Grizzly Bear
(Ursus arctos horribilis)

5-Year Review:
Summary and Evaluation

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U.S. Fish and Wildlife Service
Grizzly Bear Recovery Office
Missoula, Montana

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5-YEAR REVIEW
Grizzly bear (*Ursus arctos horribilis)*

1. GENERAL INFORMATION

1.1 Purpose of 5-Year Reviews

The U.S. Fish and Wildlife Service (FWS) is required by Section 4(c)(2) of the Endangered Species Act (ESA) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since the time it was listed or since the most recent 5-year review. Based on the outcome of the 5-year review, we recommend whether the species should: 1) be removed from the list of endangered and threatened species; 2) be changed in status from endangered to threatened; 3) be changed in status from threatened to endangered; or 4) remain unchanged in its current status. Our original decision to list a species as endangered or threatened is based on the five threat factors described in Section 4(a)(1) of the ESA. These same five factors are considered in any subsequent reclassification or delisting decisions. In the 5-year review, we consider the best available scientific and commercial data on the species, and we review new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process that includes public review and comment.

1.2 Reviewers

Lead Regional Office: Mountain-Prairie Regional Office
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Lead Field Office: Missoula Montana Grizzly Bear Recovery Office
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Cooperating Field Offices:
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Cooperating Regional Office: Pacific Regional Office
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1.3 Methodology Used to Complete the Review

The Federal Register (FR) notice initiating this review was published on April 18, 2007 (72 FR 19549). This notice opened a 60-day request for information period, which closed on June 18, 2007. We received four comments from four different conservation organizations. We considered these comments in detail and they are reflected in this status review. This review was led by Chris Servheen, Grizzly Bear Recovery Coordinator for the FWS with input from Montana Fish, Wildlife and Parks (MFWP); Montana Department of Natural Resources and Conservation (MDNRC); Idaho Department of Fish and Game (IDFG); Wyoming Game and Fish Department (WGFD); Washington Department of Fish and Wildlife (WDFW); National Park Service (NPS); U.S. Forest Service (USFS); U.S. Geological Survey; Bureau of Land Management; U.S. Department of Agriculture (USDA)-Wildlife Services; British Columbia (B.C.) Ministry of Environment, Lands and Parks; the Blackfeet Tribe; the Confederated Salish and Kootenai Tribes; the Nez Perce Tribe; Idaho Department of Lands; Washington Department of Natural Resources; and the Lincoln Montana County Commissioners. We relied upon peer reviewed literature when possible and supplemented these data with research and monitoring reports produced by the FWS and our partner agencies. The GIS analyses were conducted by relevant National Forests to determine habitat conditions.

1.4 Background

1.4.1 FR Notice Announcing Initiation of this Review

72 FR 19459, April 18, 2007

1.4.2 Listing History

Original Listing under the Endangered Species Preservation Act
FR Notice: 32 FR 4001, March 11, 1967
Entity listed: Grizzly Bear (*Ursus arctos horribilis*)
Classification: Endangered

Original Listing under the Endangered Species Act
FR Notice: 40 FR 31734, July 28, 1975
Entity listed: *Ursus arctos horribilis* in the lower 48 States
Classification: Threatened

Revisions to the Listing
FR Notice: 72 FR 14866, March 29, 2007
75 FR 14496, March 26, 2010
Action: Designating the Greater Yellowstone Population of Grizzly Bears as a Distinct Population Segment (DPS) and Removing the Yellowstone DPS of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife (hereafter referred to as the Yellowstone Final Rule; see Appendix A). The action retained the threatened status for remaining lower 48 State grizzly bears. This action was challenged in Greater Yellowstone Coalition v. Servheen,

07-CV-134-DWM (D. Mt.). On September 21, 2009, the Federal District Court in Missoula issued an order which enjoined and vacated the Yellowstone Final Rule. The United States (U.S.) is appealing this decision. The Final Rule and delisting action also are being challenged in two additional court cases currently pending in Federal District Court in Boise, Idaho.

1.4.3 Associated Rulemakings

Special 4(d) Rule Governing Take
FR Notices: 40 FR 31734, July 28, 1975
50 FR 35086, August 29, 1985
51 FR 33753, September 23, 1986
57 FR 37478, August 19, 1992
Action: Under Section 4(d) of the ESA, the Secretary may extend to a threatened species those protections provided to an endangered species as deemed necessary and advisable to provide for the conservation of the species. When the grizzly bear was listed as threatened in 1975, we issued a special rule applying all of the ESA's prohibitions except for: 1) self-defense or defense of others; 2) removal of nuisance bears; and 3) scientific research activities not resulting in death or permanent injury. This rule also provides reporting requirements for any of the aforementioned circumstances while prohibiting the possession, import, or export of grizzly bears and their parts with certain exceptions for zoological institutions. Until 1992, this special 4(d) rule included a provision allowing a controlled grizzly bear hunt in certain parts of the Northern Continental Divide Ecosystem (NCDE). This provision was removed in 1992 following an adverse court ruling. This type of take is no longer allowed.

