred during spring and summer. In the long term, the State has sufficient discretion to allow continued gradual population reductions as necessary and appropriate, before stabilizing the population comfortably above the minimum recovery goals.

Overall, given the biological resilience of wolves to controlled and managed human-caused mortality, these strategies will provide that Wyoming's minimum management targets are not compromised. When combined with wolves occurring in adjoining jurisdictions and across the NRM DPS, we have high confidence recovery will not be compromised in Wyoming, the GYA, or across the NRM DPS.

Issue 20: One peer reviewer expressed concern that the State's reliance on minimum population numbers, instead of estimates that incorporate detection probabilities, could result in improper assumptions about trends. This reviewer went on to indicate that if the State increased monitoring intensity as the population gets closer and closer to the minimum management targets, this increasing monitoring intensity could result in the appearance of a population increase when actual populations are declining. For example, if a raw count of 105 wolves one year detected only 80 percent of the population and a raw count of 115 wolves the next year detected 95 percent of the population, raw counts would imply an increasing population (from 105 to 115 wolves) when the actual population would have declined (from 131 wolves to 121 wolves). Such data could lead State officials to increase quotas and other take allowances even as populations are declining. Issues associated with such errors would be increasingly risky the closer the State is to its minimum population target.

Response 20: We concluded that risk associated with such potential population counting errors will be minimal because detection in Wyoming will be high under State management, year in and year out. Several factors contribute to this likely high detection rate including: WGFD's survey effort will be greater than what has been occurring under Service management because WGFD has substantially more human power dedicated to wildlife management in northwestern Wyoming than we do; and the geography and use of the area is conducive to wolf detection. These factors will result in a high detection rate, likely higher than we achieved in the past. Therefore, while estimates of abundance

and trends will not be perfect, we conclude that they are likely to always be sufficiently reliable assuming maintenance of an adequate buffer above minimum recovery levels.

That said, the importance of this issue and any possible erroneous conclusions about abundance and trends is dependent on how close Wyoming manages to its minimum population targets. In 2012, Wyoming's take allowances are expected to maintain around 170 wolves and 15 breeding pairs outside of YNP and the Wind River Indian Reservation at the end of the year (Mills 2012, pers. comm.). As discussed in Issue and Response 19 above, in subsequent years the population will likely be gradually reduced, but always maintained with a sufficient buffer to allow management flexibility and preclude the possibility that relisting could occur. In most years, the wolf population within the Trophy Area will be well above the minimum management targets of at least 10 breeding pairs and at least 100 wolves. Minimum counts will verify that the State has achieved these goals (as discussed in Issue and Response 2 above). Wolves in YNP and the Wind River Indian Reservation provide an additional buffer so that the statewide minimum recovery level is not compromised. Within the larger GYA, wolves in the Montana and Idaho portion of the GYA provide additional representation, resiliency, and redundancy across the overall GYA population. Such a conservative approach sufficiently minimizes the risk associated with erroneous conclusions about trends resulting from fluctuating detection probabilities. While we would support the development of a monitoring technique that incorporates detection probabilities, and Wyoming has indicated that it is open to such an approach if subsequent data indicate that there is a need (State law requires Wyoming to employ techniques that accurately

determine the population (W.S. 23-1-304(d(i))) (Mills 2012, pers. comm.), we conclude that current techniques are adequate, given the overall management approach that will be employed in the Trophy Area, the GYA, and the NRM region.

Issue 21: A few commenters thought it problematic that the agreed-upon strategy places the burden of meeting the minimum recovery goal (at least 10 breeding pairs and at least 100 wolves) on areas outside of YNP. These comments pointed out that the proposed rule appeared to view YNP as merely playing “a supporting role” in maintaining recovery, rather than the central role the park is likely to play, given its abundance of high-quality suitable habitat. These comments note this approach is a complete reversal from previous Wyoming wolf management plans, which relied primarily on YNP to meet the minimum recovery levels, with Wyoming providing the buffer above the minimum levels. Some comments maintained YNP should bear a greater burden for wolf recovery and commit to maintain specific numbers of wolves. Others wanted clarification that the agreement with Wyoming in no way obligates the State of Wyoming to manage for more than 10 breeding pairs and more than 100 wolves at any time.

Response 21: Our discussion of YNP was not intended to downplay or undermine the importance of YNP for the conservation of the GYA or NRM gray wolf population. YNP represents a secure block of suitable habitat, which has supported between 96 and 174 wolves and from 6 to 16 breeding pairs since 2000. While a lower long term future population level in YNP is predicted (Smith 2012), YNP will continue to

be important to the regional wolf population and will play an important role in maintaining the regional wolf population's recovered status. We agree that this approach is a modification from that used in previous Wyoming wolf management plans, but it is an approach that we requested as a remedy to our previous determination that the Wyoming management plan was inadequate. In fact, recovery in Wyoming depends both on having healthy populations within YNP as well as the additional 100 wolves and 10 breeding pairs outside the YNP. The combination of these two conservation areas will provide for wolf recovery in Wyoming.

Issue 22: Numerous comments objected to Wyoming's approach to lethal take permits. Some objected to the State's statutory mandate to issue lethal take permits as long as population objectives are not likely to be compromised. Others objected to the issuance of lethal take permits for "harassing" livestock or domestic animals. These comments indicated that harassment is not defined and could include, for example, causing dogs to bark or cattle to move from one grazing area to another. These comments went on to indicate that because an area would be categorized as a chronic wolf depredation area if there are two harassment episodes within a 2-month period, this could allow large portions of Wyoming to be designated as a chronic wolf depredation area, which, in turn, would authorize liberal mortality over most of the Trophy Area. One comment suggested that this "flimsy standard" could result in the issuance of hundreds of permits (perhaps more permits than wolves exist in the Trophy Area). Some commenters wondered how long it would take the WGFD to figure out whether there was a need to suspend or cancel permits and whether this could endanger the ability of the

State to maintain the population above agreed-upon targets. A few comments noted there was not a quantitative limit on the size of a chronic depredation area or the number of permits in such areas indicating resulting take could be significant. Other comments noted safeguards and limits on lethal take permit issuance designed to minimize population-level impacts and prevent this source of mortality from compromising management objectives.

Response 22: Wyoming law (W.S. 23–1–304(n)) states that permits “shall be issued” to landowners or livestock owners in cases where wolves are harassing, injuring, maiming, or killing livestock or other domesticated animals, and where wolves occupy geographic areas where chronic wolf predation occurs. Numerous safeguards limit the potential of these permits to detrimentally affect the population. For example, State statute requires that permits be issued, and renewed as necessary, in 45-day increments (W.S. 23–1–304(n)), and State regulations limit the take allowance for each permit to a maximum of 2 gray wolves, and specify that each permit can only apply to a specified limited geographic or legally described area (chapter 21, section 7(b)(ii)). These requirements provide that application of this source of take is limited in time and geography. Similarly, State regulations indicate that purported cases of wolf harassment, injury, maiming, or killing must be verified by the WGFD (chapter 21, section 6(b)). We conclude that this requirement for WGFD verification would limit potential abuse for this source of mortality. Regarding the issuance of lethal take permits for wolves “harassing” livestock or domestic animals, Wyoming will require that WGFD staff verify that wolves were present and involved in activities that would directly indicate an actual attack was

likely (Mead 2012b). Such activity must be an activity, such as chasing or molesting, that is an immediate precursor to actual biting, wounding, grasping, or killing (Mead 2012b). Similar allowances are incorporated in our experimental population rules (50 CFR 17.84(n)(3)).

Finally, and most importantly, State law (W.S. 23–1–304(n)) and the implementing regulations (chapter 21, section 7(b)(iii)) clarify that existing permits would be cancelled, and issuance of new permits would be suspended, if the WGFD determines further lethal control could compromise the State’s ability to maintain a population of at least 10 breeding pairs and at least 100 wolves in Wyoming outside of YNP and the Wind River Indian Reservation at the end of the calendar year. Importantly, the word “could” (as opposed to would or will) provides authority for the WGFD to manage for a buffer above the minimum target and limit control from lethal take permits, if necessary, to maintain an adequate minimum buffer. However, the Addendum to the Wyoming Gray Wolf Management Plan explains that the State law’s mandatory approach to issuance of lethal take permits requires that Wyoming’s adaptive management framework limit other discretionary sources of mortality before it limits this source of mortality (WGFC 2012, p. 7).

On the whole, the available information indicates that Wyoming’s approach to lethal take permits may affect population abundance (particularly at a localized level where wolf-livestock conflict is high), but that Wyoming has instituted sufficient safeguards so that this source of mortality would not compromise the State’s ability to

maintain a population of at least 10 breeding pairs and at least 100 wolves in Wyoming outside of YNP and the Wind River Indian Reservation at the end of the calendar year.

Issue 23: We received many comments on the permanent Trophy Area and the predator area. Many of these comments asserted this line was arbitrary and not scientifically derived. A few comments ridiculed an approach that assumed wolves would adhere to human-made boundaries. Most of these comments thought that the WGFD should be given management authority statewide (note that the WGFD does not have management authority over wolves in the predator area). Some comments noted that Wyoming treats other predators (e.g., mountain lions and black bears) as trophy game animals statewide, while others noted that wolves are not managed as predators in any other State in the country. Many suggested a predator designation was unnecessary because State management provides plenty of management flexibility to address wolf problems as evidenced by the Wyoming gray wolf plan's long list of lethal options.

Some comments asserted that Wyoming's new strategy including the Trophy Area and the flex zone was almost the same or only marginally better than previously rejected State regulatory frameworks and accused the Service of reversing itself on this issue. These comments noted that our 2009 delisting determination had stated support for a state-wide trophy game status and provided numerous reasons why we felt such an approach was "advisable" and "the best way for Wyoming to provide adequate regulatory mechanisms." Some noted that we previously found statewide trophy game status would provide WGFD more flexibility to devise an adaptive management strategy that allows

the State to respond to population declines and still maintain its numeric objectives.

Others thought areas like the Big Horn Mountains, Wind River Range, Wyoming Range, and Salt Range could support wolves and should be protected (not designated as a predator area) so recovery can eventually take hold in these areas. Still other comments supported State management and indicated the State's Trophy Area was adequate because it includes most of the suitable habitat.

One peer reviewer noted that there was no functional difference between Wyoming's predator status across largely unsuitable habitat and management in eastern Montana and southern Idaho (today or while listed) that precluded wolf pack establishment in these areas. A number of comments indicated that we must approve Wyoming's dual status approach, because we had previously concluded such an approach was acceptable (Hall 2007; 73 FR 10514, February 27, 2008), noting only minor issues that needed to be remedied (Gould 2009; 74 FR 15123, April 2, 2009). A few comments advocated for a smaller Trophy Area, asserting that all wolves outside of National Parks should be considered predators.

Response 23: We recognize our position on this issue may have led people to view our perspective as changing over time without reasoned justification. We clarify our position here. A statewide Trophy Area has long been our preferred approach to sustain wolf conservation, but that something less than a statewide trophy game designation (i.e., the current Trophy Area) can satisfy the species' biological needs and

maintain Wyoming's share of a recovered wolf population assuming adequate management within this area.

This issue is important because designation of an area as a predator area or a Trophy Area strongly influences the likelihood of wolf and wolf pack persistence within the area. "Trophy game" status allows the WGFC and WGFD to regulate methods of take, hunting seasons, types of allowed take, and numbers of wolves that can be killed. All other States within the NRM DPS manage wolves as a game species statewide. "Predatory animals" in Wyoming are regulated by the State's Department of Agriculture under title 11, chapter 6 of the Wyoming Statutes. Under these regulations, wolves in predator areas can be killed by anyone with very few restrictions. Coyotes are managed in Wyoming in this manner. The nature of this taking means it is unlikely that wolf packs or breeding pairs will persist in the predator area of Wyoming. While some lone wolves and dispersing wolves from both within the GYA and from other metapopulations will be killed, lone wolves and dispersers will likely be less prone to take than resident packs, whose locations are easily detected and ranges are easily determined.

Given these impacts, our assessment of adequacy analyzed whether the Trophy Area is of sufficient size to support and maintain a recovered wolf population in Wyoming over the long term, assuming adequate management within this area. This assessment compared Wyoming's Trophy Area to past assessments of where we thought wolf recovery would occur, subsequent modeling exercises showing where wolves are most likely to occur and persist, and actual wolf distributional data of where wolves

persisted under the Act's protections. In total, Wyoming wolves will be managed as game animals year-round or protected in about 38,500 km² (15,000 mi²) in the northwestern portion of the State (15.2 percent of Wyoming (Lickfett 2012)), including YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, adjacent U.S. Forest Service, designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and most of the Wind River Indian Reservation. Wolves will be designated as predatory animals in the remainder of the State (predator area).

The above protected and permanent 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 Wyoming portion of the primary analysis area used in the 1994 Environmental Impact Statement (areas analyzed as potentially being impacted by wolf recovery in the GYA) (Service 1994, Figure 1.1); the entire home range for 24 of 27 breeding pairs (88 percent), 40 of 48 packs (83 percent), and 282 of 328 individual wolves (86 percent) in the State at the end of 2011 (Service *et al.* 2012, Tables 2, 4, Figure 3; Jimenez 2012a; Jimenez 2012, pers. comm.); and approximately 81 percent of the State's suitable habitat (including over 81 percent of the high-quality habitat (greater than 80 percent chance of supporting wolves) and over 62 percent of the medium-high-quality habitat (50 to 79 percent chance of supporting wolves) (Oakleaf 2011; Mead 2012a)). Based on the above analysis, it is clear that this is the portion of Wyoming where wolf recovery was always envisioned to occur, that wolves have failed to persist in large numbers outside of this area, that the vast majority of the State's suitable habitat is contained within this portion of Wyoming, and that this portion of Wyoming has a

demonstrated history of being able to support a wolf population that exceeds agreed-upon minimum management targets. While a statewide trophy game designation would allow for more management flexibility, Wyoming's current Trophy Area is of sufficient size to support and maintain a recovered wolf population in Wyoming over the long term, assuming adequate management within this area.

To understand our position on the Trophy Area, it is useful to review our past positions on this issue. Prior to 2003, the gray wolf was designated by W.S. 23-1-101(a)(viii) as a predatory animal statewide in Wyoming. In 2003, Wyoming passed a State law that designated wolves as "trophy Game" in YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, and the adjacent USFS-designated Wilderness areas (Wyoming House Bill 0229) once the wolf is delisted from the Act. This State law also allowed the WGFC to increase the Trophy Area if certain population targets were not achieved. The 2003 permanent Trophy Area totaled about 7 percent of Wyoming (Lickfett 2011). Wyoming's 2003 post-delisting regulatory framework was rejected because of several flaws including (but not solely because of) an insufficiently small Trophy Area (Williams 2004c). Our 2006 petition finding clarified that "a large portion of the area permanently designated as 'trophy game' actually has little to no value to wolf packs because it is not suitable habitat for wolves and, thus, is [seasonally] used... because of their high elevation, deep snow, and low ungulate productivity" (71 FR 43410, August 1, 2006). Overall, we concluded that a larger Trophy Area was necessary because maintenance of wolf populations above recovery levels would likely depend on wolves living outside the National Parks and wilderness portions of Wyoming

(71 FR 43410, August 1, 2006). In 2007, Wyoming adopted new legislation that increased the Trophy Area. This new Trophy Area, comparable to the current protected and trophy areas, was deemed sufficient to provide for the conservation of Wyoming's share of a recovered wolf population (Hall 2007; 73 FR 10514, February 27, 2008). However, this approval was later retracted, in part, because Wyoming's 2007 legislation allowed the WGFC to diminish the Trophy Area to the 2003 line if it determines the diminution would not impede the delisting of gray wolves (*Defenders of Wildlife, et al., v. Hall, et al.*, 565 F.Supp.2d 1160 (D. Mont. 2008); Gould 2009; 74 FR 15123, April 2, 2009).

The current Trophy Area improves upon the 2003 Trophy Area as it is significantly larger and not subject to WGFC expansion or reduction. The current Trophy Area improves upon the 2007 Trophy Area in that: (1) It is permanent and cannot be diminished; and (2) it will be seasonally expanded approximately 80 km (50 mi) south (see Figure 3) (an additional 3,300 km² (1,300 mi²) or 1.3 percent of Wyoming) from October 15 to the last day of February (28th or 29th) to facilitate natural dispersal of wolves between Wyoming and Idaho. While many commenters asserted that these changes were minor tweaks that do not justify a departure from past Service positions, we conclude that these changes are biologically substantive and important. These and other changes were sufficient for us to determine that the current plan rectifies the inadequacies of the previous plan.

Many comments note the Service’s prior preference for statewide trophy game designation. We acknowledge that many official statements on this issue (i.e., letters from the Director or **Federal Register** notices) demonstrate that we consistently questioned past Wyoming Trophy Area designations and concluded a revision was necessary or required. However, a careful inspection of the record will show that most statements regarding a statewide trophy game designation describe this approach as advisable or recommended, rather than required. While there are exceptions to this generalized summary of our position in the record, an overall reading of the record confirms this account of our position over time.

Issue 24: Some comments expressed the opinion that predator status across most of the State would subject wolves to unsustainable levels of mortality and compromise the population’s recovered status. A few comments asserted that the vast majority of wolves in Wyoming would be subjected to unlimited and unregulated taking. Some comments supported the “very strict” requirements for reporting wolf mortality in the predator area, while other comments questioned whether the monitoring and collection of genetic samples would be mandatory. Several comments expressed concern that wolves from YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, and the National Elk Refuge would be killed when they venture outside those protected areas. These comments indicated this outcome would be exacerbated when wolves follow elk to neighboring elk feeding grounds. One comment suggested State and Federal officials develop a protocol for collaboration and coordination before wolf removal occurs on feed grounds in the Jackson area, in light of potential impacts to Grand Teton National Park

and National Elk Refuge wolves. Use of nonlethal take was particularly recommended on elk feedgrounds. A few comments recommended a 20-mile buffer around the Trophy Area to protect wolf parents during the denning and pup rearing season. Other comments objected to the Trophy Area being set in statute, to the extent it prevents an expansion of the Trophy Area, even if it becomes necessary to protect wolf populations.

A few comments noted occupancy rarely persisted in the predator areas even when wolves were listed, so all the predator status does is change the form of mortality these wolves endure from agency control when they kill livestock to preemptive landowner control. Still other comments disputed our assertion that wolves in the predator area would likely not persist. These comments asserted take in this area, once the initial novelty wears off, would likely be “opportunistic” rather than a “wholesale extirpation.” Some of these comments expressed the opinion that individual wolves, packs and breeding pairs could or would occasionally occur in less densely populated portions of eastern Wyoming. Others suggested control in the predator area is nothing new because most wolves in this area are already killed because they tend to become problem wolves. Still others expressed the view that wolves should be “controlled by any means” if they move outside “their designated range.”

Response 24: Although a large predator area will result in forms of mortality that many members of the public view as inhumane or unethical (see Issue and Response 31 below), this portion of Wyoming’s regulatory framework will not subject wolves to unsustainable levels of mortality or compromise the population’s recovered status. In

fact, few wolves currently occur in the predator area where such unlimited taking will be allowed (at the end of 2011, this included: 3 of 27 breeding pairs; 8 of 48 packs; and 46 of 328 wolves). As in eastern Montana and southern Idaho, wolf restoration will not occur in largely unsuitable habitat regardless of its management designation.

Wolf packs in the predator portions of Wyoming are easy to detect and locate and will generally not persist following delisting. However, some individuals from these packs could survive as lone animals. Because none of the packs resident to YNP or the Trophy Area are known to spend a significant portion of their time in the predator portions of Wyoming (Jimenez 2012 a; Jimenez 2012, pers. comm.), the predator designation is not expected to meaningfully affect wolves in YNP or in the Trophy Area (Jimenez 2012, pers. comm.). While a larger Trophy Area may benefit wolves and wolf conservation, protected and game portions of Wyoming are of sufficient size to support a recovered wolf population in Wyoming, under the management regime developed for this area.

Finally, State law requires that any human-caused mortality occurring in the predator area must be reported to WGFD within 10 days (W.S. 23–1–304(d)(iii)). This will assist the WGFD with monitoring mortality in the predator area and allow the State to adjust mortality within the Trophy Area, if necessary. The State will also collect genetic samples from these animals when possible (chapter 21, section 5(a)).

Issue 25: Many comments expressed concern about the potential for the hunting of wolves on Federal land and that this delisting rule represented a new management arrangement between the Department of the Interior and the State of Wyoming for particular areas (e.g., National Parks or Wildlife Refuges) that would supersede existing law, regulations, or policy. The most frequently mentioned land ownership categories included the National Elk Refuge, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, Wilderness Areas and Wilderness Study Areas, and Forest Service lands. Many comments expressed concern that inclusion of an area in Wyoming's Trophy Area implied an intention by the State of Wyoming to hunt wolves in these areas. Specifically, some were confused by YNP's exclusion from the Trophy Area, contrasted with Grand Teton National Park's inclusion when management in these areas should be comparable, if not identical. Other comments expressed concern that Wyoming claimed jurisdiction over private lands within Grand Teton National Park and might authorize hunting within the park's boundaries. Many expressed concern for hunting in the John D. Rockefeller, Jr. Memorial Parkway, noting such hunting would sever a critical connectivity corridor between Grand Teton National Park and YNP. Other comments expressed concern that National Park system wolves would be killed when they left the park and suggested that buffers with no hunting or subunits immediately adjoining these units be established with very limited quotas to protect these wolves. Finally, a few comments expressed concern that Wyoming claimed jurisdiction for non-Indian fee title lands within the Wind River Indian Reservation, meaning any wolves on these lands would be treated as a predator.