Critical Habitat
FR Notice: No final rules issued.
Action: In 1976, we proposed to designate critical habitat for the grizzly bear (41 FR 48757, November 5, 1976). This designation was made stale by the 1978 critical habitat amendments to the ESA including the requirement to perform an economic analysis. This proposal was never finalized. Recognizing the importance of habitat to the species, instead, the Interagency Grizzly Bear Committee (IGBC) issued habitat management guidelines (hereafter referred to as the Guidelines) within all occupied grizzly bear habitat (USFS 1986).

Non-Essential Experimental Population Designation
FR Notice: 65 FR 69623, November 17, 2000
Action: Establishment of a Nonessential Experimental Population of Grizzly Bears in the Bitterroot Area of Idaho and Montana. Note that on June 22, 2001, we issued a proposed rule to remove this regulation (66 FR 33620). However, this regulation remains in effect as the 2001 proposed rule was never finalized.

1.4.4 Review History

Since the original listing of the grizzly bear, the FWS has initiated three 5-year reviews (46 FR 14652, February 27, 1981; 52 FR 25523, July 7, 1987; 56 FR 56882, November 6, 1991). None of these past 5-year reviews produced detailed status summaries and none proposed or changed the status of the grizzly bear listing.

Between 1986 and 2007, we received and reviewed 10 petitions requesting a change in status for individual grizzly bear populations (51 FR 16363, May 2, 1986; 55 FR 32103, August 7, 1990; 56 FR 33892, July 24, 1991; 57 FR 14372, April 20, 1992; 58 FR 8250, February 12, 1993; 58 FR 38552, July 19, 1993; 58 FR 43856, August 18, 1993; 58 FR 43857, August 18, 1993; 59 FR 46611, September 9, 1994; 64 FR 26725, May 17, 1999; 72 FR 14866, March 29, 2007; 72 FR 14866, March 29, 2007). Through this process, we determined the Cabinet-Yaak Ecosystem (CYE), Selkirk Ecosystem (SE), and NCDE warrant endangered status. These uplistings remain precluded by higher priority listing actions (63 FR 30453, June 4, 1998; 64 FR 57534, October 25, 1999; 66 FR 54808, October 30, 2001; 67 FR 40657, June 13, 2002; 69 FR 24876, May 4, 2004; 70 FR 24870, May 11, 2005; 71 FR 53756, September 12, 2006; 72 FR 69034, December 6, 2007; 73 FR 75176, December 10, 2008; 74 FR 57804, November 9, 2009; 75 FR 69221, November 10, 2010).

The FWS also reviewed the species' status in our 1982 Recovery Plan (FWS 1982), our 1993 revision to the Recovery Plan (FWS 1993) and supplemental chapters in later years (FWS 1996, 1997, 2007a, 2007b).

1.4.5 Species' Recovery Priority Number at Start of 5-year Review:

At the start of this 5-year review, the Recovery Priority Number for grizzly bears in the lower 48 States was 3C. This number indicates that this DPS faces a high degree of threat, has a high recovery potential, and is in conflict with construction, development, or other forms of economic activity.

Degree of Threat	Recovery Potential	Taxonomy	Priority	Conflict
High	**High**	Monotypic Genus	1	1C
		Species	2	2C
		Subspecies/DPS	3	**3C**
	Low	Monotypic Genus	4	4C
		Species	5	5C
		Subspecies/DPS	6	6C
Moderate	High	Monotypic Genus	7	7C
		Species	8	8C
		Subspecies/DPS	9	9C
	Low	Monotypic Genus	10	10C
		Species	11	11C
		Subspecies/DPS	12	12C
Low	High	Monotypic Genus	13	13C
		Species	14	14C
		Subspecies/DPS	15	15C
	Low	Monotypic Genus	16	16C
		Species	17	17C
		Subspecies/DPS	18	18C

The above ranking system for determining Recovery Priority Numbers was established in 1983 (48 FR 43098, September 21, 1983 as corrected in 48 FR 51985, November 15, 1983).

1.4.6 Recovery Plan

Name of plan: Grizzly Bear Recovery Plan
Date first approved: January 29, 1982
Date of revision: September 10, 1993
Dates of supplements: September 11, 1996; June 23, 1997; March 13, 2007

2. REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment Policy

2.1.1 Overview of the DPS Policy Relative to Lower 48 State Listing

The grizzly bear was listed in the lower 48 States on July 28, 1975 (40 FR 31734). This determination predated the 1978 amendments replacing the ability to list "populations" with the ability to list "Distinct Population Segments." To interpret and implement the 1978 DPS provision of the ESA and congressional guidance, the FWS and the National Marine Fisheries Service published a policy regarding the recognition of distinct vertebrate population segments under the ESA (61 FR 4722, February 7, 1996). Below we conduct an analysis to confirm that the 1975 listing complies with subsequent changes to the statute and FWS policy.

Pursuant to the ESA, we shall consider for listing or delisting any species, subspecies, or, for vertebrates, any DPS of these taxa. Under our DPS policy, the FWS considers two factors to determine if a population segment meets the definition of a DPS—1) discreteness of the population segment in relation to the remainder of the taxon, and 2) the significance of the population segment to the taxon to which it belongs. If a population meets both tests, it meets the definition of a DPS.

2.1.2 Analysis of Discreteness

Under our Policy Regarding the Recognition of Distinct Vertebrate Population Segments, a population segment of a vertebrate taxon may be considered discrete if it satisfies either one of the following conditions: 1) is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence of this separation); or 2) is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of Section 4(a)(1)(D) of the ESA.

Differences Among U.S. and Canadian Grizzly Bear Populations – While there is no evidence of marked biological separation between grizzly bear populations across the international boundary between the lower 48 States and Canada, the DPS policy allows us to use international borders to delineate the boundaries of a DPS if there are differences in control of exploitation, habitat management, conservation status, or regulatory mechanisms between the countries. The current lower 48 State listing is discrete from Canadian populations of *Ursus arctos horribilis* as delineated by the U.S./Canadian international boundary with significant differences in control of exploitation, management of habitat, conservation status, and regulatory mechanisms.

Regarding exploitation, unlike in the lower 48 States, Canada has legal hunting seasons for grizzly bears throughout most of their Canadian range except in Alberta and select hunting districts in B.C. Regarding habitat management, unlike the U.S., there is no Federal or national land management agency or process to implement access management standards or any other habitat protections. Grizzly bear habitats in Canada outside of National and Provincial Parks have no uniform habitat protections in place for grizzlies. Regarding conservation status, unlike in the lower 48 States, Canada still possesses relatively large, contiguous, and robust populations of grizzly bears. Approximately 27,000 grizzly bears occur in Canada (Ross 2002), where suitable habitat is abundant. While grizzlies in Canada are listed as a species of "special concern" under the Canadian Species at Risk Act (SRA), this designation is given to any species that is particularly sensitive to human activities and is not directly related to current threat levels or extinction risk. The SRA requires a management plan to be written for any species of special concern, but does not provide a regulatory framework, habitat protections, or mortality control for species of special concern. In contrast, U.S. Federal protection under the ESA with intensive management, regulatory oversight, regulation of take, and habitat considerations is necessary to recover the grizzly in the lower 48 States. This need for intensive monitoring, habitat management, control of exploitation, and regulatory oversight is necessary currently and will likely remain into the foreseeable future, even if grizzly bears in the lower 48 States were removed from the Federal List of Endangered and Threatened Wildlife.

Conclusion – We conclude, based on our analysis of the best available scientific information, that the lower 48-State grizzly bear listing satisfies the DPS policy's requirement that populations be discrete in relation to the remainder of the taxon. Specifically, it remains appropriate to continue to use the U.S./Canadian border as the northern boundary of the lower 48-State DPS given differences in regulatory mechanisms, exploitation, habitat management, and conservation status between the two countries. No additional discrete boundaries must be justified to verify the current lower 48 State listing.

2.1.3 Analysis for Significance

If we determine a population segment is discrete, we next consider available scientific evidence of its significance to the taxon to which it belongs. Our DPS policy states that this consideration may include, but is not limited to, the following factors: 1) persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; 2) evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon; 3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; or 4) evidence that the discrete population segment differs markedly from other populations of the species in its

genetic characteristics. Only one of these factors needs to be met in order to satisfy the DPS policy's requirement for significance. Below we analyze the first, second and fourth factors. The third factor does not apply to this entity.