Response 25: Nothing in this rule would alter, or in any way affect, the jurisdiction or authority of the State of Wyoming, Tribal governments, the National Park Service, the U.S. Fish and Wildlife Service, or any other entity with respect to the regulation of hunting. Whatever jurisdiction or authority to authorize, prohibit, or regulate hunting existed in such areas prior to this final rule is unchanged by the promulgation of this rule (except, of course, that this rule removes the protections of the Act for wolves in Wyoming). More specifically, inclusion of an area in the Trophy Area does not imply a delegation of management authority to the State or in any way alter existing management arrangements. Inclusion in the Trophy Area does not necessarily mean hunting or other State control actions will be allowed. Grand Teton National Park was included in the Trophy Area and YNP was not because wolves occurring in Grand Teton National Park are likely to spend significant amounts of their time in areas under State jurisdiction (including possibly denning in the Trophy Area) whereas most YNP wolf packs spend most of their time in YNP. Thus, it makes sense to count Grand Teton National Park wolves in the State's management totals, and it makes sense to exclude YNP wolves from the State's management objectives. For utmost clarity, below we summarize management authority for the most often mentioned areas within the Trophy Area.

Within the National Elk Refuge (included in the Trophy Area), the refuge retains all authority and responsibility to manage all wolves on the Refuge including, but not limited to, monitoring, research, harvest, and wolf control for depredations on domestic animals and negative impacts on wildlife. Recreational wolf hunting and trapping is not

currently authorized on the refuge and is not anticipated, but could be considered in the future (Kallin 2012, pers. comm.). Regarding predator management, regional Service guidance clarifies that management decisions are the purview of the refuge manager, but that generally: Agency-directed population management activities (i.e., those intended solely to reduce or control predator populations) would not be allowed on refuge lands; ground-based control activities (but not aerial gunning) could be allowed for specific animals or family groups likely responsible for documented livestock depredations on neighboring or adjoining lands (subject to National Environmental Policy Act compliance); and requests to conduct nonlethal activities such as surveillance, live-trapping, marking, or radio-collaring by partners could be granted (Coleman 2011). The Service will continue to monitor and report on wolves located on the National Elk Refuge (Kallin 2012a). These wolves will count toward the State's objective of at least 10 breeding pairs and at least 100 wolves outside YNP and the Wind River Indian Reservation (Kallin 2012a).

Within National Park System units, hunting is not allowed unless the authorizing legislation specifically provides for it. Thus, hunting will not occur within YNP or Grand Teton National Park (Frost and Wessels 2012; Joss 2012; Mead 2012b). Although the Addendum to Wyoming's Wolf Management Plan asserts the state's authority to manage wolves on inholdings within Grand Teton National Park, hunting of wolves on those inholdings would not be allowed because hunting within Grand Teton National Park is not authorized by federal law, and is therefore prohibited. Title 36 of the Code of Federal Regulations makes clear that the hunting prohibition is applicable on all lands within the

park boundary, regardless of ownership. Therefore, taking of wolves would not be allowed on any of the inholdings within the park. The exception to the hunting prohibition within the park is the elk reduction program, which is a management tool specifically included in the park's enabling legislation.

Although hunting is currently allowed for many other game species in the John D. Rockefeller, Jr. Memorial Parkway under the Parkway's enabling legislation and Wyoming law, the National Park Service has indicated a "strong preference that wolves not be hunted in the John D. Rockefeller, Jr. Memorial Parkway" (Frost and Wessels 2012). Wyoming's hunting regulations are clear that gray wolf hunting would not occur in the Parkway during the 2012 season, although nothing in Wyoming's regulations or Wyoming's wolf management plan would preclude wolves from being hunted in the Parkway in subsequent years. Should hunting ever occur in the John D. Rockefeller, Jr. Memorial Parkway, it would likely be very limited, would be unlikely to noticeably affect wolf gene flow or connectivity, and it would be closely coordinated with the National Park Service.

Some wolves in protected areas, such as Grand Teton National Park or the National Elk Refuge, will be vulnerable to hunting and other forms of human-caused mortality when they leave these Federal land management units. These wolves were included in the Trophy Area for exactly this reason. Because Wyoming counts these wolves in its totals, it has an incentive to minimize impacts to these wolves (e.g., more wolves, packs, and breeding pairs in these protected Federal lands means fewer wolves

are needed for recovery in the remainder of the Trophy Area). Such information influenced Wyoming's intended harvest in 2012. Specifically, in 2012, Wyoming authorized a harvest of 15 wolves in all of the units adjoining Grand Teton National Park (more than 60 wolves occur in Grand Teton National Park and the surrounding area). We expect that harvest will have a minimal impact on Grand Teton National Park wolves because: The surrounding units are fairly large; we have no reason to assume harvest in these units will be concentrated along park boundaries; and some reproduction will occur. Similar considerations will also occur in future years. Furthermore, should such mortality result in higher than expected impacts in 2012 or future years, we expect Wyoming to work with the Service and National Park Service to address the issue (Mills 2012, pers. comm.). Should it ever become necessary, Wyoming could consider smaller hunting units for areas adjoining these protected areas. Similar strategies have been successfully implemented in Montana in areas adjoining YNP.

Within Forest Service lands, including Wilderness Areas and Wilderness Study Areas (which are generally Forest Service lands), the Forest Service typically defers to States on hunting decisions (16 U.S.C. 480, 528, 551, 1133; 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, most State-authorized hunting occurs on State and Federal public lands like National Forests, Wilderness Areas, and Wilderness Study Areas. Bureau of Land Management lands are managed similarly. This rule does not change or in any way alter this arrangement.

Regarding the Wind River Indian Reservation, we understand that Wyoming claims management authority of non-Indian fee title lands and on Bureau of Reclamation lands within the Wind River Indian Reservation's boundaries. Thus, wolves will be classified as game animals (Shoshone and Arapaho Tribal Fish and Game Department 2007, pp. 2–3, 9) within about 80 percent of the reservation and will be treated as predators on the remaining 20 percent (Hnilicka 2012). Predator status would have minimal impact on wolf management and abundance, because these inholdings tend to be concentrated on the eastern side of the reservation outside of reported areas of wolf activity (Shoshone and Arapaho Tribal Fish and Game Department 2007, Figure 1). We note that, while the Shoshone and Arapaho Tribes do not agree that Wyoming has authority over these lands, to date the Tribes have not challenged this management authority for other wildlife species. Therefore, we assume that if any wolves occur in these areas they will be treated as predators.

Issue 26: Some comments expressed concern that State management and the resulting increased human-caused mortality would negatively affect surviving wolves and packs across the region. Some comments focused on the impact to pack social structure. Others focused on psychological trauma and increased stress to survivors which in turn could affect their own likelihood of survival. A few comments noted that even in a relatively large protected area, human harvesting outside park boundaries can affect evolutionarily important social patterns within protected areas.

Response 26: 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, if adequately regulated (as will occur in the NRM region), is a significant concern for wolf conservation.

Issue 27: A few comments opined that Wyoming State law would allow abuse of the State’s defense of property allowance. Specifically, some opined that Wyoming’s chapter 21 and State statutes (W.S. 23–3–115) could allow the use of dogs or livestock as bait to encourage wolves to attack, which would in turn allow the killing of the offending wolf “doing damage to private property.” These comments noted this is different than our experimental population rule’s allowances for defense of property, where such baiting was specifically prohibited.

Response 27: A representative from the Wyoming Attorney General’s Office indicated the baiting scenario laid out above could be prosecuted under State law (Nesvik 2012). Regardless, we conclude that such a scenario is unlikely to occur and exceedingly unlikely to become a meaningful source of mortality. Should a member of the public

desire to pursue wolf removal, rather than risk violating State laws and regulations, most would pursue either a hunting tag or a lethal take permit. Such permitted take would be regulated and limited as necessary. Furthermore, from a practical standpoint, such baiting is likely to be very time consuming given the difficulty of trying to actually catch a wolf “doing damage to private property.” In the unlikely event that this theoretical issue becomes a regular source of uncontrollable mortality, similar to legitimate defense of property allowances, it would result in a smaller harvest quota or other limits on controllable human-caused mortality as a means of compensating and ensuring the population’s recovered status is not compromised. This approach is adequate to address this improbable, theoretical issue.

Issue 28: Many comments objected to killing wolves for eating their natural prey. These comments dispute the conclusion that wolves were causing unacceptable impacts to ungulate herds and instead suggested prey abundance was primarily shaped by other factors (e.g., habitat and climate). Many of these comments suggested that we should let nature achieve a natural balance over time instead of reducing wolf populations. Other comments suggested Wyoming might use its allowance to address “unacceptable impacts to ungulate populations” to quickly reduce wolf populations to minimum levels. These comments asserted that the vague and flexible definition of “unacceptable impacts” (“any decline in a wild ungulate population or herd that results in the population or herd not meeting the state population management goal or recruitment levels established for the population or herd”) could result in abuse of this provision if the State established absurd objectives for the primary purpose of justifying large-scale wolf removals.

Response 28: To date, Wyoming has not proposed any wolf control projects specifically to address unacceptable impacts to ungulate herds. At present, nearly all of Wyoming's elk herds are at levels above State objectives. While half of Wyoming's moose populations are not meeting State objectives, the science does not indicate wolves are the primary culprit for this outcome. This information indicates no immediate need for such an approach. After delisting, other management tools will reduce wolf populations from current levels, further limiting the need for control specifically to address unacceptable impacts to ungulate herds. Therefore, we expect wolf control specifically to address unacceptable impacts to ungulate herds will be rare, will be regulated should it occur, and will not compromise recovery. Instead of using this tool, we expect that Wyoming will consider ungulate herd health when designing hunting units and quotas. This approach will allow them to use hunting (which is a far cheaper management tool) to address any perceived issues. Both hunting and projects specifically to address unacceptable impacts to ungulate herds (should any occur) will be carefully regulated so that population objectives are not compromised and recovery is maintained in Wyoming, the GYA, and across the NRM DPS.

Issue 29: Some comments expressed concern that illegal human-caused mortality might be greater once Federal protections are removed due to lower and undefined consequences of illegal wolf killing in the Trophy Area. A few comments suggested unlimited and unregulated taking in the predator area will encourage people to illegally shoot wolves in regulated portions of Wyoming. A few comments noted our previous

statements that a statewide trophy game status would be easier for the public to understand and easier to regulate and enforce. Some comments noted the need for strict enforcement with strong fines and penalties.

Response 29: Upon delisting, wolves will become protected by State, Tribal, and Federal laws and regulations. In most cases, when wildlife managers have sufficient evidence to recommend prosecution, prosecution is pursued (Bruscino 2012, pers. comm.). Enforcement will keep illegal activity to a minimal level. While listed, illegal killing was estimated to be responsible for approximately 10 percent of annual mortality. This level of mortality was not a threat to the population because of the species' prolific reproductive capacity. There was no indication that illegal mortality levels increased following previous delistings. In the Midwest, it appeared that fewer wolves were illegally killed during the deer hunting season when wolves were delisted than when they were listed (Wydeven *et al.* 2008). Furthermore, we do not share the opinion that the take allowances authorized in the predator area will encourage others within the Trophy Area to break the law. To the contrary, slightly greater defense of property allowances and legal hunting opportunities may shift some illegal killing into legal mortality categories.

Finally, while enforcement of the law would have been easier under statewide trophy animal status, we conclude that human-caused mortality can be adequately regulated by Wyoming under the current regulatory framework. Under Wyoming's regulatory framework it will be incumbent upon members of the public to know their

rights and responsibilities towards wolves in different parts of the State. Similar requirements would be placed upon the public even if Wyoming adopted a single statewide trophy animal designation when wolves cross into areas like National Parks, wildlife refuges, sovereign Indian land, or other States, or when hunters move from one hunting unit into another. Such differential standards governing take allowance currently exist for other State-regulated species and rarely cause confusion for the public. Furthermore, the potential for confusion is lessened because Trophy Area boundaries are set in statute. Thus, the same agency will consistently make management decisions for a set location; while management may seasonally shift between agencies in the seasonal Trophy Area, the timing and geography of this shift is set in statute and will not change across years, providing some reasonable level of predictability here, too. This contrasts with and substantially improves upon previous regulatory frameworks in Wyoming where the WGFC had authority to move the line whenever it saw fit if the State's objectives could be met in a smaller area. Thus, overall, we conclude that, while some confusion is possible, the available evidence indicates that most stakeholders will obey the law as it applies to wolves in different geographical areas.

Therefore, we conclude that while some level of illegal mortality goes on now and is likely to continue, we have high confidence that this issue, singularly or in combination with other factors, will not compromise the Wyoming, the GYA, or the NRM gray wolf population's recovered status.

Issue 30: Many other comments suggested Wyoming should employ nonlethal deterrents, birth control or sterilization, or relocation before resorting to lethal control. Some comments accepted lethal control when there was a current or imminent threat to personal property. Many comments suggested increased spending for rancher education including nonlethal approaches to deterring wolf depredation. One comment asserted that limiting lethal control methods was the best way to spur innovation in developing and increasing application of effective nonlethal options. This commenter asserted that, by limiting the amount of lethal control and who can implement it, incidents of residents killing the wrong wolf would be minimized. A few comments indicated that State compensation programs (which pay at 7 times market value) create a perverse incentive to encourage poor animal husbandry practices (things like putting livestock in known wolf-occupied areas).

Response 30: While not required by the Act, State, Tribal, and Federal managers will continue to use a combination of management options in order to reduce wolf-human conflicts, including nonlethal forms (Bangs *et al.* 2006). However, these methods are only effective in some circumstances, and no single tool is a cure for every problem. Lethal control will still be required in many circumstances. In areas with year-round high livestock density, it is almost impossible to prevent chronic livestock depredation if wolf packs form in those areas. Lethal control used in combination with nonlethal methods can improve the overall effectiveness of both management options (Bangs *et al.* 2006, p. 8; Brietenmoser *et al.* 2005, p. 70).

Issue 31: Many comments objected to various types of mortality that will be allowed in Wyoming, particularly in the predator area, as well as activities currently ongoing in Montana and Idaho, which they viewed as inhumane, unethical, or unfair. For example, some people objected to poisoning, gassing, hunting, trapping or snaring (as well as not checking traps often enough), torturing, and various other methods of killing wolves. A few suggested humane euthanasia instead of other less-humane methods of control. Others objected to any wolf killing. Many viewed wolves as intelligent, sentient beings that warrant protection. A few comments expressed the opinion that the sudden shift of wolves being protected as endangered one day to being considered vermin the next day was unprecedented, contrary to the intent of the Act, and violated the duty imposed by the Act to recover and protect at-risk species. Others opined that this approach violated the stated purpose of the Act “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.” A few comments suggested Wyoming’s decision to designate wolves as predators across most of the State violated six principles of the North American Wildlife Model of Conservation including: Wildlife as public trust resources; allocation of wildlife by law; wildlife should only be killed for a legitimate purpose; wildlife are considered an international resource; science is the proper tool for discharge of wildlife policy; and democracy of hunting (the 7th principle is “elimination of markets for game”).

Response 31: We recognize and respect that many find some or all forms of human-caused wolf mortality as morally or ethically objectionable. Some forms of wolf mortality that may occur in the predator area were not implemented while the Service

was responsible for wolf management. However, the Act requires that we make our determination based on the status of the subject species (is it recovered and will State management retain that recovered status if the Act's protections are removed) and does not allow us to consider the manner in which individuals will be killed after delisting unless it would affect this overarching viability determination. The manner of take is subject to State control once wolves are delisted. Based on the available information, we do not find any persuasive information to indicate that the manner of killing will affect the viability of the Wyoming, the GYA, or the NRM gray wolf populations. Regarding viability, few wolves occur in the predator portion of Wyoming (now and likely far fewer after delisting); therefore, few wolves will be subjected to such taking. Furthermore, we cannot find any evidence that a shift from being Federally protected under the Act one day to being considered vermin the next day conflicts with Congressional intent or violates the Act. Finally, designation of large portions of Wyoming as a predator area is not inconsistent with the purposes of the Act—wolf restoration in nearly all of the predator area is unrealistic regardless of its designation; as in eastern Montana and southern Idaho, wolf restoration will not occur in largely unsuitable habitat regardless of its management designation. In other words, protection of the wolf population and maintenance of the ecosystems on which wolves depend have been, and will continue to be, protected to the extent necessary.

Gene Flow and Genetic Diversity

Issue 32: A few comments suggested that lack of genetic diversity was an issue for NRM gray wolves, that almost all wolves in Yellowstone and Idaho descended from a small reintroduced population, and that the genetic diversity of the extirpated North American gray wolf was twice that of the current population. Many comments discussed genetic connectivity and potential future genetic issues that could result from genetic isolation (e.g., inbreeding depression or reduced genetic fitness). Many comments indicated that gene flow was limited under the Act's strict regulatory framework, and would be even more limited after delisting. Specifically, these comments indicated State management would reduce the wolf population resulting in fewer dispersers, and reduce occupied range, increasing the distance a dispersal event would need to cover, which in turn would reduce both the numbers of dispersal events and increase mortality among dispersers. Various types of allowable mortality (hunting and killing in the predator area were most frequently mentioned) would result in reduced survival for wolves traveling between subpopulations (including dispersal during peak dispersal periods), and high mortality rates in unprotected areas would kill wolves that successfully traverse between subpopulations.

Some comments noted our previous conclusion that dispersal would likely “noticeably decrease” if populations were maintained near 150 wolves per State. Several comments apparently viewed this as an admission that management at these levels are not genetically sustainable. A few comments suggested that we should analyze this threat at minimum population levels. Some comments challenged our assertion that the population was recovered as long as human-caused mortality, the primary threat faced by

the species, could impede gene flow. While the peer review report concluded that “gene flow is likely to be adequate in the short and medium term,” some comments expressed concern about genetic health in the long term. Still other comments indicated gene flow was unlikely to become a conservation issue for NRM and GYA wolves, given the proximity of neighboring wolf populations and the dispersal capabilities of wolves. Numerous documented long distance-dispersal events were given as examples of the species’ dispersal ability (i.e., dispersal into Oregon, Washington, California, South Dakota, Nebraska, Colorado, and Utah). A few comments noted that most of the peer reviewers viewed genetic connectivity and potential genetic issues as a “non-issue.”

Response 32: 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.* 2010, pp. 4412, 4416–4421), 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). Wolves have an unusual ability to rapidly disperse long distances across virtually any habitat and select mates to maximize genetic diversity. 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). Genetic and dispersal data demonstrate that minimal acceptable levels of genetic exchange between all NRM subpopulations were met or exceeded while the species was listed (including from 1995 to 2004 when the population was between 101 and 846 individuals and likely a higher rate of effective dispersal since then). While State management will almost

certainly reduce genetic exchange rates from recent levels (which exceed minimal acceptable levels of genetic exchange), we find it extremely unlikely that it will be reduced to the point that the GYA wolf population will be threatened by lower genetic diversity in the foreseeable future. Similarly, the peer review report concluded “genetic concerns (inbreeding, maintenance of gene flow) are minor” and that “gene flow is likely to be adequate in the short- and medium-term” (Atkins 2012, p. iii). Overall, the best

scientific and commercial information available indicates this issue is unlikely to undermine the Wyoming, the GYA, or the NRM gray wolf population’s recovered status and that this issue, singularly or in combination with other factors, is unlikely to cause the population to become an endangered species within the foreseeable future throughout all or a significant portion of its range. This issue is discussed further in subsequent Issues and Responses and in Factor E below.

Issue 33: Many comments expressed the opinion that the seasonal Trophy Area expansion would not be effective in maintaining a genetic connection between wolves in Wyoming and wolves in Idaho. A few comments noted that we previously recommended a statewide Trophy Area reasoning that dispersal is more likely to lead to genetic exchange if dispersers have safe passage through the predator area. Numerous comments asserted that the seasonal Trophy Area’s boundary was based on political compromise and not science. Many comments noted that we failed to present any data explaining why

this geographic area and this time period are adequate to maintain genetic connectivity. Some of these comments noted that seasonal protection was inadequate because wolf dispersal takes many months and occurs at all times of the year. Other comments noted that more than half of the time the area was protected as a game area, hunting would occur, further limiting its effectiveness as a protective corridor.

A few comments suggested the effectiveness of this area would be further hindered by management in Idaho. Specifically, during the fall 2011 to spring 2012 hunting season, Idaho's Southern Wolf Hunting Zone (adjacent to the seasonal Trophy Area) had a 7-month hunting season (August 30 to March 31) with unlimited total quotas. This comment indicated that these combined management schemes do little or nothing to prevent genetic isolation because they do not provide a single day of the year when wolves can move between this portion of Idaho and Wyoming and not face unlimited kill prospects. A few comments recommended the seasonal Trophy Area should be added to the permanent Trophy Area. Some comments suggested the southern boundary should be placed further south than the Teton County line for both scientific and economic reasons (predator status in Teton County could hurt its image as a place that honors and protects wildlife). Others suggested the entire State should be categorized as a Trophy Area (instead of the seasonal Trophy Area expansion) in order to maximize the likelihood of maintaining genetic connectivity.

Response 33: Dispersing wolves will likely use multiple routes to enter the GYA in the years to come. For example, a simple evaluation of Figure 2 in this rule would

suggest the shortest and most direct path to entering the GYA is from the central Idaho region into eastern Idaho's portion of the GYA. In recognition of this likelihood, Idaho has limited hunting in this region. Similarly, some wolves could move from western Montana into south-central Montana and enter the GYA subpopulation. The distance between these areas is currently very small (a fact demonstrated by the relative difficulty in determining which subpopulation some intervening packs should be assigned to based on visual inspection alone; i.e., pack 99 or 242 in Figure 2) and is expected to remain an easily travelable distance long term. Effective migration into the GYA via these routes could be done without moving through Wyoming and would accomplish the desired connectivity goal.

Similarly, while YNP's recent high density and reproductive output appears to have limited gene flow from other subpopulations into the park (but not necessarily through the park), the lack of dispersal into YNP may change as the park's wolf population continues its decline into a lower long term equilibrium (Smith 2012). Furthermore, regardless of whether they establish in the park, future wolf population densities in YNP will not preclude dispersing wolves from traveling through the park. Given the above, dispersal around the southern end of the permanent Trophy Area is likely to be a small portion of the total number of dispersers.

Additionally, the predator area designation will not preclude dispersal. While resident packs with established home ranges and known denning sites in the predator area are expected to be removed, dispersers will be more difficult to find, resulting in some

successful dispersal. Hunting data from Idaho's Southern Wolf Hunting Zone demonstrates this conclusion. During the 2009–2010 hunting season, Idaho allowed hunting from August 30th to March 31st in this zone, but only one wolf was harvested. During the 2011–2012 hunting season, Idaho allowed hunting from August 30th to March 31st with an unlimited quota in this zone, but only harvested two wolves. Much like the Wyoming predator area, few resident wolves occupy this area, so most take that occurs is opportunistic. Such take has proven minimal to date. We conclude that this trend will continue in Idaho's Southern Wolf Hunting Zone. Similarly, take of dispersers in the predator area will occur, but will be limited, and dispersal will likely continue through this area, despite the predator area's legal status and liberal take opportunities.

The seasonal expansion of the Trophy Area was designed to facilitate additional dispersal around the southern edge of the GYA population. Specifically, the permanent Trophy Area will expand approximately 80 km (50 mi) south along the western border of Wyoming from October 15 to the end of February (see Figure 1 above). This seasonal expansion covers approximately 3,300 km² (1,300 mi²) (i.e., an additional 1.3 percent of Wyoming). This area was selected to provide a southern route around the Teton Range in winter when high elevation and high snow packs would limit wolf passage. The timing of this expansion was also selected to provide additional protection for wolves during peak dispersal periods in winter. Human-caused mortality will be limited during this important time period. For example, in 2012, Wyoming established a quota of 2 wolves for the seasonal Trophy Area with a season from October 15 through December 31; no hunter harvest will be allowed from January 1 through the end of February. The seasonal

expansion of the Trophy Area, together with other reforms to the State's regulatory framework, will benefit dispersal and will provide that the Wyoming, the GYA, and the NRM gray wolf population's recovered status will not be compromised.

Most of the peer reviewers concurred with our assessment, noting that the Trophy Area was sufficient to maintain genetic connectivity and gene flow between subpopulations. Additionally, most peer reviewers indicated that the designation of a large predator area would not undermine this connectivity and the desired levels of gene flow.

Issue 34: Some comments questioned the basis for the goal of at least one effective migrant per generation moving into the GYA to address potential genetic issues. A few comments noted that documented effective natural migration into the Greater Yellowstone Ecosystem was less than half of the one effective migrant per generation standard (0.43 natural effective migrants per generation); one comment noted that this estimate was a minimum estimate and a rate around the minimum standard probably occurred. Some comments cited literature recommending up to 10 migrants per generation. One comment even indicated that some populations require greater than 20 migrants per generation. One of the peer reviewers noted gene flow should also occur from the GYA into the other subunits.

Response 34: 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 and Allendorf 1996, entire; Wang 2004, entire; Mills 2007, p. 193). This level of gene flow allows for local evolutionary adaptation while minimizing negative effects of genetic drift and inbreeding depression. While higher levels of genetic exchange may be beneficial (note the “at least” in the above standard), we conclude that a minimum of one effective migrant per generation is a reasonable and acceptable goal to avoid any degradation in the NRM DPS’s current levels of genetic diversity. Even the most cautious peer reviewer, Dr. Vucetich, agreed “existing literature suggests that this objective for immigration is appropriate” (Atkins 2011, p. 87). As discussed further in Factor E below, this level of genetic exchange likely occurred when the population was between 101 and 846 wolves and has likely been exceeded at higher population levels (as discussed in more detail in Factor E below).

Management attention to date has focused on gene flow into the GYA from other subpopulations because this is the most isolated population, and the population where a lack of gene flow has a theoretical potential to affect the population. The other two subpopulations are well connected to each other and Canadian wolf populations, indicating that genetic issues are not likely to be a conservation issue for the central Idaho or northwestern Montana subpopulations. While gene flow from the GYA into other subpopulations has likely occurred and will likely continue after delisting, such movement is not necessary for the preservation of GYA, central Idaho, or northwestern Montana wolf subpopulations. While such gene flow is desirable, it is not necessary to

prevent the NRM DPS or any of its subpopulations from becoming threatened or endangered.

Issue 35: A few comments noted that no genetic exchange could occur for up to 20 years before remedial action would be considered. Some of these comments saw this as problematic because some modeling indicates a small, isolated population of around 170 wolves could see decreased juvenile survival within 60 years.

Response 35: As discussed elsewhere in this rule, genetic diversity is not a short term issue and will not constitute a threat to the viability of the wolf population at any time in the foreseeable future. Even for small and isolated populations (neither of which will be the case for the GYA wolf population), changes in genetic diversity take time. For example, a vonHoldt *et al.* (2007, pp. 16, 19) model suggested that even if the GYA population is maintained at about 170 animals and no effective migration occurs, the heterozygosity and inbreeding coefficients will not change for the next 10 years, would change minimally over the next 20 to 30 years (not enough to result in a phenotypic change), and that it would take 60 years before a 15 percent reduction in reproductive rates could occur (which would not likely threaten or endanger the population). However, we believe even these outcomes are overly pessimistic, because the vonHoldt *et al.* (2007) model assumes a population level about half the GYA's likely long term average (as discussed elsewhere in this rule) and, even in a worst case scenario, natural effective migration and gene flow will exceed zero (the model assumes zero effective migration).

Given the above, we conclude that it is appropriate to monitor this issue for multiple wolf generations before deciding whether to take action and what type of action to take. However, this approach does not mean this issue will be neglected as this comment seems to imply. In fact, Wyoming has agreed to pursue an extensive long term genetic monitoring program, which will be more intensive than what is undertaken for any other species in Wyoming (Mead 2012a). Should data warrant a need, the States will then implement remedial actions, as appropriate, including options like limiting the amount and timing of human-caused mortality to increase survival of dispersing wolves. Overall, this comprehensive and rigorous approach to this issue gives us confidence that genetic diversity will not become a threat to the population's recovered status.

Issue 36: Many comments objected to human-assisted migration as a strategy to address potential genetic threats associated with reduced or lost connectivity when feasible methods for ensuring natural dispersal and population connectivity exist (e.g., reducing human-caused mortality). Others thought human-assisted migration should be a last resort and that it was an inappropriate tool to overcome anthropogenic barriers to dispersal (primarily human-caused mortality). Others noted that this management approach risks unnecessarily creating a conservation-reliant species. Some suggested allowance for human-assisted migration meant the population was not recovered, because the Act requires self-sustaining wild populations to achieve recovery. Other comments argued any species that requires translocation is not recovered because section 3 of the Act defines "recovery" (technically "conservation") as "the point at which the measures

provided pursuant to this Act are no longer necessary” and the list of measures includes relocation. Some comments expressed the view that we had no real assurance Wyoming would use translocation only as an option of last resort, and more likely, it would become “standard procedure.”

A few comments viewed our allowance for human-assisted migration as removing State incentive to achieve the criterion via natural dispersal. Others requested clarification on when it would be used, what it would look like, and how it would be financed. These comments concluded it was counter to the Act for us to rely on the unenforceable intentions of Wyoming as grounds to dismiss this potential threat. One comment suggested the proposed rule oversimplified the feasibility of artificial translocation noting few transplanted wolves would become breeders, that artificial insemination would be technically difficult, and that such a program would be costly to the States. Still other comments suggested relocating problem wolves instead of killing them, noting the ancillary benefit of providing gene flow. Other comments insisted delisting should not occur until the population can be shown to be genetically viable under State management without translocation.

Response 36: Montana, Idaho, and Wyoming all agree that natural connectivity is the preferred approach to maintaining genetic diversity, and have indicated an intention to jointly collaborate to provide continued opportunities for natural connectivity between all three recovery areas (Groen *et al.* 2008, p. 2; WGFC 2012, pp. 6–7). Given the dispersal capabilities of wolves and the proximity of suitable habitat, we conclude that

the States can, and will, achieve adequate levels of genetic exchange. Such levels likely occurred when the population was between 101 and 846 wolves and have likely been exceeded at higher population levels (as discussed in more detail in Factor E below). Although future dispersal will differ from past levels, the available data support a conclusion that human-assisted migration is unlikely to be a regular activity. Instead, translocation of wolves or other management techniques to move genes between subpopulations would only be used as a stop-gap measure, if necessary to increase genetic interchange (WGFC 2012, p. 7). In short, NRM wolves and wolves in the GYA are not expected to need or rely on human-assisted migration often, if ever, and these populations will not become “conservation reliant” as defined by Scott *et al.* (2005, entire). That said, should it ever become necessary, human-assisted migration is an acceptable management technique (especially when relied upon only as a measure of last resort). This conclusion is consistent with the position we took in our 1994 Environmental Impact Statement, which noted that other wildlife management programs rely upon such agency-managed genetic exchange and concluded that the approach should not be viewed negatively (Service 1994, pp. 6–75).

We recognize that the logistics of human-assisted migration, should it ever become necessary, would present a number of challenges, but we are confident that those challenges can be overcome. Source wolves could be obtained from any of the other subpopulations or adjoining populations in Canada. Wolf capturing and transporting was used for the initial reintroductions, have proven to be a feasible and successful technique, and could be used again (Fritts *et al.* 2001, p. 129). Such assisted migration efforts would

take into account the fact that only a fraction of relocated wolves would likely become breeders (35 percent of naturally dispersing wolves reproduce (Jimenez *et al.* In review, pp. 9–12); similarly, two of ten pups moved from northwestern Montana to YNP in 1997 became breeding adults (vonHoldt *et al.* 2010, p. 4421). Other unorthodox approaches to genetic migration such as artificial insemination of wild animals could also be considered, but are less likely to be used because they would present their own logistical challenges (Thomassen and Farstad 2008, entire; Payan-Carreira *et al.* 2011, entire). All such efforts would be a cooperative effort between the three States, Federal agencies and other partners as appropriate. Funding such wolf management would also be a cooperative effort with multiple parties contributing various portions as necessary and appropriate; funding wolf management is discussed further in Issue and Response 46 below.

Finally, the idea that delisting should not occur until the population can be shown to be genetically viable under State management without translocation is inconsistent with the purposes of the Act. Because delisting is a precursor to full State management (i.e., State management unrestricted by the Act and including hunting), it is impossible to require demonstrated successful State management as a precondition to delisting. This issue is true for management of genetics or any other issue.

Issue 37: We received a number of suggestions to improve the adequacy of Wyoming's commitment to maintaining natural connectivity including: That we develop objective and measurable recovery criteria or relisting triggers for natural dispersal; that

we develop specific management actions to ensure the criteria remain met; that the States commit to genetic monitoring in State law or a binding management plan; and that we commit to relisting within a specific time period if the natural dispersal criteria are not met.

Response 37: Although we seriously considered developing a status review trigger related to genetic connectivity, we ultimately decided this was not appropriate because we concluded that it is extremely unlikely that declines in genetic diversity would threaten or endanger the Wyoming, the GYA, or the NRM gray wolf populations. Thus, we concluded that a status review trigger would create an issue where there was not one and, therefore, was inappropriate. Similarly, we concluded that it was not appropriate to commit to relisting if certain levels of gene flow are not achieved. Such a specific commitment would require us to demonstrate that the population would necessarily be threatened or endangered if the goals were not met. Given the available information, we did not feel we could satisfy this standard. For example, we do not believe the available information would support a conclusion that the population would be threatened or endangered if we achieved an average of 0.75 effective dispersers per generation over the next century instead of the goal of at least one effective migrant per generation. In fact, we find it very unlikely this would be the case. Therefore, we decided it would be inappropriate to commit to a specific status review or relisting trigger related to this issue. However, we will continue to work with the States on this issue so that genetic issues do not threaten the NRM gray wolf. We will also work with the States over the long term to carefully monitor any changes in genetic diversity and fitness. In

the unlikely event that this issue does ever pose a significant risk to the well-being of NRM gray wolves, as required by section 4(g)(2) of the Act, we will make prompt use of the Act's emergency listing provisions.

Adequacy of Regulatory Mechanisms

Issue 38: A few comments questioned the competency of the State to manage wolves. Some comments asserted that giving Wyoming management authority was inappropriate given the State's history with this issue and public attitudes towards wolves in the State. Others expressed faith that Wyoming's wildlife professionals would do an exceptional job managing this species, as they have done with other wildlife like mountain lions, black bears, bobcats, and coyotes. Numerous comments expressed confidence the State would do a far better job than we have done.

Response 38: WGFD has a relatively large and well-distributed professional game and fish staff that have demonstrated skill and experience in successfully managing a diversity of resident species, including many large, high-profile, and controversial carnivores. WGFD staff is fully qualified to manage a recovered wolf population. State management of wolves in the Trophy Area (where most wolves reside) will be in alignment with 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).

WGFD provided evidence of this competency when it had management authority within the Trophy Area for a few months in 2008. During 2008, the documented minimum wolf population outside YNP saw modest changes, including a total population decrease from 188 to 178 individuals, an increase in the number of packs from 25 to 30, and an increase in the number of breeding pairs from 14 to 16 (Service *et al.* 2007–2008, Wyoming chapter, p. 4). Wyoming also experienced a comparable number of livestock depredations in recent years (67 in 2008, while the area has averaged 98 since 2003) (Service *et al.* 2007-2008, Wyoming chapter). Meanwhile, agency control including defense of property take was also comparable to the long term average (46 in 2008, while the area has averaged 39 since 2003) (Service *et al.* 2007–2008, Wyoming chapter). Although Wyoming only had management authority for a few months in 2008, most agency control and defense of property mortality occurs during spring and summer, which makes these numbers informative of the WGFD’s approach to management and its capacity to meet objectives. Wyoming also planned a modest hunt with a quota of 25 wolves in 2008 before this hunt was enjoined from occurring. Collectively, this information corroborates our belief that Wyoming can, and likely will, follow through on its stated management intentions.

Issue 39: We received a few comments on what constitutes an adequate regulatory mechanism and what was appropriate to consider in our analysis. Some comments pointed out that we relied on unenforceable State intentions in our 2009 delisting, which were promptly disavowed or violated. For example, some comments

asserted that we relied upon Idaho's stated intention to manage for 520 wolves, but that this commitment was set aside when the State suspended their 2008–2012 step-down wolf management plan. Some comments suggested the Wyoming Gray Wolf Management Plan was not regulatory in nature and should not be considered or relied upon. Some comments suggested that State statute and regulations should not be considered adequate because they can be modified after the delisting become effective. For example, while the size and permanency of the Trophy Area is set in statute, this could be repealed or amended by the Wyoming state legislature.

Numerous comments objected to our “unrealistically high prediction of future wolf numbers” (“perhaps around 1,000 wolves across the NRM DPS”). A few comments questioned the basis for our statement that it was “extremely unlikely” that Montana, Idaho, and Wyoming would manage their wolf populations near the minimum management targets. These comments indicated that the States' only commitment was to targets between 100 and 150 wolves per State, that it was illegal for our analysis to assume any numbers other than those that we had firm commitments to maintain, and that the States were clearly demonstrating a strong commitment to quickly reduce the wolf population. One peer reviewer expressed concern whether Wyoming had authority to manage for a buffer above minimum management targets and whether State management would push Wyoming's population closer and closer to the razor edge of 10 breeding pair and 100 wolves. This reviewer seemed concerned over numerous sources of take allowed under Wyoming's wolf management plan and repeated reference to the 10 breeding pair and 100 wolf thresholds in State statutes and regulations, rather than

referring to a buffer above these minimums. Other comments indicated Wyoming's agreed-upon population targets would not be compromised because no decision-makers, managers, or stakeholders would ever want to risk relisting and the loss of State control, especially after living with a protected wolf population with limited management options for so many years.

A few comments indicated that we erroneously considered a nonbinding genetics Memorandum of Understanding (MOU) with unenforceable commitments in our 2009 delisting, that the States had since failed to deliver on these promises, and that this should serve as evidence that reliance on such nonbinding commitments is inappropriate. Numerous comments indicated that there was no guarantee that the subpopulations would continue to be connected, and thus that we lacked adequate regulatory mechanisms. Others suggested the commitment to translocate wolves was not guaranteed to occur and should not be relied upon. A few comments suggested a species can be threatened by the inadequacy of regulatory mechanisms alone, even if no other threat factor puts the population at risk. Some comments suggested binding and enforceable habitat standards must be in place as was done in the Yellowstone grizzly bear delisting. Several comments suggested we should have pressed for the development of a single, regional management plan (including all relevant State, Federal, and private interest groups) instead of separate plans for each State.

Response 39: Our primary consideration in gauging the adequacy of Wyoming's regulatory framework is that binding State statutes and implementing regulations

mandate maintenance of a population at least satisfying agreed-upon minimum management targets. Wyoming's wolf management plan further clarifies that the WGFD and WGFC intends to satisfy these statutory and regulatory mandates by maintaining a buffer above minimum population targets. The approach outlined in the WGFC plan will be used, for example, by WGFD and WGFC in setting annual hunting quotas and limiting controllable sources of mortality. While it would have been desirable for Wyoming to have included reference to a buffer above minimum population targets in State statute and regulations, inclusion of such a concept or a specific numeric buffer is not required for us to consider the buffer described in Wyoming's wolf management plan. While some have questioned whether Wyoming has the legal authority to maintain a buffer, we conclude that Wyoming has the authority because: (1) Both the statute and regulations require maintaining "at least" these minimum population levels; and (2) meeting this statutory and regulatory mandate will require managing above this goal so that uncontrollable sources of mortality (e.g., disease and defense of property) do not compromise the mandated minimum targets.

While Wyoming statutes, implementing regulations, or its wolf management plan could theoretically be changed at any time, just as the Act could theoretically be repealed tomorrow, it is reasonable to rely on these documents as the basis to understand the State's management intentions after delisting. In short, the Act does not require documents to be permanent, for nothing is permanent. Furthermore, we cannot ignore any of these documents, as it would violate the requirement of section 4(b)1(A) to rely upon the best scientific and commercial information available and to take into account

State conservation efforts. As a final safeguard against management being meaningfully modified after the delisting becomes effective, we will initiate a status review and consider relisting if there is a change in State law or management objectives that would significantly increase the threat to the wolf population. We will also make prompt use of the Act's emergency listing provisions, as required by section 4(g)(2) of the Act, if necessary to prevent a significant risk to the well-being of the population.

Our analysis must consider what is most likely to occur in light of the practical reality of the situation as informed by minimum State commitments and other information. In this case, while all three States intend to pursue population reductions, which we anticipate and to which we do not object, none of the States have indicated an interest in managing their populations at or very close to minimum agreed-upon targets (although Wyoming will likely be the closest to its minimum management targets). None of the States are likely to manage down to, or very near, minimum management targets because doing so would severely limit State flexibility to address wolf depredation issues, limit wolf harvest opportunities, and increase the risk of relisting. None of the States or any major interest group in the States would like to see any of these scenarios occur. In fact, State wildlife managers have consistently reiterated to us their desire not to come close to their floor levels in light of these factors. Such information leads us to conclude that Idaho, Montana, and Wyoming will all manage comfortably above the minimum management targets.

While we recognize that both Idaho and Montana are moving toward higher harvest and longer seasons, we conclude that these approaches are temporary as the States pursue population reductions. We expected population reductions in Montana and Idaho at the time of their delisting and conclude that such reductions are reasonable given the current size of the wolf population (which are likely at or above the suitable habitat's long term carrying capacity) and the resulting impacts (some real and some perceived; see Issue and Response 50). It should also be noted that Idaho's 2011 hunting season, which was criticized by some stakeholders for being overly aggressive, only resulted in a slight change in minimum estimated population levels in Idaho in 2011 (from a minimum Idaho population estimate of 777 wolves and 46 breeding pairs to a minimum statewide estimate of 746 wolves and 40 breeding pairs) (Service *et al.* 2012, Table 4b). After the States achieve an initial population reduction, harvest rates will moderate as the population stabilizes and the public's current angst and intense interest wanes (see Issue and Response 41). The NRM gray wolf population will then likely settle into a reasonable, long term equilibrium, well above minimum recovery levels.

Another factor that we weighed regarding likely long term population levels is the practical challenges of reducing wolf populations down to minimum levels and maintaining such reductions long term. These factors include wolves' reproductive capacity, which will require substantial mortality to keep populations well below carrying capacity; the rugged, remote, and difficult to access landscape in which many wolves occur (particularly in central Idaho); the likelihood that wolves will become more difficult to find and kill as their numbers are reduced and as they become more wary of

humans; and the likelihood that hunter and trapper interest and dedication will diminish as the wolf population is reduced, impacts are less pronounced, and success rates diminish (trapping in particular is expensive and time-intensive and would likely not be worthwhile with reduced success rates). Overall, we expect measurable population reductions over the next few years. During this initial reduction phase, populations may even fall below our long term predicted levels. However, given the above information, we conclude that such reductions would likely be temporary and, in the long term, a NRM gray wolf population more than double the minimum management targets is likely. Conversely, the scenario of achieving and maintaining population minimums across the entire NRM DPS is very unlikely.