Unusual or Unique Ecological Setting – The lower 48 State listing covers a large and diverse area. Most occupied areas within the lower 48 States are not unique for the taxon. For example, salmon eating grizzly bears are found within the North Cascades Ecosystem (NCASC) and coastal ecosystems further north in Canada and Alaska. Similarly, inland montane ecosystems like the SE, CYE, and NCDE are similar to the ecological setting found along the Canadian Rockies further north.

However, the Greater Yellowstone Area Ecosystem (GYA), contained within the lower 48 State listing, does represent an unusual and unique ecological setting for the taxon. This area is unusual and unique in that grizzly bears in this area have greater access to large-bodied ungulates such as bison (*Bison bison*), elk (*Cervus elaphus*), and moose (*Alces alces*), and less access to fall berries than any other interior North American, European, or Asian grizzly bear populations (Stroganov 1969; Mattson et al. 1991a; Jacoby et al. 1999; Schwartz et al. 2003b). Although grizzly bears are successful omnivores, grizzlies in the rest of the conterminous States (Jacoby et al. 1999), most of Europe (Berducou et al. 1983; Clevenger et al. 1992; Dahle et al. 1998), and Siberia (Stroganov 1969) rely on plant and insect materials for the majority of their diet. In contrast, grizzlies in the GYA rely on terrestrial mammals as their primary source of nutrition, as indicated by bear scat (Mattson 1997), feed site analysis (Mattson 1997), and bear hair isotope analysis (Jacoby et al. 1999). Concentration of isotopic nitrogen (15N) in grizzly bear hair from Yellowstone grizzly bears suggests that meat constitutes 45 percent and 79 percent of the annual diet for females and males, respectively (Jacoby et al. 1999). These high percentages of meat in Yellowstone grizzly bears' diet are in contrast to the 0 to 33 percent of meat in the diet of bears in the NCDE and 0 to 17 percent of meat in the diet of bears from the Cabinet-Yaak Ecosystem (Jacoby et al. 1999). Furthermore, the source of this animal meat is primarily large-bodied ungulates, not fish, as in other populations of brown bears in Alaska and Siberia (Stroganov 1969; Hilderbrand et al. 1996). Of particular relevance is the Yellowstone grizzly bears' use of wild bison, a species endemic to North America, but eradicated in most of the lower 48 States except the GYA by the end of the 19th century (Steelquist 1998). Mattson (1997) found that wild bison comprised the second largest source of ungulate meat (24 percent) consumed by Yellowstone grizzly bears, second only to elk (53 percent). The Yellowstone grizzly population also exists in a unique ecological setting because it is able to use whitebark pine seeds as a major food source (Felicetti et al. 2003; Kendall and Keane 2001; Mattson 1997; Mattson and Reinhart 1994). Whitebark pine, a tree species found only in North America (Schmidt 1994), exhibits annual variation in seed crops, with high seed production in some years and very low seed production in other years (Weaver and Forcella 1986; Morgan and Bunting 1992). During years of high seed production, Yellowstone grizzly bears derive as much as 51

percent of their protein from pine nuts (Felicetti et al. 2003). In fact, grizzly bear consumption of ungulates decreases during years of high whitebark pine seed production (Mattson 1997). In most areas of North America where whitebark pine distribution overlaps with grizzly bear populations, bears do not consistently use this potential food source (Mattson and Reinhart 1994). Although several berry-producing shrubs occur in the area, these are relatively limited by climatic factors and most grizzly bears in the GYA do not rely on berries as a significant portion of their diets. A complete analysis of this issue is available in the Yellowstone Final Rule (72 FR 14866 , March 29, 2007).

Thus, while most occupied areas within this area are not unique, the lower 48 State entity contains at least 1 area that represents an unusual and unique ecological setting for the taxon.

Significant Gap in the Range of the Taxon – Grizzly bears once lived throughout the North American west from Alaska and Canada, and south into central Mexico (FIGURE 1). Grizzly bears have been extirpated from most of the southern portions of their historic range. Given the grizzly bear's historic occupancy of the conterminous States and the portion of the historic range the conterminous States represent, recovery in portions of the lower 48 States has long been viewed as important to the taxon (40 FR 31734–31736, July 28, 1975). The loss of these grizzly bears would substantially curtail the range of the taxon. Such a loss would retract the subspecies range by moving it approximately 6 degrees of latitude north (approximately 560 kilometers (km) / 350 miles (mi)) while eliminating the roughly 12.5 degrees of longitude (approximately 970 km / 600 mi) grizzly populations currently occupy in the lower 48 States. This large area, at the southern extent of the subspecies' range, is biologically important to the taxon as it meaningfully enhances the subspecies' representation, resiliency, and redundancy.