Considering the above factors, we continue to conclude that the GYA wolf population will likely maintain a long term average of around 300 wolves and the entire NRM DPS will likely achieve a long term average of around 1,000 wolves. These numbers are based on our professional opinion after considering all of the above and evaluating various regional scenarios. For example, 200 wolves is likely a conservative estimate for the Wyoming statewide wolf population including YNP and the Wind River Indian Reservation; similarly, it is unlikely Idaho or Montana will reduce and maintain their wolf populations below 350 wolves per State. Even if all three States were to simultaneously achieve and maintain the low end of this range, an unlikely outcome, the NRM population would still total around 900 wolves, excluding dispersers and lone wolves, which typically range from 10 to 12 percent of the population (Mech and Boitani

2003, p. 170). Therefore, our conclusions regarding long term abundance are likely conservative estimates of long term averages.

Similar to our position on population numbers, our evaluation of risk associated with genetic factors must consider what is most likely to occur in light of the practical reality of the situation as informed by State commitments and other factors. Our consideration of this issue involves a number of factors, including the very high levels of genetic diversity in the GYA and the NRM DPS at present; the remarkable dispersal capabilities of wolves; wolves' ability to outbreed to maximize genetic diversity; demonstrated minimum levels of gene flow from 1995 through 2004 when the NRM region contained between 101 and 846 wolves; the high probability that actual effective migration was likely significantly higher than demonstrated minimum levels; expected population levels and distribution in the GYA and across the NRM DPS long term; and consideration of the likely impacts of State management in the initial years when populations are being reduced and longer term as populations level off. Based on these factors and other information, we continue to conclude that the best scientific and commercial information available indicates that genetic issues are extremely unlikely to threaten the wolf population in Wyoming, the GYA, or the NRM DPS within the foreseeable future.

By definition, a MOU is an agreement between parties indicating an intended common line of action. While we did not rely on the genetics MOU in reaching the above conclusion on population viability, the MOU is indicative of an intention of the

States to maintain the NRM population's metapopulation structure by encouraging natural dispersal and effective migrants and implementing management practices that should foster both. Some management practices that would assist in achieving this goal include maintaining the wolf population at higher rather than minimum levels; maintaining greater rather than more restricted pack distribution throughout suitable habitat; reducing human-caused wolf mortality during key dispersing and reproductive time periods over the long term; and maintaining the integrity of the core recovery areas so that they can continue to serve as refugia and source populations. One example of where Idaho has acted consistent with the MOU was its decision in 2009 and 2011 to end its wolf hunting season on December 31st for those areas thought most important for dispersal (i.e., the Beaverhead and Island Park units) (Idaho Fish and Game Commission 2011, entire). In the 2012–2013 season, hunting ends January 31st for these units. While State management through the population reduction phase will likely reduce gene flow from current levels, we conclude that the reduction will not compromise acceptable levels of gene flow long term and find it very unlikely State management will negatively affect genetics to the point that this issue constitutes a threat that could warrant listing in the near, medium, or long term.

We do not anticipate translocation of wolves will be necessary, because we expect that natural connectivity will continue at acceptable levels after delisting. Genetic exchange is not a short or medium term issue even if no genetic exchange occurs for many generations (a very unlikely outcome). The States will monitor for genetic exchange and indications of loss of genetic diversity. This monitoring and the related

results could then affect management (e.g., the timing and intensity of human-caused mortality) if the available data indicates remedial actions are needed. Translocation will only be used as a matter of last resort if adequate genetic diversity does not occur and State management is not able to otherwise remedy. While we have high confidence the States would complete such translocation and said translocation could be effective if it was ever necessary, we conclude that it is unlikely that it will ever become necessary.

Furthermore, we disagree with comments that indicate that the existing regulatory mechanisms are inadequate even if no threats put the population at risk. Post-delisting regulatory mechanisms are needed to regulate remnant threats. If there are no remnant threats, a regulatory framework would serve no purpose. In short, if there is nothing to threaten the population, nothing needs regulation after delisting. With respect to wolves, habitat protections were not necessary to achieve delisting, and will not be necessary to maintain recovery after delisting. Therefore, strict binding and enforceable habitat standards (as established for grizzly bears in the GYA) are not needed for wolves. In this case, 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 and the only issue that requires regulation after delisting (in the form of binding minimum population targets by geographic area). Such protections are in place.

Regarding the shape that the regulatory framework takes, we disagree that a single cross-regional framework was necessary. In this case, separate post-delisting regulatory frameworks per State appear adequate. We also note that Congress directed us

to republish our April 2009 rule in 2011, which contained separate State regulatory approaches rather than a single regional one. To the extent cross-regional coordination is desirable, it goes on today as appropriate and is expected to continue for the foreseeable future.

Issue 40: Other comments expressed the view that while statutory changes were necessary to implement the State wolf management plan, delisting should not be contingent on adoption of conforming regulations. These comments suggested that State statute and development of an approved wolf management plan were a sufficient commitment to maintain a sustainable recovered wolf population and that State regulations should remain flexible and be defined at the sole discretion of the State, consistent with the commitments represented by State statutes and the Wyoming wolf management plan.

Response 40: As noted above, State statute, State regulations (chapter 21 and 47), and the Wyoming wolf management plan all are important pieces of the State's post-delisting management framework. All three of these documents guide and clarify the State's approach to wolf management after delisting, and ignoring any one of these three documents would violate our responsibility to rely upon the best scientific and commercial information available. By extension, a significant change to any one of these documents would prompt us to consider whether to initiate a status review. We took a similar approach in Idaho in 2011 following Idaho's suspension of its 2008–2012 wolf management plan (reverting to its 2002 Service-approved plan) and after it set its hunting

plan for 2011–2012 (Cooley 2011). In that case, we determined these management decisions did not represent a significant threat to the Idaho wolf population and did not meet the threshold necessary to trigger a status review (Cooley 2011).

Public Attitudes Toward Wolves

Issue 41: Numerous comments indicated the region’s “frontier” and “wild west” attitudes, including those of State officials, threatened wolves. Some comments pointed toward the Wyoming wolf management plan’s negative portrayal of wolves, the decision to designate wolves outside the Trophy Area as predators, and Wyoming’s apparent willingness to do only the minimum necessary to prevent relisting as evidence of negative public attitudes toward wolves. Many comments suggested the ongoing wolf killing across the NRM was evidence that negative attitudes towards wolves were a threat that could eliminate wolves from the region. Other comments indicated conservation organizations had negatively affected public attitudes toward wolves in Wyoming and across the NRM with their unrealistic expectations for wolf recovery, lack of recognition of property rights, and continued litigation. We received conflicting comments and perspectives about whether a return to State management and the resulting increased management flexibility would lead to greater acceptance of wolves and decreased animosity toward wolves. A few comments indicated that the polarizing wolf issue had become indicative of a culture clash and that extremist attitudes toward wolves (pro and con) had little to do with the realities of wolf conservation and more to do with values.

Response 41: As indicated elsewhere in this rule, human attitudes are important to the long term preservation of the gray wolf population in Wyoming, the GYA, and the NRM DPS. While there is not universal acceptance of wolves in Wyoming or the NRM DPS, we conclude that the majority of the region's residents are willing to tolerate wolves as a part of the landscape provided impacts to humans are minimized (see also Issue 50 below). Although we agree our failure to delist has negatively affected public tolerance (see Issues 50 and 53 below), we conclude that State management in Wyoming and across the NRM DPS will be successful in achieving a reasonable balance between the needs of a recovered wolf population and other public needs. We recognize and accept that achieving this balance will require reducing the wolf population in Montana, Idaho, and Wyoming from current levels. This reduction will, in turn, reduce the real and perceived impacts of the wolf population and will reduce public opposition to the species' conservation. The increased ability of members of the public to defend their property and the ability of the hunter community to harvest wolves will also increase this tolerance for wolves. Once these initial population reductions are realized, public pressure will be reduced, State harvest rates will moderate, and the species will likely settle into a reasonable equilibrium well above minimum recovery levels. As noted elsewhere in this rule (see Issue and Response 39 above), we conclude that the GYA wolf population will likely maintain a long term average of around 300 wolves and the entire NRM DPS will likely achieve a long term average of around 1,000 wolves. At these levels, impacts of the recovered wolf population will be modest. This will in turn promote public tolerance such that this issue does not materialize to the point where it might threaten the gray wolf population's long term survival.

Other Potential Threat Factors

Issue 42: A couple of comments indicated that the Wyoming wolf population was threatened by impacts to habitat and range. One comment suggested wilderness areas were not secure because Congress can undesignate them at any time. This comment also suggested that we had no guarantee that private lands will not be developed or otherwise altered so that they would no longer support wolves. This comment also suggested that wolves were at risk on public lands because livestock grazing on public lands would result in wolf mortality; poison on public lands could kill wolves; mining, mineral development, oil and gas development, and associated human traffic would cause direct mortality (increased wolf-truck collision) and cause pollution that would kill wolves or impair their reproduction; and hunting and illegal take on some public lands would kill still more wolves. This comment criticized the proposed rule for not quantifying the amount of development expected, quantifying the impact to suitable habitat and the impact to unsuitable habitat important as dispersal corridors, and the number of wolves that will be killed or otherwise adversely affected. This comment also suggested that road repairs and reconstruction in YNP was a new threat that would degrade the environment in the park, affecting prey and causing wolves to leave the protected park boundaries and be subjected to increased likelihood of dying. This comment also suggested snowmobile use can kill or injure wolves and that associated pollution could kill wolves or reduce their reproductive success.

Response 42: We have thoroughly analyzed the issue of habitat and range and conclude that it is not a threat to the population now or in the foreseeable future. The vast majority of suitable wolf habitat is secure in mountainous forested public land (wilderness and roadless areas, National Parks, 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. Department of Agriculture Forest Service 2006). While changes to the protected status of these areas is theoretically possible, such an outcome is highly improbable, especially at the scale that would be necessary to affect the viability of the Wyoming, the GYA, or the NRM gray wolf population. Although some human activities in these areas and other surrounding areas could increase human-caused mortality, we do not expect noticeable increases in such activities in the foreseeable future. Furthermore, human-caused mortality will be adequately regulated by the States so that the population's recovered status is not compromised. This rule also analyzes impacts to habitat and range as they relate to connectivity and concludes future connectivity is unlikely to be meaningfully affected by changes in habitat and range. To the extent that such development does occur, it would not threaten the recovered status of the Wyoming, the GYA, or the NRM gray wolf populations in the foreseeable future. Finally, we conclude that ongoing activities in YNP (e.g., road repair and snowmobile use) are unlikely to increase to the point where they would negatively affect wolves. Statutory, regulatory, and policy restrictions covering national parks give us great confidence that YNP will take proper precautions to ensure all activities in the park minimize impacts to wildlife, including wolves.

Issue 43: Numerous comments indicated nonnative human populations are overpopulated and a threat to the wolf population.

Response 43: Human presence and the activities associated with this presence does affect the landscape and a region's use by wolves. For example, areas like New York City have been so altered that they are unable to support a resident wolf population. Similarly, some prairie habitats in Wyoming are also no longer capable of supporting persistent wolf packs; however, more than sufficient habitat exists to support a recovered wolf population. Human population levels in Wyoming (the second least densely populated State in the country) are not a threat to the wolf population's recovered status now or in the foreseeable future. Secondary impacts related to human presence are discussed in more detail in separate sections.

Issue 44: A few comments noted that wolf numbers would soon begin to see significant natural declines if the wolf population is not reduced, because wolf overabundance is causing the native prey population, on which wolves are dependent, to drastically decline. Numerous personal accounts of ungulate population declines were offered. One comment suggested that the wolf population could be endangered by grizzly bears, black bears, mountain lions, and other wolves as wolves and other predators compete for limited food resources.

Response 44: While there have been documented declines in some ungulate populations, overall, prey numbers remain robust and more than adequate to provide for the regional wolf population's needs. The availability of prey is not a threat factor to wolf persistence now or within the foreseeable future. While intraspecific conflict can regulate wolf populations, natural predation has not threatened the NRM gray wolf population and is not likely to in the foreseeable future; future changes in prey abundance are not expected to change this conclusion.

Issue 45: A number of comments noted that climate change is expected to have a severe impact on the North American continent during the 21st century. A few comments indicated climate change would stress wild animal and plant populations and reduce survival rates. A few comments asserted it would be a mistake to delist when we do not yet know what impacts climate change will have on ungulate and wolf populations (e.g., impacts on behavior, distribution, and abundance). One comment stated that the Trophy Area might not be adequate to meet the population's needs in a climate-altered world. This comment cited a Ninth Circuit Court of Appeals ruling that suggested a need for specific management responses tied to specific triggering criteria, not a general commitment to adaptive management, in order to address threats associated with climate change. Some comments suggested wolf densities should be maintained to buffer the impacts of climate change on other species. For example, wolf killing of vulnerable elk might compensate for reduced winter elk kills, thus bolstering food availability for other animals and minimizing the impacts of climate change.

Response 45: This issue is discussed in our Factor E analysis below. We continue to conclude that wolves are unlikely to be threatened by climate change. Wolves are one of the most adaptable and resilient land mammals on earth, once ranged across most of North America from central Mexico to the Arctic Ocean and from coast to coast, and can prey on every type of ungulate in their worldwide northern hemisphere range. Thus, wolves are among the least likely species to be threatened by this factor.

Other comments on this issue are also not persuasive. For example, there is no evidence to support the idea that the Trophy Area might not be adequate to meet the population's needs in a climate-altered world. At present, the Trophy Area supports a robust prey base and a wolf population that far exceeds the agreed-upon minimum management targets. This topic is discussed in detail below in Factor E. Based on available climate change projections, it is unlikely that climate change would noticeably hinder the Trophy Area's capacity to support a wolf population well above the agreed-upon minimum management targets. Because this issue is not a meaningful factor affecting the population's viability, a detailed adaptive management framework with specific triggers and specific responses is not necessary or appropriate. Finally, the Act does not allow us to consider impacts of this decision to other species nor does it allow us to require the States to maintain wolf populations at high densities to benefit other species in the face of climate change.

Issue 46: Some comments expressed concern that all or parts of the State wolf management plan would not be implemented because of hard economic times and

resulting funding limitations. These comments noted that the Wyoming Gray Wolf Management Plan does not identify definite funding sources and does not guarantee funding will be available. For example, one comment suggested population targets could be compromised if inadequate monitoring caused the State to overlook a disease event and the State then also allowed a high hunting quota. Other comments noted Wyoming's robust economy and healthy State funding for wildlife would mean adequate funding for wolf management. Conversely, these comments noted that looming Federal budget cuts would harm our ability to properly manage the Wyoming wolf population.

Response 46: It is not possible to predict with certainty future governmental appropriations, nor can we commit or require Federal funds beyond those appropriated (31 U.S.C. 1341(a)(1)(A)). Even though Federal funding is dependent on year-to-year allocations, we have consistently and fully funded wolf management. Federal funding will continue to be available in the future for State management, but certainly not to the extent while wolves were listed. The Service will continue to assist the States to secure adequate funding for wolf management. The States recognize that implementation of their wolf management plans requires funding and have committed to secure the necessary funding to manage the wolf populations under the guidelines established by their approved State wolf management plans (Idaho Legislative Wolf Oversight Committee 2002; p. 23–25; Montana Wolf Management Advisory Council 2003, p. xiv; Wyoming 2011, pp. 42–43). In Wyoming specifically, the State indicates it will fund operational costs for the wolf management program through its regular budget, but also noted that continued Federal funding will assist in some aspects of management, e.g.,

direct Federal funding to the State, Federal management on some Federal lands such as National Wildlife Refuges and National Parks, and Wildlife Services assisting in control activities (WGFC 2011, pp. 42–43). Wyoming also indicated a willingness to pursue outside funding sources such as private donations, grants from foundations, assistance from nongovernmental organizations and funding partnerships with other interested entities (WGFC 2011, p. 43).

These combined State and Federal commitments are more than enough to provide for adequate management of the population after delisting. In the unlikely event that wolf management is inadequately funded to carry out the basic commitments of an approved State plan, then the promised management of threats by the States and the required monitoring of wolf populations might not be addressed. That scenario would trigger a status review for possible relisting under the Act, including possible use of the emergency listing authorities under section 4(b)(7) of the Act.

Issue 47: One comment mentioned hybridization as a threat. This comment did not elaborate on this issue and how it could threaten the population.

Response 47: The NRM wolves' genetic signature does not show signs of past or ongoing hybridization with other canid species (VonHoldt *et al.* 2011, p. 4). Unlike some other wolf populations (e.g., red wolves), hybridization is not affecting NRM gray wolf populations and is not a threat to the NRM DPS's recovered status.

Cumulative Impacts of Threats

Issue 48: Several comments questioned the validity of our conclusions for individual threat factors suggesting they were considered in isolation. These comments indicated that we needed to analyze threats in a cumulative manner. A number of comments suggested some combination of natural mortality, disease events, catastrophic events, and high human-caused mortality events could co-occur and threaten the wolf population. Some of these noted the likelihood of such an event if the population was already close to minimum population targets.

Response 48: Our assessment of threats considered potential risk factors individually and cumulatively. Our threats assessment is organized sequentially, consistent with how section 4(a) of the Act is organized. We then discuss the overall finding, which considers the cumulative impacts of all potential threat factors. We considered and weighed the cumulative effects of all known and reasonably foreseeable threat factors facing the population when reaching the conclusion that the gray wolf in Wyoming no longer meets and is unlikely to ever again meet the definition of an endangered species.

When considering the population's recovered status, it is important to remember that the minimum recovery criteria require Idaho, Montana, and Wyoming to each maintain at least 10 breeding pairs and at least 100 wolves in mid-winter. After delisting, Wyoming has committed to maintain at least 10 breeding pairs and at least 100 wolves

outside of YNP and the Wind River Indian Reservation at the end of the year, and will maintain a buffer above these minimum levels so that the minimum targets are not compromised. Thus, Wyoming intends to manage for the entire recovery goal outside of YNP. These statewide totals will be further buffered by wolves in YNP which experience extremely low rates of human-caused mortality allowing the population essentially to be naturally regulated at carrying capacity. From 2000 to the end of 2011 (the most recent official wolf population estimates available), the wolf population in YNP ranged from 96 to 174 wolves, and between 6 to 16 breeding pairs. The YNP wolf population appears to be settling around the lower end of this range (Service *et al.* 2000–2010, Table b; Smith 2012). Specifically, YNP biologists expect that the park will settle between 50 to 100 wolves and 5 to 10 packs with 4 to 6 of these packs meeting the breeding pair definition annually (Smith 2012). Given the above, the minimum recovery criteria for Wyoming will always be greatly exceeded.

Additionally, the GYA wolf population will be further buffered by wolves in Idaho and Montana's portion of the GYA. Since 2002, Montana's GYA wolf population ranged from 55 to 130 wolves since recovery was achieved in 2002, and Idaho's ranged from 0 to 40 wolves in its portion of the GYA (Service *et al.* 2003–2012, Tables 1b, 2). While populations in these areas are expected to be reduced from current levels, both States have maintained, and are expected to continue to maintain, a sizable population in their portion of the GYA. Across the entire GYA, we expect the population will be managed for a long term average of around 300 wolves across portions of Montana, Idaho, and Wyoming.

Overall, the GYA's expected abundance and geographic distribution (occurring in both protected and unprotected portions of the GYA and occurring across multiple management jurisdictions) provides the GYA wolf population with substantial representation, resiliency, and redundancy. Additional representation, redundancy, and resiliency is also provided across the three connected recovery areas and three core NRM DPS States, as well as connectivity to Canada. These factors provide us with confidence the population can withstand the types of impacts mentioned in the above comments.

Wolves are very resilient and can withstand and recover from most of the specific events noted in the above comments. Such events are likely to cause localized impacts, which would not affect all or even a majority of the population in Wyoming, the GYA, or the NRM DPS. For example, when disease hit the YNP wolf population in 2005 and 2008 there were substantial, temporary impacts, but they were experienced only on a local scale and the YNP population quickly rebounded. No similar large-scale events have been documented in other portions of Wyoming.

It should be noted that wolves' natural reproductive capacity and dispersal ability, State commitments to monitoring and adaptive management, and the regional population's representation, resiliency, and redundancy would not provide total protection from catastrophic events. For example, as noted in the rule, a cataclysmic eruption underneath YNP would devastate the GYA ecosystem. However, events such as these are extremely unlikely within the foreseeable future.

Regarding management, Wyoming does not intend to manage the population at minimum agreed-upon targets. Instead, the State intends to manage for a buffer, recognizing that some unforeseen events could affect the population. Furthermore, Wyoming (like Montana and Idaho) intends to carefully monitor the population and will adjust all controllable mortality factors, such as mortality resulting from harvest and depredation control, in response to measured mortality of all causes (WGFC 2012, p. 7). For example, Wyoming will monitor for disease and associated impacts (WGFC 2011, p. 22) and reduce controllable sources of human-caused mortality if the available information indicates such factors are causing unacceptable population declines (WGFC 2011, pp. 23–25; WGFC 2012, p. 7). These management measures provide that impacts related to human-caused mortality are appropriately managed and will not singularly, or in combination with other factors, compromise the population's recovered status.

Post-Delisting Monitoring

Issue 49: A few comments indicated our status review triggers were too low. Other comments expressed frustration with the perceived relative lack of oversight once delisting occurs, including failure to initiate status reviews in Idaho and Montana following changes to management (most often mentioned were decisions to suspend the 2008–2012 Idaho Wolf Population Management Plan and after decisions to set hunting and trapping seasons with high or no quotas).

Response 49: For Idaho and Montana, three scenarios would lead us to initiate a status review and analysis of threats to determine if relisting was warranted including:

(1) If the wolf population falls below the minimum NRM wolf population recovery level of 10 breeding pairs of wolves or 100 wolves in either Montana or Idaho at the end of the year; (2) If the wolf population segment in Montana or Idaho falls below 15 breeding pairs or 150 wolves at the end of the year in any one of those States for 3 consecutive years; or (3) If a change in State law or management objectives would significantly increase the threat to the wolf population. For Wyoming, we will 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 or 100 wolves in Wyoming statewide (including YNP and the Wind River Indian Reservation) at the end of any 1 year; (2) If the wolf population segment in Wyoming 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. These status review triggers are appropriate because: The numeric status review triggers are consistent with the minimum recovery criteria and the State's minimum management targets, and the final criterion would be triggered if management veers from approved post-delisting regulatory frameworks.

Some commenters, including some peer reviewers, expressed concern that the States may face pressure to manage to the "razor's edge" (e.g., intentionally manage below the above levels 2 out of every 3 years). This could result in a population lower than the above

standards are designed to facilitate without triggering a status review. In response to this concern, we will also conduct a status review if the above standards are routinely not achieved—an outcome we do not anticipate. We have incorporated this commitment into the “Post-Delisting Monitoring” section of this final rule, discussed below.

We take our post-delisting monitoring commitments very seriously and will fulfill our responsibilities to monitor the population’s status relative to the above triggers. Our record demonstrates this commitment—we published our annual assessments of the population’s status at the end of 2009 and 2011 (Bangs 2010; Jimenez 2012b); we did not publish a similar finding in 2010 because the population was not delisted at the end of 2010. We also evaluated Idaho’s decision to suspend its 2008–2012 wolf management plan at the end of 2010 (prior to Congressional action to delist this population) and revert to its Service-approved 2002 wolf management plan and its hunting plan for 2011–2012. We conducted an evaluation of the changes in Idaho and not Montana that year because only Idaho decided to authorize no quotas in large portions of the State and no overall state-wide quota. This assessment determined these management decisions did not represent a significant threat to the Idaho wolf population and did not meet the threshold necessary to trigger a status review (Cooley 2011). This assessment’s determination was validated by the minimum end-of-year population numbers, which showed little change in 2011 (technically, slight increases in minimum population levels were documented; Service *et al.* 2012, tables 4a, 4b). Consistent with this past practice, similar assessments of Idaho and Montana’s 2012–2013 hunting and trapping seasons are ongoing as of this writing.

Throughout the post-delisting monitoring period we will continue to publish annual assessments to determine if the status review triggers have been met. We will also conduct on-the-spot assessments (similar to our August 2011 assessment (Cooley 2011)) when the available information indicates a change in management strategy could represent a meaningful threat. Finally, as indicated above, we offer our strongest assurance that we will consider relisting if there is ever sufficient evidence that the species may meet the definition of threatened or endangered and, as required 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 population. This approach more than satisfies our post-delisting monitoring responsibilities so that the population's recovered status will not be compromised.

Positives and Negatives of Wolf Restoration

Issue 50: Some comments expressed the view that failure to delist had resulted in unchecked growth of the wolf population in Wyoming and throughout the NRM region, and that the resulting wolf abundance had caused significant negative impacts to: ungulate populations (elk, moose, deer, bison, and bighorn sheep herd declines); State game agencies (largely dependent on hunting revenue); guides and outfitters (reduced opportunity for ungulate harvest by clients); hunters (reduced recreational and sustenance opportunities); ranchers (from livestock depredation by wolves; stress to livestock affecting weight and health; and declining business opportunities for ranchers who

use/lease their land for hunting); and the local economy (lost hunting and ranching revenue). Some expressed concern for wolves attacking pets and pack animals. Other comments expressed concern for habituated wolves threatening human safety. Still other comments expressed concern that wolves carry and transmit diseases and parasites harmful to both wildlife and humans (*Echinococcus granulosus*, also known as Hydatid Disease, was most frequently mentioned). Many sportsmen noted that wolves were significantly hindering the conservation progress for other wildlife, which has been funded by sporting revenues. Some comments suggested the 1994 Environmental Impact Statement was flawed in that we underestimated the impacts wolves would cause. Many of these comments described the reintroduction in such terms as “catastrophic” and “disastrous.” Some comments asserted that Wyoming residents had been promised that the wolf population would be maintained at or below 100 or 150 animals and that excess wolves should be killed. Many comments expressed support for hunting as a method to reduce the Wyoming wolf population and restrict its distribution.

Others suggested wolf population impacts were minimal and had been exaggerated by anti-wolf interest groups. A few noted wolves kill few livestock and that other predators kill more livestock than do wolves. Some comments noted impacts to ungulates are complex and not fully understood with some herds showing declines, some showing increases, and some showing little or no effect from wolves. A few comments asserted that hunters were erroneously blaming wolves for decimating elk populations. These comments noted that all of Wyoming’s elk herds are at or above State management objectives. A few indicated ungulate herds were overpopulated and destroying native

ecosystems. Numerous comments noted the positive direct and indirect economic impacts of wolf restoration through increased tourism; other comments suggested visitation to YNP had not meaningfully changed since reintroduction.

Response 50: Although we recognize that wolf restoration has resulted in both positive and negative economic impacts to the region, the Act precludes consideration of such impacts on listing and delisting determinations. Instead, listing and delisting decisions are based solely on the best scientific and commercial information available regarding the status of the subject species. In this case, the Wyoming wolf population and the greater NRM gray wolf population is recovered, and now that adequate regulatory mechanisms are in place, we have sufficient assurances the species' recovered status will be maintained. Nevertheless, after delisting, we expect Wyoming will reduce the State's wolf population, which should reduce any adverse economic impacts of the region's wolf population.

Regarding human safety, there have been no wolf-caused injuries or deaths in the NRM region since recovery efforts first began. Some individuals have reported feeling threatened by wolves, and a few wolves have been taken in such situations. Such take is allowed by both our general regulations for the Act and both experimental populations' special regulations (50 CFR 17.21(c)(2); 50 CFR 17.84(i)(3)(v); 50 CFR 17.84(n)(4)(vi)). After delisting, the States will continue to allow for take in defense of an individual's life or the life of another person.

Regarding disease, the public should treat all wildlife, including canids, as potential vectors of disease. Although wolves reintroduced to Yellowstone and central Idaho were treated with drugs to destroy *Echinococcus granulosus*, wolves in these ecosystems currently have a relatively high prevalence of the parasite. *E. granulosus* is just one of many zoonotic diseases (diseases transmissible to humans) in wildlife. When handling canids or canid feces we recommend wearing gloves, not smoking, eating, or drinking, and washing up afterwards. These simple precautions decrease exposure to a negligible level. We also recommend not feeding uncooked wild or domestic ungulate organs to dogs and maintaining proper veterinary care of dogs and their parasites. These types of public health advisories are appropriate for those engaged in wolf hunting or other wildlife pursuits that include handling of any canine species, tissues, or scat (Boyce and Samuel 2011, entire).

Issue 51: Many comments suggested both the Wyoming wolf management plan and the proposed delisting rule failed to note the value of wolves. Some commenters noted that the return of wolves had restored ecological balance to the region and that delisting would upset this balance. A number of comments pointed to the ecological role of wolves in modifying ungulate behavior, distribution, and movements and the resulting “cascade effect” they produce for other unrelated species and the larger ecosystem. Some contended these cascading effects also helped farming and ranching. Many comments also pointed out that wolves strengthen ungulate herds by preying on vulnerable ungulates, which allows greater numbers of healthier, more robust, and more alert animals to survive and pass on genes. Some comments suggested wolves reduce the

prevalence of disease (particularly chronic wasting disease and brucellosis) by removing sick individuals from native ungulate populations. Others comments pointed out that maintaining top level predators like wolf populations resulted in fewer mesopredators like coyotes (*Canis latrans*), which has been shown to reduce impacts on pronghorn antelope (*Antilocapra americana*). Some comments suggested these positive impacts would be reduced or hindered if Wyoming was allowed to implement its wolf management plan. Others suggested recovery levels should prevent “trophic downgrading” and provide for “ecological effectiveness” (i.e., occupancy with densities that maintain critical ecosystem interactions and help ensure against ecosystem degradation).

Response 51: We recognize that wolf recovery appears to have caused trophic cascades and ecological effects in some areas that affect numerous other animal and plant communities, and their relationships with each other. These effects have been most pronounced in pristine areas, such as in YNP. While these effects may occur at varying degrees elsewhere, they are increasingly modified and subtle the more an area is affected by humans (Ripple and Beschta 2004, entire; Smith *et al.* 2003, pp. 334–338; Robbins 2004, pp. 80–81; Fortin *et al.* 2005, entire; Garrott *et al.* 2005, p. 1245; Hebblewhite *et al.* 2005, p. 2135; Campbell *et al.* 2006, pp. 747–753; Mech 2012, entire). While these purported effects are interesting (albeit still controversial; see Mech 2012, entire), such information is not considered in listing or delisting decisions. Similarly, the Act does not require that we prevent “trophic downgrading” (Estes *et al.* 2011, entire) or that we achieve or maintain “ecological effectiveness” (Soule *et al.* 2003, p. 1239). Instead,

listing and delisting decisions are based upon extinction risk of the subject species. When a species no longer meets the definition of an endangered or threatened species under the Act, it is recovered, and we are to delist it.

Native American Tribal Considerations

Issue 52: A number of comments noted that many Native American tribes honored wolves; viewed wolves as sacred relatives that taught them to hunt, live in harmony, and sing to the creator; and learned how to build stronger tribes by observing wolf pack loyalty. Only one of these comments came from a self-identified Native American (the rest were speaking generally about what we could learn from Native Americans on this issue). This comment indicated wolves should be protected because they are sacred to Native Americans and important for Native American religious ceremonies.

Response 52: We take our relationships with the Tribes very seriously and are sensitive to potential conflicts with tribal cultural values. The wolf reintroduction has returned what traditional Arapaho and Shoshone stories call a helper (Shoshone and Arapaho Tribal Fish and Game Department 2007, p. 2) and assisted in restoring what the Salish & Pend d'Oreille Tribal Elders call a "balanced ecosystem" (Confederated Salish and Kootenai Tribes 2009, p. 3). In preparation for a return to Tribal management, we worked with the Tribes to prepare wolf management plans that allowed for self-governance. Most of these plans discuss the cultural importance of wolves, but also

allow control of problem wolves and the potential for wolf hunting. Having an approved plan allowed the Shoshone and Arapaho Tribal Fish and Game Department to manage wolves on the Wind River Indian Reservation under the more liberal 2005 and 2008 nonessential experimental populations regulations (70 FR 1286, January 6, 2005; King 2007; 73 FR 4720, January 28, 2008; 50 CFR 17.84(n)). Most recently, we contacted the Eastern Shoshone and Northern Arapaho tribes in October 2011, requesting government-to-government consultation to discuss any concerns the Tribes may have with our proposal (Guertin 2011). The Joint Council for these Tribes declined this opportunity (Greenwood 2011). Neither of these tribes nor any other Tribes formally commented on the proposal. We also funded some Tribal wolf monitoring and management through the years. Collectively, the above activities satisfy our Tribal consultation responsibilities. While some individuals may find portions of Wyoming's regulatory framework morally objectionable and in conflict with their tribal cultural values, these individual objections are not grounds to take a different course. We will continue to inform the Tribes regarding the status of wolves and to respond to any Tribal requests for government-to-government consultation.

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 affect a species negatively may not be sufficient to justify 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.

The following analysis examines the five factors affecting, or likely to affect Wyoming, GYA, and NRM wolves within the foreseeable future. We have previously concluded wolves in the remainder of the NRM DPS are recovered and warranted delisting (74 FR 15123, April 2, 2009; 76 FR 25590, May 5, 2011). Today's rulemaking is separate and independent from, but additive to, the previous action delisting wolves in the NRM DPS. While this rulemaking focuses on Wyoming, because this is the only portion of the NRM DPS that remains listed, the conclusions of the previous delisting and the information supporting this determination are incorporated by reference. This information is only updated where necessary (e.g., Idaho's suspension of its 2008–2012 step-down wolf management plan and Montana's and Idaho's hunting seasons) to consider new developments affecting the larger NRM DPS. The best scientific and commercial information available demonstrates gray wolves in Wyoming, the GYA, and the NRM DPS are recovered and are unlikely to become endangered in the foreseeable future throughout all or a significant portion of their range.

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

This section evaluates the entire State of Wyoming, and within Wyoming we focus primarily on suitable habitat, currently occupied areas, and the Trophy Area. Within Wyoming, we also examine unsuitable habitat. Habitat suitability is based on biological features that affect 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. For an analysis of other portions of the NRM DPS relative to this factor, see our 2009 delisting determination (74 FR 15123, April 2, 2009). 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 are habitat generalists (Mech and Boitoni 2003, p. 163) and 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.* In review, 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.* 2006, 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 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.* 2006, p. 555). In total, Oakleaf *et al.* (2006, p. 559) ranked 28,725 km² (11,091 mi²) 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 km² (29,808 mi²) 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. Unlike the Oakleaf model, the Carroll model did not incorporate livestock density into its calculations (Carroll *et al.* 2006, pp. 27–29; Oakleaf *et al.* 2006, p. 556). Thus, the Carroll model did not consider those conditions where wolf mortality is high and habitat unsuitable because of chronic conflict with livestock. 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. However, due to the large area analyzed, the Carroll model provided a valuable relative measure across the western United States upon which comparisons could be made.

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 conclude that these areas are not 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.* 1999–2012, 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; Service 1987, p. 7; Service 1994, p. vii). Because these two 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.* 2006, p. 554). This conclusion is supported by dispersal and genetic exchange data (vonHoldt *et al.* 2010, p. 4420; Jimenez *et al.* In review, p. 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 Environmental Impact Statement for the GYA (63,700 km² (24,600 mi²) (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.* 1999–2012, 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 conclude 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, represent a reasonable prediction of suitable wolf habitat in Wyoming (although these calculations somewhat overestimated habitat suitability in some areas such as the Big Horn mountains) (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 2011 (Service *et al.* 2010; 2012, 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 Trophy Area and protected areas contain approximately 81 percent of the State's suitable habitat (including over 81 percent of the high-quality habitat (greater than 80 percent chance of supporting wolves) and over 62 percent of the medium-high-quality habitat (50 to 79 percent chance of supporting wolves) (Oakleaf 2011; Mead 2012a).

Although Carroll determined there may be some additional suitable wolf habitat in Wyoming beyond the area Oakleaf analyzed, we conclude that 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 to be 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 conclude that such areas are unsuitable habitat and 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.* 2006, 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 not support wolf breeding pairs.

Strips and smaller (less than 2,600 km² (1,000 mi²)) patches of theoretically suitable habitat (Carroll *et al.* 2006, p. 34; Oakleaf *et al.* 2006, 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 usable 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). Implementation of wolf recovery has shown that some theoretically suitable habitat described by the available models fails to be functional (or suitable) wolf habitat because of non-modeled parameters (e.g., edge effect discussed above) that exist in those areas.

For the above reasons, we conclude 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 Environmental Impact Statement. This core area will support the recovered Wyoming and GYA wolf population and continue to contribute to the NRM gray wolf populations' recovered status.

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.* 2012, Figure 1). Since 2002, most packs have occurred within a consistent area (Service *et al.*

2003–2012, 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). 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).

The overall distribution of most Wyoming wolf packs primarily forming in mountainous forest habitat has been similar since 2000, despite a wolf population in the State that has more than doubled (Service *et al.* 2001–2012, Figure 1; Bangs *et al.* 2009, p. 104). 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 contribute to demographic and genetic connectivity (vonHoldt *et al.* 2010, p. 4412). While these areas are not 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.* In review, p. 1).

Occupied habitat in Wyoming occurs only in the northwestern part of the State (see Figure 1 above). Specifically, this occupied area extends slightly further east than the Trophy Area, 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.

The Wyoming wolf population's relatively stable distribution is the result of the wolf population approaching biological limits, given available suitable habitat and conflict in unsuitable 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.* 2012, 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 abundance 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 affected 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 and wild ungulates and 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.* 2006, p. 560).

The 63,714 km² (24,600 mi²) 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 occupied portions of Wyoming, land ownership is mostly Federal (78.6 percent, 58.1 percent of which is National Park Service or wilderness) with some State (2.6 percent), Tribal (8.4 percent), and private lands (10.5 percent) (Lickfett 2012).

The vast majority of suitable wolf habitat and the current wolf population are secure in mountainous forested Federal public land (wilderness and roadless areas, National Parks, 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. Department of Agriculture 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 far exceed necessary criteria for maintaining suitable habitat for wolves (for an example, see U.S. Department of Agriculture Forest Service 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 2011a). All but two 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; Mead 2012a). 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 affect 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. 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 around 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.* 2012, Tables 4, 5; Smith *et al.* 2010, p. 620). Such active control promotes tolerance for wolf presence by responding to, and minimizing future, impacts to private property 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). Assuming adequate regulation of other potential threat factors (discussed below), the continued presence of livestock will not in any meaningful way threaten the recovered status of the Wyoming wolf population in the foreseeable future.

Although human population growth and development may affect wolf habitat and range, we expect these impacts will be minimal, because 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 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 (Freudenthal 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 conclude that future human population growth will not 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.* In review, 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 provide for the 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 (Boyd *et al.* 1995, p. 136; Boyd and Pletscher 1999, pp. 1100–1101; Jimenez *et al.* In review, p. 23). 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. Overall, we conclude that 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 affected by changes in habitat and range (genetic exchange is discussed in more detail under Factor E below), and any changes that are likely will not threaten the recovered status of the Wyoming, the GYA, or the NRM gray wolf populations in the foreseeable future. Therefore, we find present or threatened destruction, modification, or curtailment of habitat and range, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf populations to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

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 Mortality” section of Factor C below; potential impacts of human-caused mortality to natural connectivity and gene flow are discussed in the “Genetic Considerations” section of Factor E 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. For an analysis of other portions of the NRM DPS relative to this factor, see our 2009 delisting determination (74 FR 15123, April 2, 2009). Additional consideration of such take since 2009 has verified our previous conclusions that State management of such human-caused mortality will not undermine maintenance of any portion of the NRM DPS's recovered status (Cooley 2011; Jimenez 2012b; see also Issue and Response 4 above). Additional consideration of such take in Montana and Idaho are also included in other portions of this rule as appropriate.

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, 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 conclude that 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, 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 Montana, Idaho, and Wyoming after delisting. Additionally, the Wind River Indian Reservation may consider legal regulated harvest. Harvest will be done in a manner compatible with wolf conservation. Wolves can maintain themselves despite human-caused mortality rates of 17 to 48 percent (Fuller *et al.* 2003, pp. 182–184 [22 percent +/- 8 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent]).

We have long encouraged hunting as a long term strategy for wolf conservation because it is a valuable, efficient, and cost-effective tool to help manage wildlife populations (Bangs *et al.* 2009, pg. 113). Viable robust wolf populations in Canada, Alaska, and other parts of the world are hunted and trapped and are not threatened by this type of mortality. Furthermore, all States in the NRM DPS have substantial experience operating regulated harvest as a wildlife management tool for resident species. Regarding experience specific to wolves, in both 2009 and 2011, more than 250 NRM wolves were killed through hunting and a total of more than 600 NRM wolves died each year from all sources of mortality (agency control including defense of property, regulated harvest, illegal and accidental killing, and natural causes), and the population showed little change (technically, slight increases in minimum population levels were documented each year) (Service *et al.* 2012, tables 4a, 4b). While future population

reductions are anticipated, the available information gives 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 managed as game animals year-round or protected in about 38,500 km² (15,000 mi²) in the northwestern portion of the State (15.2 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and most of the Wind River Indian Reservation (Lickfett 2012). This area is of sufficient size to support Wyoming wolf population targets, under the management regime developed for this area.

Wolves will be considered as trophy game animals within the area of northwestern Wyoming identified as the Trophy Area (see Figure 1 above). In areas under State jurisdiction, “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 Trophy Area was established by State statute and cannot be diminished through WGFC rule or regulation. The Trophy Area 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 Area will be expanded by approximately 3,300 km² (1,300 mi²) (i.e., an additional 1.3 percent of Wyoming) (Lickfett 2011).

Regarding methods for regulated hunting within the Trophy Area, numerous safeguards ensure such take will be fair chase. For example, hunting regulations within the Trophy Area prohibit: Use of dogs to aid in wolf hunting (W.S. 23-3-109(a)); poisoning (W.S. 23-3-304); hunting from a road (W.S. 23-3-305); hunting with the aid of artificial light (W.S. 23-3-306(b)); hunting from snow machines, automobiles, or airplanes; and hunters receiving spotting assistance from aircraft (W.S. 23-3-306). Note that the limitations listed here are a small sample of protective measures in place and not intended to constitute a comprehensive list; parties looking for a comprehensive list of limitations on wolf hunting within the Trophy Area should consult the WGFD.

Within the Trophy Area, Wyoming intends to use public harvest of wolves to reduce wolf populations to minimize wolf impacts to livestock, ungulate herds, and humans (WGFC 2011, pp. 1, 23). Wyoming 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 wolf mortality and population growth estimated 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 coincide primarily with fall big game hunting seasons (October through December), but they may be established outside of that period or extended beyond that period if necessary to achieve management objectives (WGFC 2011, pp. 23–25, 53). Wyoming’s wolf management plan indicates that the State expects to delineate approximately 10 to 12 wolf hunting areas within the Trophy Area 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). Wyoming has 12 hunting units for the 2012 hunting season. Persons who legally harvest a wolf within the Trophy Area 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.