Resiliency allows a species to recover from periodic disturbance and environmental variation. A species is more resilient if large populations exist in high-quality habitat that is distributed throughout the range of the species in such a way as to capture the environmental variability found within the range of the species. In terms of resiliency, the lower 48 States contain 5 large blocks of high-quality habitat where grizzly bears persist. The wide geographic area over which grizzlies in the lower 48 States exist would distribute the impacts of any environmental disturbance or stochastic event and, therefore, increase the resiliency of grizzly bears in all of North America. For example, grizzlies in the lower 48 States would be less vulnerable to a wildfire or a disease outbreak that originated in northern B.C. Additionally, with stark declines of grizzly bears in the lower 48 States from 1850-1975, the fact that remnant populations exist in these ecosystems today demonstrates that these areas serve as refugia against human-caused mortality. For this reason and the wide geographic area over which the lower 48 States would distribute a disturbance event and thus allow grizzlies to recover from periodic disturbance, grizzlies in the lower 48 States contribute to the resiliency of the subspecies.

Redundancy of populations may be needed to provide a margin of safety for the species to withstand catastrophic events. The idea is to conserve enough areas of the range such that random perturbations in the system act on only a few populations. In terms of redundancy, we view the lower 48 States as important because it ensures there are additional (i.e., redundant) populations outside of the large, contiguous populations in Canada and Alaska. Collectively, the multiple grizzly bear populations and habitat units provide a margin of safety to withstand catastrophic events and, thus, meaningfully contribute to the redundancy of grizzly bears in North America.

Representation ensures that the species' adaptive capabilities are conserved. A substantial contribution to representation comes from populations that are markedly genetically divergent. In terms of representation, the SE and the GYA populations in the lower 48 States are genetically divergent from nearby adjacent populations, as evidenced by lower heterozygosity values (Proctor et al. in press). Additionally, the NCASC, SE, CYE, and GYA populations are all peripheral populations. Peripheral populations are often genetically divergent from central populations (Lesica and Allendorf 1995; Hampe and Petit 2005) and warrant special conservation consideration to preserve the full spectrum of genetic material found across a species' range and thus conserve full evolutionary potential. Thus, genetic data indicate that the lower 48 States could play a role in conserving the adaptive capabilities of grizzlies in North America and, thus, contributes to their representation.

Given the above, we continue to conclude that the loss of this population would result in a significant gap in the current range of the taxon (*Ursus arctos horribilis*).

Marked Genetic Differences – Levels of genetic differences vary across the lower 48 State listing ($0.54 \leq$ observed heterozygosity (H_o) ≤ 0.68). The most substantial genetic differences are in the SE and GYA which have the lowest relative genetic diversity of any continental grizzly populations, 0.54 and 0.57 respectively (Proctor et al. in press). Only Kodiak Island grizzly bears, a different subspecies (*Ursus arctos middendorfi*), have lower values (0.298), reflecting as much as 12,000 years of separation from mainland populations (Paetkau et al. 1998; Waits et al. 1998b). Miller and Waits (2003) concluded that gene flow between the GYA and the closest remaining population was limited prior to the arrival of European settlers but could only speculate as to the reasons behind this historical separation. In contrast, the SE most likely experienced a rapid decline in genetic diversity due to a very small population size in the 1970s (see section 2.3.1.1).

While the NCDE and CYE[1] each contain different heterozygosity scores, their values are similar to those found in each ecosystem's adjacent, contiguous Canadian grizzly bear populations. Furthermore, these genetic differences do not appear to have translated into detectable biological, physiological, morphological, or behavioral differences.

[1] The North Cascades population has not been included in a genetic analysis to date due to its limited size and the resulting difficulty in obtaining samples.

In conclusion, while some lower 48 State populations do not show marked genetic differences, others in the lower 48 State listing (i.e., the GYA and SE) do display marked genetic differences.

Conclusion – We conclude, based on our analysis of the best available scientific information, that the lower 48-State grizzly bear listing represents an area and population which is significant in relation to the remainder of the taxon. Specifically, the loss of this population would result in a significant gap in the range of the taxon. Furthermore, the lower 48 State listing contains 1 population (i.e., the GYA) which exists in a unique ecological setting for the taxon and 2 populations with marked genetic differences. Thus, the lower 48 State grizzly bear listing satisfies the DPS policy's requirement for significance.

2.1.4 DPS Policy Analysis Conclusion Relative to Current Lower 48 State Listing

Based on the best scientific and commercial data available, as described above, we find that the lower 48 State listing is discrete from other grizzly populations and significant to the remainder of the taxon (i.e., *Ursus arctos horribilis*). Because the lower 48 State grizzly bear population is discrete and significant, it warrants recognition as a DPS under the ESA.

2.1.5 Potential Future Application of the DPS Policy

Prior to the development of the DPS policy, we envisioned recovering and delisting individual ecosystems (FWS 1993, pp. 16, 33). There are six grizzly bear recovery zones associated with these ecosystems but only five are occupied (i.e., subpopulations). FIGURE 1 illustrates these ecosystems and their relative location within the lower 48 State listing. The six recovery zones are:

(1) The GYA in northwest Wyoming, eastern Idaho, and southwest Montana (24,000 square kilometers (sq km) (9,200 square miles (sq mi)) has nearly 600 bears in 2008 (Haroldson 2009). It is approximately 386 km (240 mi) from the BE and at least 120 km (75 mi) from populations in the NCDE.

(2) The NCDE of north central Montana (25,000 sq km / 9,600 sq mi) had 765 bears in 2004 (Kendall et al. 2009). It is approximately 72 km (45 mi) from the BE and 24 km (15 mi) from the CYE.

(3) The NCASC of north central Washington (25,000 sq km / 9,500 sq mi) is estimated to contain less than 20 bears (Almack et al. 1993). The nearest population of grizzly bears is immediately north in Canada with an estimated 23 individuals, but populations to the east and west of the Cascades in Canada are considered extirpated (North Cascades Grizzly Bear Recovery Team (North Cascades GBRT) 2004).

(4) The SE of north Idaho, northeast Washington, and southeast B.C. [2] (5,700 sq km / 2,200 sq mi) has approximately 80 bears total, found on both sides of the border (Proctor et al. in press). It is approximately 24 km (15 mi) from the CYE.

(5) The CYE of northwest Montana and northern Idaho (6,700 sq km / 2,600 sq mi) has approximately 40 bears (Kasworm and Manley 1988; Kasworm et al. 2010). It is roughly 60 km (37 mi) from the BE.

(6) The **BE** of east-central Idaho and western Montana (14,500 sq km / 5,600 sq mi) does not contain a grizzly bear population at this time (FWS 1996; 65 FR 69624, November 17, 2000; FWS 2000).