Within the Trophy Area, at the end of 2011, there were at least 177 wolves in at least 29 packs (including 16 breeding pairs), as well as at least 4 lone wolves; within the

seasonal Trophy Area, at the end of 2011, there were at least 10 wolves in at least 2 packs (including 1 breeding pair), as well as at least 5 lone wolves (Jimenez 2012a). In 2012, Wyoming will authorize a hunting quota of 52 wolves in 2012, and once reproduction is accounted for, the State estimates that this would reduce the population by about 11.5 percent within the Trophy Area (Mills 2012, pers. comm.). Specifically, Wyoming estimates the population within the Trophy Area would be around 170 wolves and 15 breeding pairs at the end of 2012 (Mills 2012, pers. comm.). We note that this first-year goal is comfortably above the minimum agreed-upon population targets.

Commercial or recreational trapping is not currently being planned in Wyoming (Bruscino 2011b). However, an adaptive management approach, which could include trapping, may occur in the future (WGFC 2011, p. 25; Mead 2012a). If such a season is considered in the future, it would be regulated by the WGFD and the WGFC. Furthermore, take would be limited because the resultant mortality would count toward Wyoming's total harvest quotas, which are already expected to be modest once desired population reductions are achieved. If trapping is used in the future it will be conducted within the framework of the State's overall demographic targets.

Regarding past hunting seasons, in our 2009 delisting rule (74 FR 15123, April 2, 2009), we determined that Wyoming's proposed 2008 harvest strategy (that was not 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 a population of at least the agreed-upon minimum

population targets, its intention to consider all forms of wolf mortality when making wolf management decisions, and numerous safeguards built into its harvest strategy, we are confident that this source of mortality will not 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 wolf hunting or trapping will occur within the boundaries of YNP and Grand Teton National Park. Similarly, no wolf hunting is currently planned or anticipated on the National Elk Refuge (although it could be considered in the future)

(Kallin 2012, per. comm.). However, wolves in these areas may be impacted by hunting or trapping when they leave these areas to various extents depending on the unit. 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 will likely impact these wolves. These wolves were included in the Trophy Area for exactly this reason. Therefore, Wyoming will manage these wolves along with other wolves within the remainder of the Trophy Area to ensure their statewide minimum management target is not compromised.

Most YNP packs rarely leave the park. However, a few packs occasionally leave the park boundaries, which could subject them to hunting in adjoining areas. This situation is most common for packs in the northern part of YNP where some of these wolves occasionally enter adjoining portions of southern Montana. Montana has responded to this situation by creating a small subquota for areas adjoining YNP. Specifically, within the large South Central Montana hunting unit, which had an overall quota of 18 wolves in 2011, Montana Fish, Wildlife and Parks created a small subunit with a subquota of 3 wolves for areas immediately adjoining YNP's northern boundary (Montana Fish, Wildlife and Parks 2011, pp. 6–7). This approach has been successful at minimizing hunting impacts to YNP packs (Smith 2012, pers. comm.). We anticipate Montana will continue such harvest limits in areas adjoining YNP in future years. Most other YNP wolf packs are not expected to be as vulnerable to human-caused mortality in adjoining areas most years because they generally spend less time in these adjoining areas. That said, these patterns will vary by year. For example, the Delta pack is

generally known from southeastern YNP and its range can include adjoining portions of Wyoming, but this year it appears to be spending so much time in Wyoming that it may count as a Wyoming pack rather than a YNP pack.

Although not likely to be necessary, should hunting in other adjoining areas have a bigger impact than anticipated, we expect other adjoining States would follow Montana's lead and limit hunting in these adjoining areas to limit impacts to YNP wolves. All three States have long cooperated with YNP on wildlife management issues, a situation we expect to continue (Bruscino 2012, pers. comm.; Smith 2012, pers. comm.). Furthermore, all three States have an incentive to maintain a minimally affected wolf population in YNP both for visitor enjoyment and the resulting economic benefits. Additionally, while we doubt this issue could ever bring the Wyoming statewide population down below 15 breeding pairs or below 150 wolves, all 3 States have an incentive not to have their management actions outside YNP cause population-level impacts in the park that could lead to a Service status review (see status review trigger 3 below). Wyoming's wolf management plan confirms this intention in that it states Wyoming is committed to coordinate with YNP to contribute to maintain a statewide total of at least 15 breeding pairs and at least 150 wolves (WGFC 2011, p. 1).

Although hunting is currently allowed for many other game species in the John D. Rockefeller, Jr. Memorial Parkway under the Parkway's enabling legislation and Wyoming law, the National Park Service has indicated a "strong preference that wolves not be hunted in the John D. Rockefeller, Jr. Memorial Parkway" (Frost and Wessels

2012). Wyoming's hunting regulations are clear that gray wolf hunting would not occur in the Parkway during the 2012 season, although nothing in Wyoming's regulations or Wyoming's wolf management plan would preclude wolves from being hunted in the Parkway in subsequent years. Should hunting ever occur in the John D. Rockefeller, Jr. Memorial Parkway, it would likely be very limited, would be unlikely to noticeably affect wolf gene flow or connectivity, and it would be closely coordinated with the National Park Service.

Recent hunts in Idaho and Montana demonstrate wolf tolerance for hunting. Both Idaho and Montana designated wolves as game animals statewide and each State conducted conservative wolf hunts in 2009. 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 (Montana Fish, Wildlife and Parks 2009, entire; Dickson 2010; Service *et al.* 2010, Idaho chapter, pp. 13–14; Service *et al.* 2010, Montana chapter, pp. 17–25). In total, Montana hunts took 72 wolves out of the 75-harvest quota and, in Idaho, hunts took 185 wolves out of 2009's quota of 220 (Montana Fish Wildlife & Parks 2009, entire). Each State closed wolf harvest in individual management zones at the end of that State's season or when as a unit (or subunit) met its quota, whichever came first. 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 and other sources of human-caused mortality, the NRM population showed little change in 2009 (technically, a slight increase in minimum population levels was documented). Hunting continued in some

portions of Idaho into 2010. In 2010, the minimum population estimate saw a small decline. During the 2011–2012 harvest, 379 wolves were taken in Idaho (255 by hunters and 124 by trappers), and 166 wolves were taken in Montana (Idaho Department of Fish and Game 2012, entire; Montana Fish, Wildlife and Parks 2012a, entire).

Considering all sources of mortality in 2011, the population changed minimally (minimum population estimates grew by around 3 percent across the NRM DPS including a 15 percent increase in Montana and 4 percent reduction in Idaho). Some additional reduction likely occurred during the 2012 portion of the 2011–2012 hunting season. Regardless, these data confirm wolves' capacity to withstand significant mortality. As anticipated in our 2009 delisting rule (74 FR 15123, April 2, 2009), Montana and Idaho are now planning higher harvest rates to reduce the population below current levels (which are likely at or above long term carrying capacity of the suitable habitat). After this initial population reduction phase, we anticipate that the NRM gray wolf population will then settle into a reasonable, long term equilibrium, well above minimum recovery levels.

On a more localized level, hunting in Idaho and Montana may affect Wyoming wolves because some wolves and some packs cross State boundaries. Thus, next we analyze hunting in Idaho's and Montana's portion of the GYA. During the 2009 season, Island Park hunting unit 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.* 2010, Idaho chapter, pp. 81–84). The quota for this unit was met, and the unit was closed November 2nd (Service *et al.*

2010, Idaho chapter, pp. 81–84). There is no harvest data from 2010 because wolves were not hunted in this unit in 2010. During the 2011 season, Idaho authorized a quota of 30 wolves in the Island Park hunting unit with a season from August 30th to December 31st, and limits of 1 wolf per tag with a limit of 2 tags per person (Idaho Fish and Game Commission 2011). The quota for this unit was not reached because only 10 wolves were taken. The 2012–2013 hunting seasons authorize a quota of 30 wolves with a season from August 30th to January 31st and limits of 1 wolf per tag with a limit of 2 tags per person. If the last several years are any indication, it is unlikely this quota will be achieved. Overall, the data demonstrate this modest hunting level in this unit had minimal impact. As hunting continues in this region across multiple consecutive years, it will reduce the number of wolves, packs, and breeding pairs in this area (this is the State’s intention). In the long run, it is likely that 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 affect a small number of Wyoming wolves (e.g., the three Wyoming packs that 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. During the 2009–2010 hunting season, Idaho allowed hunting from August 30th to March 31st in this zone but did not reach its quota and only 1 wolf was harvested. During the 2011–2012 hunting season, Idaho allowed hunting from August 30th to March 31st with an unlimited

quota in this zone, but only harvested 2 wolves. During 2011, no documented packs or groups occupied the Southern Idaho Zone. Furthermore, hunting in this unit is expected to have little to no impact on packs in Wyoming. Because this area is largely unsuitable habitat with no substantial wolf population, recent modest take trends in this unit are likely to continue.

Trapping was not authorized in either the Island Park unit or the southern Idaho unit (Idaho Fish and Game Commission 2011). Similarly, trapping is also not planned for the 2012–2013 season in either of these areas. Trapping was only authorized where hunting alone was not anticipated to be effective in reducing the wolf population (Idaho Fish and Game Commission 2011). Because trapping is typically reserved for more remote, inaccessible areas (Idaho Fish and Game Commission 2011), we do not expect much, if any, future trapping in this area.

Montana's wolf quota for 2011 within the GYA was 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 (Montana Fish, Wildlife and Parks 2011, pp. 6–7). These quotas were nearly achieved with 16, 5, and 18 wolves taken in each of the above units, respectively. In 2011, the minimum estimate was 139 wolves in 22 verified packs, 10 of which qualified as a breeding pair. This represents a slight change in the area's wolf population (technically, a slight increase in the documented wolf population) from 2010 when the minimum population estimate was 118 wolves in 19 packs in 2010, of which 6 qualified as breeding pairs. Small fluctuations also occurred following the 2009 hunting season. Thirteen

wolves were taken in this unit in 2009. From the end of 2008 to the end of 2009 (the period affected 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.

As of this writing, the Montana 2012–2013 hunting season's quota is not determined, but will be higher than past seasons and may include trapping and increased harvest. In the long run, Montana will modestly reduce the number of wolves, packs, and breeding pairs in this area. However, it is likely this area will continue to support a sizeable number of wolves, packs, and breeding pairs. Specifically, in our professional judgment, 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 quotas for areas adjacent to YNP, may affect 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 and 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. For example, in 2009 and in 2011, more than 600 NRM wolves died each year from all sources of mortality (agency control including defense of property, regulated harvest,

illegal and accidental killing, and natural causes), and the population showed little change (technically, slight increases in minimum population levels were documented each year) (Service *et al.* 2012, tables 4a, 4b). 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; harvest units will be closed when quotas are met, or if otherwise needed (e.g., if overall population objectives are being approached); harvest 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.

On the whole, we anticipate Wyoming, Idaho, and Montana will all reduce populations in the short term and that harvest rates and season duration will be reduced over time. Long term, commercial and recreational human-caused mortality and total human-caused mortality will occur at sustainable rates that will not compromise minimum management targets or minimum recovery objectives.

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. After delisting, the States, National Parks, and 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 Trophy Area for scientific or educational purposes will be regulated by the WGFD 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. 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 affect human-caused wolf mortality rates.

In summary, we find that commercial, recreational, scientific, and educational use, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf population to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Factor C. Disease or Predation.

This section discusses disease and parasites, natural predation, and all sources of human-caused mortality not covered under Factor B above (the Factor B analysis includes sources of human-caused mortality for commercial and recreational uses). The below analysis focuses on wolves in Wyoming, but considers adjoining portions of the GYA because some wolves and some packs cross State boundaries. Data for other regions are considered, particularly where it implies a threat that could someday affect Wyoming or GYA wolves. For an analysis of other portions of the NRM DPS relative to this factor, see our 2009 delisting determination (74 FR 15123, April 2, 2009).

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 1994 Environmental Impact Statement 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 multispecies 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 affect 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 in Montana and Wyoming had blood antibodies indicating nonlethal exposure to

CPV (Atkinson 2006; Smith and Almberg 2007, p. 18; Almberg *et al.* 2009, p. 2; Service *et al.* 2009, Wyoming chapter, p. 11). 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 now points to canine distemper (CD) as having been the primary cause of low pup survival during those years (Smith *et al.* 2006, p. 244; Smith 2008, pers. comm.; 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 2008 (Service *et al.* 2012, Table 4; Smith *et al.* 2010, p. 620; also see Figure 3 above. Mech and Goyal (2011) recently found that from 1987 to 1993, CPV reduced pup survival and subsequent dispersal and overall population growth in the Superior National Forest of Minnesota (a population at carrying capacity in suitable habitat); after that the population apparently gained resistance to CPV. 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 temporarily 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 Wyoming (Smith and Almberg 2007, p. 18; Service *et al.* 2009, Wyoming chapter, p. 11; 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.) documented the most severe wolf impacts from CD when the YNP population was around the historic high of 170 wolves the previous winter. That said, less severe outbreaks of CD can and do occur at lower population levels. CD impacts are typically localized. 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. The available information indicates CD mortality may be associated with high carnivore density. Thus, the wolf populations in the GYA may be more affected by CD and other diseases when wolves and other carnivores exist at high densities in suitable habitat (e.g., in YNP in 2005 and 2008). This may partially explain why no similar events have been documented in other portions of Wyoming, and may limit the future likelihood of similar events in other portions of Wyoming after delisting.

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 scabiei*) 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, mange 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 not 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.* 2010a, 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; Jimenez *et al.* 2010b, entire). 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 immitis*), blastomycosis, brucellosis, neosporosis, leptospirosis, bovine tuberculosis, canine herpesvirus (Almberg *et al.* 2010), canine coronavirus, viral papillomatosis, hookworm, tapeworm (*Echinococcus granulosus*) (Foreyt *et al.* 2008, p. 1), lice, sarcoptic 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.* 2012, Table 1, Figure 1), wolf-to-wolf contacts will not likely lead to a continuing increase in disease prevalence. Most NRM gray wolves will continue to have exposure to most diseases and parasites in the system. However, 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). Diseases or parasites have not been a significant threat to wolf population recovery to

date, and we have no reason to conclude that they will become a significant threat to the viability of recovered wolves 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.

Overall, we conclude that diseases or changes in disease monitoring, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf population to become in danger of extinction throughout all or a significant portion of its range now or in the foreseeable future.

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 mortality 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 YNP 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 affect wolf populations.

Other wolves are the largest cause of natural predation among wolves. Wherever wolf packs occur, including the NRM DPS, some low level of wolf mortality will result from territorial conflict. Such intraspecific killing has been noted in newly expanding populations or restored populations (Fritts and Mech 1981; Wydeven *et al.* 1995; Mech and Boitani 2003; Smith 2005), in wolf populations subject to human harvest (Adams *et al.* 2008), and during periods of relatively high prey abundance (Peterson and Page 1988). However, this cause of mortality 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.

In summary, we find that natural predation, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf populations to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Human-caused Mortality—This section discusses most sources of human-caused mortality; however, hunting and trapping are discussed in the “Commercial and Recreational Uses” section of Factor B above and potential impacts of human-caused mortality to natural connectivity and gene flow are discussed in the “Genetic Considerations” section of Factor E below. As with previous sections, this write-up focuses on Wyoming, because this is the portion of the NRM DPS that remains listed; however, the conclusions of the previous delisting and the information supporting this determination are incorporated by reference and updated below as appropriate.

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 not 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 comprises 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; Service *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.* 1989–2012, Figure 1). Overall, wolf populations can maintain themselves despite human-caused mortality rates of 17 to 48 percent, indicating wolf populations are quite resilient to moderate human-caused mortality, if it is adequately regulated (Fuller *et al.* 2003, pp. 182–184 [22 percent +/- 8 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent])

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; Service *et al.* 1989-2012, Tables 1-5). While it is unclear if these wolves were representative of the entire population (Atkins 2011, p. 56), this information is nonetheless informative. From 1984 through 2004, annual adult survival likely averaged around 75 percent, which typically allows wolf population growth (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 (Service *et al.* 2012, 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, minimum known wolf numbers increased at a rate of around 20 percent annually 1995–2008 (the period when the population was presumed below carrying capacity) (Service *et al.* 2012, Table 4; Smith *et al.* 2010, p. 620; also see Figure 3 above). Since 2008, the NRM population appears to have largely stabilized (see Figure 3 above).

After delisting, human-caused mortality, and its authorization or regulation, will differ in various parts of Wyoming. In total, wolves will be managed as game animals

year-round or protected in about 38,500 km² (15,000 mi²) in northwestern Wyoming (15.2 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and most of the Wind River Indian Reservation. This area is of sufficient size to support Wyoming population targets, under the management regime developed for this area.

Within portions of the Trophy Area under State jurisdiction, wolves will be managed by the WGFD as trophy game animals. “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 Trophy Area was established by State statute and cannot be changed through WGFC rule or regulation. The Trophy Area 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 Area will be expanded by approximately 3,300 km² (1,300 mi²) (i.e., an additional 1.3 percent of Wyoming). Management within the Trophy Area is described below, followed by management in other portions of Wyoming.

After delisting, Wyoming will allow property owners inside the Trophy Area to immediately kill a wolf doing damage to private property (WGFC 2011, pp. 3, 4, 22, 30–31, 32). State statute 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” (W.S. 23–3–115(c)). These regulations 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 these regulations 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.* 2012, Table 4). Based on our experience with these similar rules, we expect take related to this issue to be minimal. 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; WGFC 2012, pp. 3–5).

Additionally, Wyoming law (W.S. 23–1–304(n)) states that permits “shall be issued” to landowners or livestock owners in cases where wolves are harassing, injuring, maiming, or killing livestock or other domesticated animals, and where wolves occupy geographic areas where chronic wolf predation occurs. Importantly, numerous safeguards are in place that limit the potential of these permits to meaningfully and

detrimentally affect the population. For example, State statute requires that permits be issued, and renewed as necessary, in 45-day increments (W.S. 23–1–304(n)), and State regulations limit the take allowance for each permit to a maximum of 2 gray wolves, and specify that each permit can only apply to a specified limited geographic or legally described area (chapter 21, section 7(b)(ii)). These requirements ensure application of this source of take is limited in time and geography. Similarly, State regulations indicate that purported cases of wolf harassment, injury, maiming, or killing must be verified by the WGFD (chapter 21, section 6(b)). This requirement for WGFD verification will limit potential abuse for this source of mortality. Regarding the issuance of lethal take permits for wolves “harassing” livestock or domestic animals, Wyoming will require that WGFD staff verify that wolves were present and involved in activities that would directly indicate an actual attack was likely; such activity must be an immediate precursor to actual biting, wounding, grasping, or killing, such as chasing or molesting (Mead 2012b). 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).

Finally, and most importantly, State law (W.S. 23–1–304(n)) and the implementing regulations (chapter 21, section 7(b)(iii)) clarify that existing permits would be cancelled, and issuance of new permits would be suspended, if the WGFD determines further lethal control could compromise the State’s ability to maintain a population of at least 10 breeding pairs and at least 100 wolves in Wyoming outside of YNP and the Wind River Indian Reservation at the end of the calendar year. Importantly, the word “could” (as opposed to would or will) provides authority for the WGFD to

manage for a buffer above the minimum target and limit control from lethal take permits, if necessary, to maintain an adequate minimum buffer. However, the Addendum to the Wyoming Gray Wolf Management Plan explains that the State law's mandatory approach to issuance of lethal take permits requires that Wyoming's adaptive management framework limit other discretionary sources of mortality before it limits this source of mortality (WGFC 2012, p. 7). On the whole, the available information indicates that Wyoming's approach to lethal take permits may affect population abundance (particularly at a localized level where wolf–livestock conflict is high), but that Wyoming has instituted sufficient safeguards so that this source of mortality would not compromise the State's ability to maintain a population of at least 10 breeding pairs and at least 100 wolves in Wyoming outside of YNP and the Wind River Indian Reservation at the end of the calendar year.

Some other minor sources of human-caused mortality may also occur inside the Trophy Area. 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 has been exceedingly rare. We expect take from these sources will remain rare after 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 increased 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 regulations, and appropriate law enforcement and legal action will be taken. We do not expect illegal killing will increase after delisting.

Within portions of the Trophy Area under State jurisdiction, WGFD may also control wolves when it determines 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). As noted by several peer reviewers, it is scientifically challenging to conclusively demonstrate that predation is causing an ungulate population decline (or what portion of a decline is being caused by predation) because numerous factors typically interact to cause the impact (Atkins 2011, pp. 67, 85–86). While any decision to remove wolves in response to “unacceptable impacts” to ungulate populations could be a normative, values-driven determination (e.g., one party may view any impact as unacceptable, while others may have extremely high tolerance for impacts), we expect the agency will primarily base such decisions on ungulate herd health. Specifically, Wyoming’s wolf management plan indicates wolf control to address unacceptable impacts to wild ungulates will require 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 but 2 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).

Wyoming has not yet put forward any proposals to control wolves to address unacceptable impacts to ungulate herds, and we are not aware of any intentions to develop such proposals. While such proposals are possible, it is more likely Wyoming will consider ungulate herd health when designing hunting units and quotas. This approach will allow them to use hunting (which is a far cheaper management tool) to address any perceived issues. Both hunting and projects specifically to address unacceptable impacts to ungulate herds (should any occur) will be carefully regulated so that population objectives are not compromised and that recovery is maintained in Wyoming, the GYA, and across the NRM DPS.

WGFD may also take wolves that displace elk from State-operated feedgrounds in the Trophy Area if this movement by elk 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). While such authorizations may cause localized impacts, we do not expect population-level impacts in Wyoming, the GYA, or the NRM DPS. 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 nor will they compromise recovery in Wyoming, the GYA, or the NRM DPS.