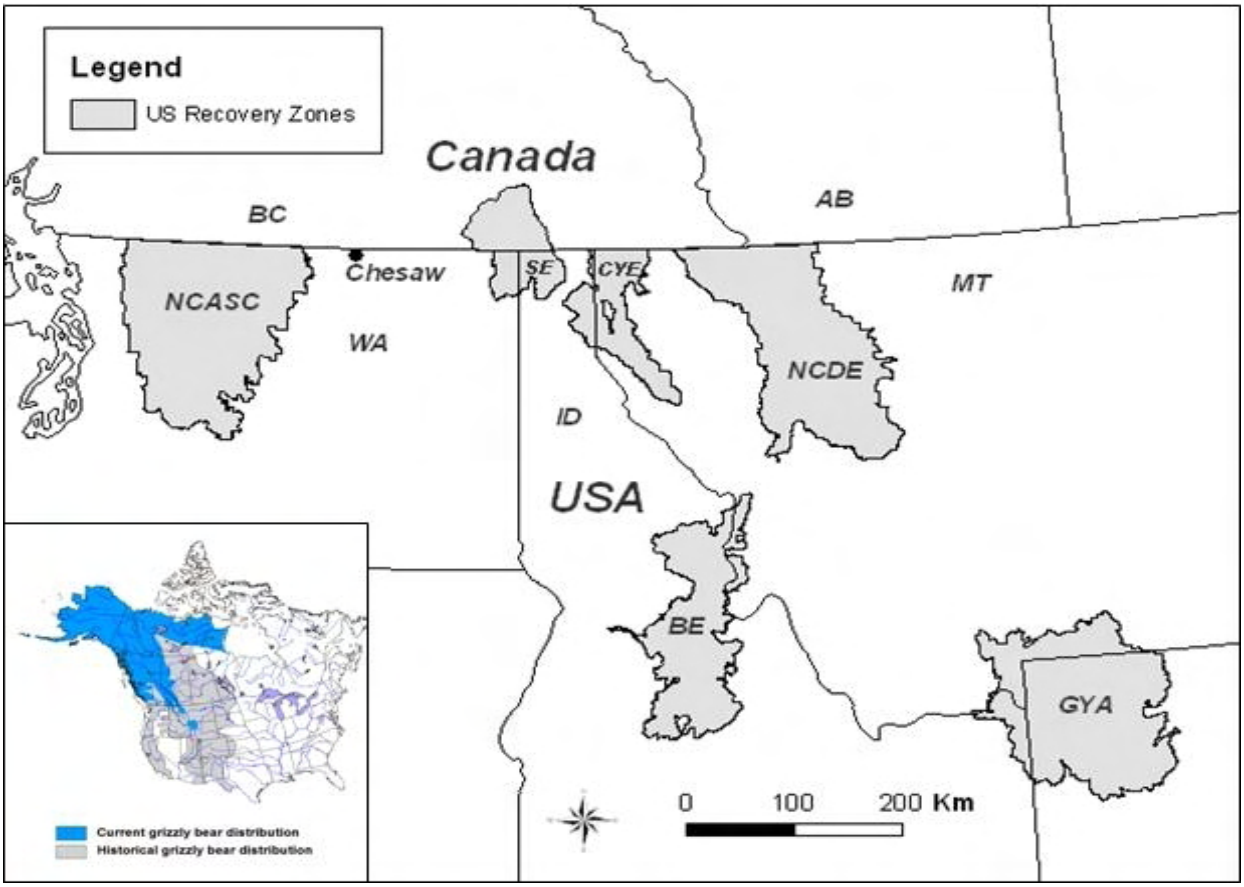


FIGURE 1. Current grizzly bear recovery ecosystems inset map illustrates historic (grey shade) and current grizzly bear distribution (dark blue). Adapted from Proctor et al. (in press).

[2] The 1993 Recovery Plan defined a portion of the SE recovery zone within Canada so that it was at least 5,180 sq km (2,000 sq mi) in size. This size would promote the Recovery Plan's goal of establishing a population of 100 grizzly bears in the SE (FWS 1993) based on the known grizzly bear density in the GYA at the time of 1 bear per 50 sq km (20 sq mi) (Blanchard and Knight 1980).

Under current policy, each ecosystem must qualify as a DPS in order for us to list or delist individually. To date, we have only revised the listing once to recognize a DPS within the lower 48 State listing. In March 2007, we determined that the GYA grizzly bear population met the definition of a DPS (72 FR 14866, March 29, 2007). On September 21, 2009, other parts of this action were overturned by the Federal Court in the District of Montana (Greater Yellowstone Coalition v. Servheen et al., CV 07-134-M-DWM), vacating the entire determination, including this designation of a DPS. This decision is being appealed as of 2011.

While we believe there is sufficient evidence to support multiple DPSs within the current lower 48 State listing, we are not currently recommending a formal revision to the listing to recognize these potential DPSs. For the time being, further subdivision of the lower 48 State listing is unnecessary. This decision will be re-evaluated as populations near the point where a rulemaking is considered (e.g., when recovery is achieved and delisting is considered; or when listing funds become available to address those populations that are warranted-but-precluded for endangered status).

Our eventual application of the DPS policy within the lower 48 listing would not alter our long-term goal of achieving connectivity and managing grizzly bear populations in the northern Rockies as subpopulations of a metapopulation (FWS 1993; IGBC 2001). To date, we have not documented natural movements by females between any of the recovery ecosystems in the lower 48 States, although efforts are underway to improve connectivity between ecosystems. Because the DPS Policy does not require complete separation of one DPS from another, such movement would not necessarily undermine the discreteness of potential DPSs. The DPS policy only requires that populations be "markedly separated" from each other. Thus, if occasional individual grizzly bears move between populations, the population could still display the required level of discreteness per the DPS Policy. Discreteness, relative to the DPS policy's markedly separate standard, will be evaluated in future rulemakings.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes, the species has a final approved recovery plan (FWS 1993). However, many criteria are not measurable criteria pertaining to specific threats, but instead are goals that provide a benchmark for measuring progress toward recovery.

2.2.2 Adequacy of Recovery Criteria

Except for the GYA, the recovery plan and the associated recovery criteria have not been updated since the plan was released in 1993 and supplemented in 1996 and 1997 with chapters for the BE and NCASC, respectively. Thus, the plan no longer reflects the best available and most up-to-date information on the biology

of the species and its habitat. We are now in the process of updating the recovery plan. Despite some outdated information, the species' status relative to these criteria are discussed below so as to show each recovery unit's relative progress toward recovery.