In the predator area, wolves will experience unlimited human-caused mortality; 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), wolf packs are unlikely to persist in portions of Wyoming where they are designated 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 Trophy Area). 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 situation would inhibit natural genetic exchange. This issue is discussed in the Issues and Responses above and in "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 Area may periodically and temporarily travel 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, affecting 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 and that some wolves that primarily occupy the Trophy Area will be killed when traveling 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 removed current statutory mandates for aggressive management down to minimum levels. Furthermore, Wyoming has agreed to maintain a population of at least 10 breeding pairs and at least 100 wolves in areas under its jurisdiction. To accomplish this, Wyoming intends to maintain an adequate buffer above minimum population objectives to accommodate management flexibility and to ensure that uncontrollable sources of mortality do not drop the population below this minimum population level (WGFC 2011, p. 24). Collectively, the plan gives us confidence that unlimited 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 its approved wolf management plan (King 2007; 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 animal husbandry practices previously specified by the Tribes

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 National Parks units, 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. 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 (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 . . .” Those techniques include “destruction of animals by National Park Service personnel or their authorized agents.” This is important in YNP because the unusually high exposure that 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 that 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 management in Wyoming provides that human-caused mortality will not threaten the recovered status of the population. As discussed above, 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 and in 2011, more than 600 NRM wolves died each year from all sources of mortality (agency control including defense of property, regulated harvest, illegal and accidental killing, and natural causes), and the population showed little change (technically, slight increases in minimum population levels were documented each year) (Service *et al.* 2012, tables 4a, 4b). 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 (Service *et al.* 2012, Table 4; Smith *et al.* 2010, p. 620; also see Figure 3 above). Overall, wolf populations can maintain themselves despite human-caused mortality rates of 17 to 48 percent (Fuller *et al.* 2003, pp. 182–184 [22 percent +/- 8 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent]).

After delisting, most human-caused mortality in Wyoming will be similar to that which occurred under either the 1994 experimental population rules (now governing most of Wyoming) or the 2005 experimental population rules (as noted above, hunting is evaluated separately under Factor B above) (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 mortality 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 Trophy Area will be lost when they occasionally travel 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 mortality will be managed to assure the Wyoming population's recovered status is not compromised.

In summary, we find human-caused mortality, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf populations to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

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). As with other factors above, the below analysis focuses on wolves in Wyoming because only wolves in Wyoming remain listed, however, the conclusions of the previous delisting and the information supporting this determination are incorporated by reference. To the extent that management changes have taken place, they are discussed in the applicable Factor elsewhere in this rule as well as in the Issues and Response section above.

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). Since 2000, the wolf population in YNP ranged from 96 to 174 wolves, and between 6 to 16 breeding pairs. While some wolves and some wolf packs also occur in Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway, most of these wolves and wolf packs usually have a portion 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 units of the National Park System. 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 federal law and applicable laws of the State or States in which a park is located (National Park Service 2006, pp. 44, 103). 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 Federal delisting for wolves located within the park boundaries.

Although hunting is currently allowed for many other game species in the John D. Rockefeller, Jr. Memorial Parkway under the Parkway's enabling legislation and Wyoming law, the National Park Service has indicated a "strong preference that wolves not be hunted in the John D. Rockefeller, Jr. Memorial Parkway" (Frost and Wessels

2012). Wyoming's hunting regulations are clear that gray wolf hunting would not occur in the Parkway during the 2012 season, although nothing in Wyoming's regulations or the Wyoming's wolf management plan would preclude wolves from being hunted in the Parkway in subsequent years. Should hunting ever occur in the John D. Rockefeller, Jr. Memorial Parkway, it would likely be very limited, would be unlikely to noticeably affect wolf gene flow or connectivity, and it would be closely coordinated with the National Park Service.

Overall, natural sources of mortality (e.g., disease) will occasionally affect 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 3596), which was affirmed in 1922 (Executive Order 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 10,000 hectares (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 an adequate prey base for them (Service and National Park Service 2007, entire; Kallin 2011, pers. comm.; Smith 2007, pers. comm. as cited by WGFC 2011, p. 18; Kallin 2012b). Recreational wolf hunting and trapping is not currently authorized and is not anticipated, but could be considered in the future (Kallin 2012, 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 U.S. Forest Service lands. Thus, much like Grand Teton National Park, 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 Indian Reservation” (King 2007; 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 not 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).

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 Trophy Area: 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 Trophy Area: 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 affecting 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 Mortality" section of Factor C.

State Regulatory Mechanisms—Within portions of the Trophy Area under State jurisdiction, 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 Trophy Area 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, was 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 Trophy Area in its management plan. From October 15 through the end of February, the Trophy Area 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 by anyone 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), wolf packs are unlikely to survive in portions of Wyoming where they are designated 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 Mortality” section of Factor C above as well as the “Genetic Considerations” portion of Factor E below).

Within portions of the Trophy Area under State jurisdiction, 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 game and fish agency that has the demonstrated skills and experience to successfully manage a

diversity of resident species, including large carnivores. The WGFD and WGFC are well-qualified to manage a recovered wolf population. State management of wolves within the Trophy Area 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 Trophy Area, Wyoming statute (W.S. 23–1–304), regulations (chapter 21, section 4(a)(i)), and its management plan (WGFC 2011, p. 1) all require maintenance of at least 10 breeding pairs and at least 100 wolves. To ensure this target is not inadvertently compromised, Wyoming intends to maintain an adequate buffer above minimum population objectives (WGFC 2011, p. 24; WGFC 2012, pp. 3–5). 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 and all forms of regulated take will be limited in the unlikely event that wolves approach minimum recovery criteria. These will be reflected in all WGFD and WGFC planning and management decisions.

Wolves taken outside the framework established by State statute and WGFC regulations 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 conclude that these measures constitute adequate regulatory mechanisms to address the threat of illegal killing of wolves.

In 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 (specific harvest quotas are discussed in Factor B, and impacts on genetics are discussed in Factor E).

The Idaho Fish and Game Commission 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 Idaho Fish and Game Commission reclassified the species as a big game animal under the 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 (Idaho Legislative Wolf Oversight Committee 2002) and big game hunting regulations currently in place. The Idaho Wolf Conservation and Management Plan 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 Idaho Fish and Game Commission determines harvest quotas annually (specific harvest quotas are discussed in Factor B, and impacts on genetics are discussed in Factor E as well as in the Issues and Responses above).

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). This will include limiting human-caused mortality timing, intensity, and overall levels as necessary. Both Montana’s and Idaho’s 2009 and 2011 hunts consider and minimize impacts to natural connectivity. As a measure of last resort, if necessary, the States will implement agency-managed genetic exchange (moving individual wolves or their genes into the affected population segment) (Groen *et al.* 2008, entire; WGFC 2011, pp. 26–29, 52, 54). Genetics is discussed further under Factor E below as well as in the Issues and Responses above)

Overall, the regulatory frameworks of Wyoming, Montana, and Idaho are adequate and provide that potential remnant threats are sufficiently minimized. Should management needs be identified in future years, all three States have regulatory authority to modify management to meet such needs; although we did not rely upon this in making our decision, we recognized 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 (used 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).

Although gas cartridges are beginning the reregistration process, we do not expect the product will be approved for use on wolves.

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 is adequate to maintain recovered wolf populations and to prevent relisting. These regulations protect wolf populations (in the case of the National Park Service) or manage them adequately above population targets so that 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. Population reductions in Idaho and Montana are not expected to threaten the Wyoming, the GYA, or the NRM gray wolf population.

Additionally, agency capacity and past practice with wolves and other game species provide confidence that minimum management targets will always be met or exceeded. Finally, the threat of relisting provides additional certainty the objectives will not be compromised, although we did not rely on this fact in reaching our conclusion.

In summary, we find existing regulatory mechanisms adequate and conclude that this issue, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf populations to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

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. As with previous sections, this write-up focuses on Wyoming because this is the portion of the NRM DPS that remains listed; however, the conclusions of the previous delisting and the information supporting this determination are incorporated by reference and updated below as appropriate.

Public Attitudes Toward the Gray Wolf—Human attitudes toward wolves were the main reason the wolf was listed under the Act 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 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 have 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; Enck 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 Sjöström 2007, p. 610; Stronen *et al.* 2007, p. 1; Heberlein and Ericsson 2008, p. 391; Bruskotter *et al.* 2009, p. 119; Wilson and Bruskotter 2009, p. 353; 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.* 2009, p. 2; for additional references see Service 1994, appendix 3; 76 FR 81666, December 28, 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 have resulted in most Americans holding favorable attitudes toward wolves and wolf restoration (Williams *et al.* 2002; Atkins 2011, p. 71). These same societal shifts in

human attitudes have also 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 Ciucci 2010, pp. 19–21). Today, a majority of Americans view wolves favorably for a multitude of reasons, and many members of the public now consider it appropriate to reverse wolf extirpation, a perceived historic wrong (Houston *et al.* 2010, p. 27).

Despite the variety of opinions, there is little published research 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 1989; Williams *et al.* 2002; Ericsson *et al.* 2004; 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 frequently decrease as people experience, or think they might soon experience, living with wolves (Houston *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; Idaho Department of Fish and Game 2007; Houston *et al.* 2010; 76 FR 81666, December 28, 2011). Wolf conservation can be successful even in areas with relatively high human density, if management policies factor-in human concerns (Linnell *et al.* 2001, p. 345).

A 1994 Environmental Impact Statement's summary of human values surveys (Service 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 may have benefited attitudes toward wolves. Wyoming intends to continue such programs in the trophy game portions of the State (WGFC 2011, pp. 4, 31).

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 nonessential 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 within the Trophy Area. 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 after delisting.

Additionally, hunters' perceptions of wolves improve when opportunity for hunting is allowed (Idaho Department of Fish and Game 2007, pp. 51, 55–56, 64–65). Idaho Department of Fish and Game and Montana Fish, Wildlife and Parks biologists (Dickson 2010; Maurier 2010; Idaho Department of Fish and Game 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, known and documented 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 *et al.* 2010, Figure 3). Although the small sample size does not allow any firm conclusions, this example illustrates that local human tolerance of wolves is an important factor in long term wolf conservation. Keeping a large, recovered wolf population listed under the Act fuels negative attitudes rather than resolves 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 game and fish 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 historical 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 2009, pers. comm.; Furuholm 2011, pers. comm.).

We conclude that public tolerance of wolves will improve as wolves are delisted, local residents begin to play a role in managing wolf populations, and hunters start to see wolves as a trophy animal with value. This process has already begun in other delisted areas; however, it will likely take time for this increased control over the resource and the related sense of ownership to translate into tangible benefits in improved public opinion and less extreme rhetoric. Public acceptance is highest where wolves did not disappear 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 has the potential to be affected by the degree of human tolerance for wolves (Boitiani 2003, p. 317; Fritts *et al.* 2003, p. 289). We expect that State management will improve tolerance of wolves because 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 conclude that public attitudes are no longer a threat to wolves' recovered status 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 so that recovery is not compromised. Thus, we conclude that human attitudes are no longer a threat to the gray wolf population's recovered status 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.* 2010, pp. 4412, 4416–4421) and, thus, genetic diversity is not a wolf conservation issue anywhere 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 (Hebblewhite *et al.* 2010, p. 4384; vonHoldt *et al.* 2010, p. 4423). Genetic diversity has likely changed little since 2004. Below we analyze whether genetics will become a threat to wolves in Wyoming, the GYA, or the NRM region 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). 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.* In review, 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 and Allendorf 1996, entire; Wang 2004, entire; Mills 2007, p. 193). This level of gene flow allows for local evolutionary adaptation while minimizing negative effects of

genetic drift and inbreeding depression. While higher levels of genetic exchange may be beneficial (note the “at least” in the above standard), we conclude that a minimum of one effective migrant per generation is a reasonable and acceptable goal to avoid any degradation in the NRM DPS’s current levels of genetic diversity. 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.* In review, p. 23).

The GYA is the most isolated core recovery area within the NRM DPS (Oakleaf *et al.* 2006, 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 (Jimenez *et al.* In review, 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). This wolf did not breed because it dispersed before the 1995–1996 reintroductions and there were no other wolves present in the GYA. 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 several times the documented number of radio-collared wolves likely entered the GYA. On average, about 35 percent of dispersing wolves reproduce (Jimenez *et al.* In review, p. 12). Because a wolf generation is approximately 4 years, dispersal data indicate 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 into the GYA per generation since reintroduction, with a large portion of this dispersal occurring in recent years.

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 the 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). 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). These data demonstrate a minimum of 0.42 natural effective migrants entering the GYA per generation from 1995 to 2004 (Stahler 2011). 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). While additional analysis may be needed to determine how much of an underestimate this represents (Stahler 2011), 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 from 1992 to 2008 and genetic analysis from 1995 to 2004) indicate acceptable levels of effective migration occurred when the population was between 101 and 846 wolves and have likely been exceeded at higher population levels. However, numerous factors that contributed to these levels of gene flow while the species was listed will differ after delisting. For example, after delisting the population will no longer be growing, the population will likely go through a period 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 an exact predictor of future effective migration rates. Below we discuss factors likely to influence future effective migration after delisting.

A more detailed look at dispersal data, although reflective of the situation while wolves were 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 (greater than 10 percent of the radio-collared 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.* In review, pp. 9–12).

It should be noted that the above estimates could over- or under estimate actual percentages depending on various factors related to the representativeness of the available data. For example, the estimate that 10 percent of the wolf population disperses annually may be an underestimate of the real number because yearlings and 2-year-olds in some areas have a higher dispersal rate than older wolves (Adams *et al.* 2008, Table 4), but may be underrepresented in the radio-collared wolf sample (Jimenez *et al.* In review, p. 10). Mech and Boitani (2003, p. 170) summarized North American wolf studies that suggested lone dispersing wolves comprised 10 to 15 percent of wolf populations in winter. Adams *et al.* (2008, Table 4) estimated dispersal rates for yearlings, 2-year-olds, and older Alaskan wolves as being 61 percent, 35 percent, and 11 percent, respectively; Adams suggested a dispersal rate around 30 percent may be more likely for NRM wolves given our data's bias toward older adults (Atkins 2011, p. 56; Jimenez *et al.* In review, p. 10). Furthermore, 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 affect these variables and affect 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. Because most wolves disperse in winter, they tended to travel through low-elevation valleys where wild prey concentrations were highest due to lower snow depths. To date, the high density and reproductive output of wolves in YNP have created a unidirectional flow of effective dispersers leaving but not entering the Park's wolf population (note, we have few data regarding whether wolves traveled through 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. This does not mean wolves were precluded from traveling through the park. Long term, we expect that, at lower YNP population densities, wolves from outside YNP will be increasingly successful at dispersing into and through YNP.

Population levels across the NRM DPS could affect natural rates of gene flow. For example, because a small portion of wolves disperse annually (perhaps between 10 and 30 percent (Adams *et al.* 2008, Table 4; Atkins 2011, p. 56; Jimenez *et al.* In review)), an Idaho wolf population of 350 to 550 wolves long term (a range that is

realistic long term) will produce many more dispersers than a population closer to minimum recovery targets. While the wolf population will probably be reduced after delisting, all three States in the NRM region 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 provide that relisting does not occur. 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, conclude that State management of population levels alone is unlikely to reduce the overall rate of natural dispersal enough to threaten adequate levels of effective migration.

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 after delisting due to hunting, more liberal defense of property allowances (than under previous experimental population rules), and, in Wyoming, control of wolves on State-managed elk feeding grounds and some impacts to dispersers in the predator area of the State.

As noted above, wolves can maintain themselves despite human-caused mortality rates of 17 to 48 percent (Fuller *et al.* 2003, pp. 182–184 [22 percent +/- 8 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent]). Because States intend to initially reduce wolf populations and ultimately maintain level wolf populations in balance with prey populations and reduce livestock conflicts, 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 at a sustainable level over the long term.

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 (late winter through early fall). Long term, across Montana, Idaho, and Wyoming, most hunting-related mortality will occur from October to December when big game seasons are scheduled and most big game hunters are in the field. In 2009 in Montana, 78 percent of harvested wolves were opportunistically harvested by hunters who were primarily hunting elk, deer, or both (Montana Fish, Wildlife and Parks 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 (Montana Fish, Wildlife and Parks 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 quotas. The 2009 hunting season was not extended in any areas important for dispersal. In 2011, Idaho's wolf hunting season ran through March for most units, but

ends December 31st for those areas thought important for dispersal (i.e., the Beaverhead and Island Park units) (Idaho Fish and Game Commission 2011, entire). During the 2012–2013 hunting season, these units will remain open until January 31st. Closing hunting in these units earlier than other units is 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). While increased human-caused mortality, particularly hunting and trapping, is expected to continue across much of the NRM DPS in the coming years as States pursue population reductions, we expect the need for such long seasons will dwindle once desired reductions are achieved. Other sources of human-caused mortality, such as State control of problem wolves, is limited to recent depredation events, which are uncommon during peak dispersal periods.

The State of Wyoming has indicated that its 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 hunting plan each year that will take into consideration, but will not be limited to, the following: 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 unlimited; 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, roaming dispersers will be less prone to removal than resident packs, whose locations and ranges are easily detected.

In total, wolves will be protected or managed as game animals year-round in about 38,500 km² (15,000 mi²) (15.2 percent of Wyoming) in northwestern Wyoming, including YNP, Grand Teton National Park, John D. Rockefeller, Jr. 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 Trophy Area incorporates nearly all of Wyoming's current wolf packs and includes the vast majority of the State's suitable habitat. Additionally, the Trophy Area 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 Area will be expanded by approximately 3,300 km² (1,300 mi²) (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 Trophy Area, 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 Trophy Area, 3 within the seasonal Trophy Area, and 9 within the permanent predator area. These areas attract and frequently hold dispersing wolves. Many dispersing wolves in Wyoming, and several established packs, include elk feed grounds as part of their winter home range. As noted above, within the predator area, take would occur without limit. Within the Trophy Area, WGFD may take wolves that displace elk from feeding grounds in the Trophy Area 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).

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. Processes 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, Bureau of Land Management, U.S. Geological Survey, and the 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 Lands Linkage Wildlife 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.

Wyoming’s gray wolf management regulations indicate the State is committed to managing gray wolves in Wyoming so that genetic diversity and connectivity issues do not threaten the population (chapter 21, section 4(a)(ii)). These regulations state that this commitment would be accomplished by encouraging effective migrants into the population in accordance with the Wyoming Gray Wolf Management Plan (chapter 21, section 4(a)(ii)). The Addendum to the Wyoming Gray Wolf Management Plan indicates the WGFD would strive for a minimum genetic target of ~1 effective migrant per generation (WGFC 2012, pp. 6–7). Wyoming, in coordination with Montana and Idaho, has agreed to collect genetic samples continuously, and test the samples every 3 to 5 years to search for dispersers and their offspring as well as to detect losses in

heterozygosity and changes in allele frequency (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 this minimum target is not achieved, the WGFD would first consider changes to the monitoring program, if the increased monitoring is likely to overcome the failure to document the desired level of gene flow (WGFC 2012, p. 6).

If the WGFD determines increased monitoring is unlikely to document adequate levels of genetic interchange, or it determines that sufficient interchange is not occurring regardless of monitoring efforts, it would alter management, including reducing mortality quotas in dispersal corridors or reducing total mortality quotas over a series of years to increase the probability that migrants into the population survive and reproduce (WGFC 2012, pp. 6–7). 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 affecting 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). Translocation of wolves between subpopulations would only be used as a stopgap measure, if necessary to increase genetic interchange (WGFC 2012, p. 7). All of the above efforts would be coordinated with Montana and Idaho (WGFC 2012, p. 7).

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 healthy buffer above this minimum population level. The wolf population in YNP has ranged from 96 to 174 wolves since 2000. However, the YNP wolf population appears to be declining toward a long term equilibrium around the lower end of this range (Service *et al.* 2000–2012, Table 2; Smith 2012). 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.* 2003–2012, 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 was 43 wolves, and 39 wolves were actually taken, which appears to have allowed the population in this area to grow (by about 18 percent). 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.* 2003–2012, 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, but the quota for this unit was not reached because only 10 wolves were taken (Idaho Fish and Game Commission 2011, entire). Collectively, these data suggest a long term average of around 300 wolves in the GYA, including sizable populations in YNP, other portions of Wyoming, and portions of the GYA in Montana and Idaho.

In summary, the GYA wolf population will not be threatened by lower genetic diversity in the foreseeable future. A number of biological factors support this conclusion including 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 because 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 not 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 Trophy Area, 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.* 2012, Table 4, Figure 1). We believe this source of mortality will remain rare into the foreseeable future.

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 areas like the predator area, widespread poisoning is unlikely in the foreseeable future because as these types of highly toxic and dangerous poisons would have to be legally registered and widely available. Overall, this potential threat is strictly theoretical in nature and is unlikely to ever again threaten this wolf population.

Climate Change—Our analyses under the Endangered Species Act include consideration of ongoing and projected changes in climate. The terms “climate” and “climate change” are defined by the Intergovernmental Panel on Climate Change (IPCC). The term “climate” refers to the mean and variability of different types of weather

conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007a, p. 78). The term “climate change” thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007a, p. 78).

Scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has been faster since the 1950s. Examples include warming of the global climate system, and substantial increases in precipitation in some regions of the world and decreases in other regions. For these and other examples, see IPCC 2007a (p. 30) and Solomon *et al.* 2007 (pp. 35–54, 82–85). Results of scientific analyses presented by the IPCC show that most of the observed increase in global average temperature since the mid-20th century cannot be explained by natural variability in climate, and is “very likely” (defined by the IPCC as 90 percent or higher probability) due to the observed increase in greenhouse gas (GHG) concentrations in the atmosphere as a result of human activities, particularly carbon dioxide emissions from use of fossil fuels (IPCC 2007a, pp. 5–6 and figures SPM.3 and SPM.4; Solomon *et al.* 2007, pp. 21–35). Further confirmation of the role of GHGs comes from analyses by Huber and Knutti (2011, p. 4), who concluded it is extremely likely that approximately 75 percent of global warming since 1950 has been caused by human activities.

Scientists use a variety of climate models, which include consideration of natural processes and variability, as well as various scenarios of potential levels and timing of GHG emissions, to evaluate the causes of changes already observed and to project future changes in temperature and other climate conditions (e.g., Meehl *et al.* 2007, entire; Ganguly *et al.* 2009, pp. 11555, 15558; Prinn *et al.* 2011, pp. 527, 529). All combinations of models and emissions scenarios yield very similar projections of increases in the most common measure of climate change, average global surface temperature (commonly known as global warming), until about 2030. Although projections of the magnitude and rate of warming differ after about 2030, the overall trajectory of all the projections is one of increased global warming through the end of this century, even for the projections based on scenarios that assume that GHG emissions will stabilize or decline. Thus, there is strong scientific support for projections that warming will continue through the 21st century, and that the magnitude and rate of change will be influenced substantially by the extent of GHG emissions (IPCC 2007a, pp. 44–45; Meehl *et al.* 2007, pp. 760–764, 797–811; Ganguly *et al.* 2009, pp. 15555–15558; Prinn *et al.* 2011, pp. 527, 529). (See IPCC 2007b, p. 8, for a summary of other global projections of climate-related changes, such as frequency of heat waves and changes in precipitation. Also see IPCC 2011(entire) for a summary of observations and projections of extreme climate events.)

Various changes in climate may have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with

other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). Identifying likely effects often involves aspects of climate change vulnerability analysis.

Vulnerability refers to the degree to which a species (or system) is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the type, magnitude, and rate of climate change and variation to which a species is exposed, its sensitivity, and its adaptive capacity (IPCC 2007a, p. 89; see also Glick *et al.* 2011, pp. 19–22). There is no single method for conducting such analyses that applies to all situations (Glick *et al.* 2011, p. 3). We use our expert judgment and appropriate analytical approaches to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

The 20th 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, 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. Next to humans, wolves 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 historical wolf distribution in North America. Because historical 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. It would be virtually impossible that environmental, habitat, or prey species changes due to the environmental effects of climate change could significantly affect such an adaptable, resilient, and generalist predator.

Environmental or habitat changes resulting from changing climatic conditions have the potential to affect wolf prey. Declining moose populations in the southern GYA may result from climate change and declining habitat quality, a conclusion that has been

reached in other parts of the southern range of moose in North America (Murray *et al.* 2006, p. 25; Becker 2008, entire; Becker *et al.* 2010, p. 151). 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.* In Press). However, the extent and rate to which most ungulate populations will be affected 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, which included extensive wildfire suppression efforts, promoted heightened potential for a large fire event. The 1988 fires, the largest wildfires 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 were not meaningfully adversely affected. 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. 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. 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 agree and do conclude that such an event is not 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 affect 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, the Wyoming, or the NRM gray wolf populations.

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 the GYA, the Wyoming, or the NRM gray wolf populations.

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 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 GYA, the Wyoming, or the NRM gray wolf populations.

Impacts to Wolf Pack Social Structure as a Result of Human-Caused Mortality—

When human-caused mortality rates are low, packs often contain a wider spread of individuals across age classes. Such larger complex pack structures are most common in National Parks and large, remote wilderness areas. These types of social structures will continue in protected areas like YNP after wolves are delisted. While intense harvest in immediately adjoining areas can alter natural social structure of kin-based groups (e.g., increase adoption of unrelated individuals into packs) in the protected areas (Rutledge *et al.* 2010, entire), as explained in the “Commercial or Recreational Uses” section of Factor B above, harvest levels have been limited in adjoining areas where such impacts are most

likely to be an issue and are likely to continue to be regulated in this manner. This approach is expected to minimize such impacts in YNP.

Regardless, only approximately 20 percent of the region's wolf population currently lives primarily in National Parks or Wilderness areas. Therefore, wolves in most 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, their ability to reproduce, or their ability to produce dispersers (Brainerd *et al.* 2008, p. 89; Jimenez *et al.* In review, 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 smaller wolf pack size and different 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, if adequately regulated (as will occur in the NRM region), is a significant concern for wolf conservation.

Since 1987, we have removed more than 1,700 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 human-caused mortality will likely increase after delisting, 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 (Boitani 2003, pp. 322–323). The Wyoming wolf population will be managed so that human-caused mortality will not threaten the population.

Overall, we conclude that other natural or manmade factors, singularly or in combination with other threats, will not cause the Wyoming, the GYA, or the NRM gray wolf population to be “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

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., recovered and is no longer endangered or threatened) applies for wolves in Wyoming.

Wolves in Wyoming, the GYA, and across the NRM DPS are recovered. All prongs of the recovery criteria are satisfied. The numerical, distributional, and temporal

components of the overarching recovery goal have been exceeded for 10 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 minimum management targets every year since at least 2004. Each of the recovery areas (which were originally used to measure progress toward 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.* 2012, Table 4). Finally, the available evidence demonstrates the NRM gray wolf population is functioning as a metapopulation with gene flow between subpopulations. Thus, we conclude that the population has recovered.

Before we can delist we must also 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 an “endangered species” if it is in danger of extinction throughout all or a significant portion of its range and is a “threatened species” if it is likely to become an endangered species 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 an “endangered species” or a “threatened species” under the Act.

As long as populations are maintained above minimal recovery levels, wolf biology (namely the species' reproductive potential) and the availability of secure blocks of suitable habitat will maintain 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 that these areas will maintain their suitability well into the foreseeable future. While disease and parasites can temporarily cause localized population impacts, 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 [Factor B] as well as other sources of human-caused mortality [Factor C]) 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 and in 2011, more than 600 NRM wolves died each year from all sources of mortality (agency control including defense of property, regulated harvest, illegal and accidental killing, and natural causes), and the population showed little change (technically, slight increases in minimum population levels were documented each year) (Service *et al.* 2012, tables 4a, 4b). Similarly, 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 (Service *et al.* 2012, Table 4; Smith *et al.* 2010, p. 620; also see Figure 3 above). Overall, wolf populations can maintain themselves despite human-caused mortality rates of 17 to 48 percent (Fuller *et al.* 2003, pp. 182–184 [22 percent +/- 8 percent]; Adams *et al.* 2008 [29 percent]; Creel and Rotella 2010 [22 percent]; Sparkman *et al.* 2011 [25 percent]; Gude *et al.* 2011 [48 percent]; Vucetich and Carroll In review [17 percent]). Furthermore, wolf populations have been shown to increase rapidly if mortality is reduced after severe declines (Fuller *et al.* 2003, pp. 181–183; Service *et al.* 2012, 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, sport hunting,

and direct agency control. 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 recovery goal calls for a three-part metapopulation of at least 30 breeding pairs and at least 300 wolves equitably distributed among 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 outside of YNP and the Wind River Indian Reservation. All sources of mortality will be considered in management decisions so that 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, the minimum recovery goal for the State of Wyoming will be exceeded in areas outside YNP and the Wind River Indian Reservation, 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 Wyoming's minimum management targets will not be compromised.

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 approach for Wyoming that recognizes this fact, but still holds the State to the same commitment 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 minimum management targets employed in Montana and Idaho (i.e., population targets 50 percent above minimum recovery levels). From 2000 to the end of 2011 (the most recent official wolf population estimates available), the wolf population in YNP ranged from 96 to 174 wolves, and between 6 to 16 breeding pairs. However, recent population levels may be higher than the long term carrying capacity of YNP; the park predicts its wolf numbers may decline further and settle into a lower equilibrium (Smith 2012). Specifically, YNP biologists estimate that the park will have between 50 to 100 wolves and 5 to 10 packs with 4 to 6 of these packs meeting the breeding pair definition annually (Smith 2012). Regardless, YNP will represent a core refugium that contains a substantial number of overwintering wild ungulates and few livestock with low levels of human-caused wolf mortality. These factors guarantee that the area will remain a secure stronghold for the Wyoming wolf population. Thus, YNP

will always provide a 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 managed as game animals year-round or protected in about 38,500 km² (15,000 mi²) in the northwestern portion of the State (15.2 percent of Wyoming), including YNP, Grand Teton National Park, John D. Rockefeller, Jr. Memorial Parkway, adjacent U.S. Forest Service-designated Wilderness Areas, adjacent public and private lands, the National Elk Refuge, and most of the Wind River Indian Reservation (Lickfett 2012). 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 used in the 1994 Environmental Impact Statement (areas analyzed as potentially being impacted by wolf recovery in the GYA) (Service 1994, Figure 1.1); the entire home range for 24 of 27 breeding pairs (88 percent), 40 of 48 packs (83 percent), and 282 of 328 individual wolves (86 percent) in the State at the end of 2011 (Service *et al.* 2012, Tables 2, 4, Figure 3; Jimenez 2012 a; Jimenez 2012, pers. comm.); and approximately 81 percent of the State's suitable habitat (including over 81 percent of the high-quality habitat (greater

than 80 percent chance of supporting wolves) and over 62 percent of the medium-high-quality habitat (50 to 79 percent chance of supporting wolves) (Oakleaf 2011; Mead 2012a)). 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 and we do not expect it to become one in the foreseeable future. While the GYA is the most isolated core recovery area within the NRM DPS, genetic and dispersal data demonstrate that minimal acceptable levels of genetic exchange between all NRM subpopulations were met or exceeded while the species was listed. While State management will almost certainly reduce genetic exchange rates from recent levels (which appear to exceed minimal acceptable levels of genetic exchange), we find it extremely unlikely that it will be reduced to the point that the GYA wolf population will be threatened by lower genetic diversity in the foreseeable future. Overall, the best scientific and commercial information available indicates that this issue is unlikely to undermine the Wyoming, the GYA, or the NRM gray wolf population's recovered status and that this issue, singularly or in combination with other factors, is unlikely to cause the population to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

We considered all potential threats individually and cumulatively, 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 wolves in Wyoming, the GYA, and the NRM DPS are recovered, likely to remain recovered, and unlikely to again become threatened with extinction within the foreseeable future. Thus, in accordance with 50 CFR 424.11(d), we are delisting 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).

Significant Portion of the Range Analysis

Having determined that gray wolf in Wyoming does not meet the definition of endangered or threatened throughout its range, we must next consider whether there are any significant portions of its range that are in danger of extinction or likely to become endangered. The Act defines “endangered species” as any species which is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species which is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The definition of “species” is also relevant to this discussion. The Act defines the term “species” as follows: “The term ‘species’ includes any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature.” The phrase “significant portion of its range” (SPR) is not defined by the statute, and we have not addressed it in our regulations including: (1) The consequences

of a determination that a species is either endangered or likely to become so throughout a significant portion of its range, but not throughout all of its range; or (2) what qualifies a portion of a range as “significant.”

Two recent district court decisions have addressed whether the SPR language allows the Service to list or protect less than all members of a defined “species”: *Defenders of Wildlife v. Salazar*, 729 F. Supp. 2d 1207 (D. Mont. 2010), concerning the Service’s delisting of the NRM gray wolf (74 FR 15123, Apr. 12, 2009); and *WildEarth Guardians v. Salazar*, 2010 U.S. Dist. LEXIS 105253 (D. Ariz. Sept. 30, 2010), concerning the Service’s 2008 finding on a petition to list the Gunnison’s prairie dog (73 FR 6660, Feb. 5, 2008). The Service had asserted in both of these determinations that it had authority, in effect, to protect only some members of a “species,” as defined by the Act (i.e., species, subspecies, or DPS), under the Act. Both courts ruled that the determinations were arbitrary and capricious on the grounds that this approach violated the plain and unambiguous language of the Act. The courts concluded that reading the SPR language to allow protecting only a portion of a species’ range is inconsistent with the Act’s definition of “species.” The courts concluded that once a determination is made that a species (i.e., species, subspecies, or DPS) meets the definition of “endangered species” or “threatened species,” it must be placed on the list in its entirety and the Act’s protections applied to all members of that species (subject to modification of protections through special rules under sections 4(d) and 10(j) of the Act).

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

We conclude, for the purposes of this finding, that interpreting the SPR phrase as providing an independent basis for listing is the best interpretation of the Act because it is consistent with the purposes and the plain meaning of the key definitions of the Act; it does not conflict with established past agency practice (i.e., prior to the 2007 Solicitor’s Opinion), because no consistent, long term agency practice has been established; and it is consistent with the judicial opinions that have most closely examined this issue. Having concluded that the phrase “significant portion of its range” provides an independent basis for listing and protecting the entire species, we next turn to the meaning of “significant” to determine the threshold for when such an independent basis for listing exists.

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

We evaluate biological significance based on the principles of conservation biology using the concepts of redundancy, resiliency, and representation. Resiliency describes the characteristics of a species that allow it to recover from periodic disturbance. Redundancy (having multiple populations distributed across the landscape) may be needed to provide a margin of safety for the species to withstand catastrophic events. Representation (the range of variation found in a species) ensures that the species' adaptive capabilities are conserved. Redundancy, resiliency, and representation are not independent of each other, and some characteristic of a species or area may contribute to all three. For example, distribution across a wide variety of habitats is an indicator of representation, but it may also indicate a broad geographic distribution contributing to redundancy (decreasing the chance that any one event affects the entire species) and the likelihood that some habitat types are less susceptible to certain threats,

contributing to resiliency (the ability of the species to recover from disturbance). None of these concepts is intended to be mutually exclusive, and a portion of a species' range may be determined to be "significant" due to its contributions under any one of these concepts.

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

We recognize that this definition of "significant" establishes a threshold that is relatively high. On the one hand, given that the consequences of finding a species to be endangered or threatened in an SPR would be listing the species throughout its entire range, it is important to use a threshold for "significant" that is robust. It would not be meaningful or appropriate to establish a very low threshold whereby a portion of the range can be considered "significant" even if only a negligible increase in extinction risk would result from its loss. Because nearly any portion of a species' range can be said to contribute some increment to a species' viability, use of such a low threshold would

require us to impose restrictions and expend conservation resources disproportionately to conservation benefit. Listing would be rangewide, even if only a portion of the range of minor conservation importance to the species is imperiled. On the other hand, it would be inappropriate to establish a threshold for “significant” that is too high. This would be the case if the standard were, for example, that a portion of the range can be considered “significant” only if threats in that portion result in the entire species being currently endangered or threatened. Such a high bar would not give the SPR phrase independent meaning, as the Ninth Circuit held in *Defenders of Wildlife v. Norton*, 258 F.3d 1136 (9th Cir. 2001).

The definition of “significant” used in this finding carefully balances these concerns. By setting a relatively high threshold, we minimize the degree to which restrictions will be imposed or resources expended that do not contribute substantially to species’ conservation. But we have not set the threshold so high that the phrase “in a significant portion of its range” loses independent meaning. Specifically, we have not set the threshold as high as it was under the interpretation presented by the Service in the *Defenders* litigation. Under that interpretation, the portion of the range would have to be so important that current imperilment there would mean that the species would be currently imperiled everywhere. Under the definition of “significant” used in this finding, the portion of the range need not rise to such an exceptionally high level of biological significance. (We recognize that if the species is imperiled in a portion that rises to that level of biological significance, then we should conclude that the species is in fact imperiled throughout all of its range, and that we would not need to rely on the SPR

language for such a listing.) Rather, under this interpretation we ask whether the species would be endangered everywhere without that portion, i.e., if that portion were completely extirpated. In other words, the portion of the range need not be so important that even being in danger of extinction in that portion would be sufficient to cause the remainder of the range to be endangered; rather, the complete extirpation (in a hypothetical future) of the species in that portion would be required to cause the remainder of the range to be endangered.

The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that have no reasonable potential to be significant and threatened or endangered. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that: (1) The portions may be “significant,” and (2) the species may be in danger of extinction there or likely to become so within the foreseeable future. Depending on the biology of the species, its range, and the threats it faces, it might be more efficient for us to address the significance question first or the status question first. Thus, if we determine that a portion of the range is not “significant,” we do not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we do not need to determine if that portion is “significant.” In practice, a key part of the portion status analysis is whether the threats are geographically concentrated in some way. If the threats to the species are essentially uniform throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to

portions of the species' range that clearly would not meet the biologically based definition of "significant," such portions will not warrant further consideration.

In this case, we have already determined wolves are not threatened or endangered in areas including protected and game portions of the State. Therefore, this analysis only evaluates whether the portions of Wyoming where wolves are treated as predators constitute a threatened or endangered significant portion of the range of wolves in Wyoming, the GYA, or the NRM DPS.

When analyzing the significance of the predator area to wolf conservation, it is important to understand the role, or lack thereof, that the predator area plays in the conservation of the species. Wyoming's predator area was not envisioned to meaningfully contribute to wolf recovery in the region (in fact, the predator area contains zero percent of the original recovery zone) as it has very little suitable habitat (~19 percent of the State's suitable habitat). Today, even with the protections of the Act, very few wolves, packs, and breeding pairs occupy the predator area (3 of 27 breeding pairs, 8 of 48 packs, and 46 of 328 individual wolves in Wyoming at the end of 2011). If all of the wolves, packs, and breeding pairs that occupy the predator area were extirpated, the remainder of the Wyoming, the GYA, or the NRM wolf population would not become endangered. This determination is based on our conclusion that the protected and game portions of the State are of sufficient size and contain enough suitable habitat to support and maintain a recovered wolf population in Wyoming over the long term, given the expected management strategy for this area, without any survival in the predator area.

While some wolves that primarily occupy the Trophy Area will be killed when traveling into the predator area, total mortality from such events is expected to be minimal, would not compromise the population's recovered status, and would not cause the remainder of the range to become endangered. Furthermore, while wolf mortality in the predator area could affect successful migration between subpopulations, such mortality: (1) Is expected to be opportunistic and minimal, and (2) is not expected to affect genetic factors to the point that it could cause the remainder of the range to become endangered. In short, even if no wolves survived in, or successfully traversed, the predator area, the NRM DPS as well as wolves in Wyoming and the GYA would not become endangered. All of these issues are discussed in more detail above.

Based on this information and analysis, we conclude that the predator portion of Wyoming does not represent "a significant portion of range."

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 treat 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 minimum number of 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 minimum population size, approximate composition, and minimum distribution. This level of wildlife monitoring is intensive and provides relatively accurate minimum estimates of wolf population distribution and structure (Service *et al.* 2012, Table 1-4, Figure 1-4). The Service Annual Reports have documented all aspects of the wolf

management program including staffing and funding, legal issues, population monitoring, livestock conflicts, control to reduce livestock and pet damage, research (predator–prey interactions, livestock/wolf conflict prevention, disease and health monitoring, publications, etc.) and public outreach.

In Wyoming after delisting, the WGFD, the National Park Service, the Service, and the Shoshone and Arapahoe Tribal Fish and Game Department will each monitor wolf populations in areas under their respective jurisdiction and share information as appropriate. These agencies will monitor breeding pairs and total number of wolves in Wyoming in order to document their minimum number, distribution, reproduction, and mortality. 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, but may modify these techniques through time as new knowledge becomes available and as the parties responsible for monitoring gain additional experience at wolf management and conservation. Information from these partners 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.* 1989–2012, entire).

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 the annual State wolf reports on our website (<http://www.fws.gov/mountain-prairie/species/mammals/wolf/>) by around April 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 minimum 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 or 100 wolves in Wyoming statewide (including YNP and the Wind River Indian Reservation) at the end of any 1 year;
- (2) If the wolf population segment in Wyoming 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.

As discussed above in Issue and Response #49, we will also conduct a status review if the above standards are routinely not achieved—an outcome we do not anticipate.

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 at least 100 wolves, the status review would focus on factors affecting wolves in YNP and the Wind River Indian Reservation. Adaptive management strategies may be recommended in this review.

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 Rule

Once effective, this rule will 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, once effective, this rule will 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). We are making this rule effective less than 30 days after the date of publication. As stated above, this rule removes protective regulations pertaining to gray wolves in Wyoming. Therefore, this rule is “a substantive rule which... relieves a restriction.” As set forth in 5 U.S.C. 553(d)(1), such a rule may be made effective less than 30 days after its publication date.

Required Determinations

Paperwork Reduction Act

The OMB regulations at 5 CFR 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 described under the Post-Delisting Monitoring section above, gray wolves in Wyoming will be monitored by WGFD, 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 National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This issue is also addressed further in Issue and Response 5 above.

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 the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have coordinated with the affected Tribes on this rule and earlier related rules including offers to consult with Native American Tribes and Native American organizations in order to both (1) provide them with a complete understanding

of the changes, and (2) to understand their concerns with those changes. If requested, we will conduct additional consultations with Native American Tribes and multi-tribal organizations subsequent to this final rule in order to facilitate the transition to State and tribal management of 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.

Regulation Promulgation

Accordingly, we hereby amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, 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 removing the entry for “Wolf, gray [Northern Rocky Mountain DPS]” under MAMMALS in the List of Endangered and Threatened Wildlife.

§ 17.84 [Amended]

3. Amend § 17.84 by removing and reserving paragraphs (i) and (n).

Dated: August 22, 2012

Daniel M. Ashe

Director, U.S. Fish and Wildlife Service

Billing Code 4310-55

[FR Doc. 2012-21988 Filed 08/31/2012 at 4:15 pm; Publication Date: 09/10/2012]