2.2.3 Recovery Criteria From the 1993 Recovery Plan and Status of Each

The 1993 Grizzly Bear Recovery Plan provides three broad goals to reach recovery in each of the grizzly bear ecosystems: 1) achieve the demographic recovery criteria for that ecosystem; 2) develop threshold habitat values necessary to support a viable population; and 3) develop and complete an interagency conservation strategy to ensure adequate regulatory mechanisms will continue after delisting (FWS 1993). The recovery plan provides specific recovery criteria and action items for each recovery zone. Below, we have listed measurable recovery criteria and broad goals/action items as outlined in the current plan with information about how each has or has not been met provided in ***italics***.

Demographic Recovery Criteria

The FWS is in the process of updating the demographic recovery criteria in the 1993 Recovery Plan because new science and techniques are available. This task has been completed for the GYA grizzly bear population (FWS 2007a) and adherence to the revised criteria is reported below. For all other ecosystems, we describe the 1993 demographic criteria and the mortality data in recent years for each ecosystem.

The following demographic recovery criteria were developed to address overutilization and human-caused mortality (Factors B and C) within each recovery zone and a surrounding 10-mile buffer by ensuring a sufficient population size and distribution. These demographic recovery criteria include measures for population size, distribution, and sustainable mortality:

(1) For the GYA, the 1993 demographic recovery criteria were revised to reflect the best available science and appended to the 1993 Recovery Plan on March 6, 2007 (FWS 2007a). Mortalities are now counted throughout the ecosystem instead of just within the recovery zone and a 10-mile buffer. For a complete explanation of these changes, please refer to 72 FR 14866 (March 29, 2007, pp. 14871-14873, Appendix A) and references therein. The revised demographic recovery criteria in the GYA include: 1) maintenance of a total population of at least 500, as indicated by the model averaged $Chao_2$ estimate (Keating et al. 2002) of at least 48 females with cubs-of-the-year which cannot drop below 48 for 2 consecutive years; 2) occupancy of 16 of 18 Bear Management Units (BMUs) by females with young and no adjacent units may be unoccupied during the same 6-year period; 3) the total mortality limit for independent females may not exceed 9% for 2 consecutive years; 4) the total mortality limits for independent males may not exceed 15% for 3 consecutive years; 5) the human-caused mortality limit for dependent young may not exceed 9% for 3 consecutive years.

STATUS: ***In the GYA, demographic criterion 1 has been achieved. The model averaged $Chao_2$ estimate has not dropped below 48 since the revised criteria became effective in 2007 (Haroldson 2008, 2009, 2010). The distribution criterion (demographic criterion 2) has been met since 1999 (Podruzny 2004; 2009; Haroldson 2010). Demographic criteria 3, 4, and 5 have been met since 2007. For independent females (>2 years old), the mortality limit was exceeded in 2008 but not in 2007, 2009, or 2010 (Haroldson and Frey 2008, 2009; Haroldson 2010, 2011). For independent males (>2 years old), the mortality limit was exceeded in 2008 and 2010 but not in 2007 or 2009 (Haroldson and Frey 2008, 2009; Haroldson 2010, 2011). For dependent young, the mortality limit has not been exceeded in any year (Haroldson and Frey 2008, 2009; Haroldson 2010, 2011).***

(2) For the NCDE recovery zone, the 1993 demographic criteria are: 1) 10 females with cubs inside Glacier National Park and 12 females with cubs outside Glacier National Park over a running 6-year average both inside the recovery zone and within a 10-mile area immediately surrounding the recovery zone, excluding Canada; 2) 21 of 23 BMUs occupied by females with young from a running 6-year sum of verified sightings and evidence, with no 2 adjacent BMUs unoccupied; and 3a) known human-caused mortality should not exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs and 3b) human-caused mortality of females should not exceed 1.2% of the population estimate for a given year. These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. Furthermore, recovery cannot be achieved without occupancy in the Mission Mountains portion of this ecosystem.

STATUS: ***The FWS is in the process of updating the demographic recovery criteria for the NCDE because new science and techniques are available. Since this update is in progress we are no longer measuring the recovery criteria in the 1993 Recovery Plan as they will be superseded by the revised criteria. Sightability of females with young has always been a challenge in this heavily forested ecosystem. Because of this challenge, we have not been recording the number of females with cubs in the NCDE or their distribution since 2004 when an extensive population estimation effort was undertaken. We continue to keep detailed records for all grizzly bear mortalities.***

For the most recent data recorded in the NCDE (1999-2004), the first population criterion of 22 females with cubs had not been met. For the 6-year average from 1999-2004, there were 21.8 females with cubs with 9.2 inside Glacier National Park and 12.7 outside the Glacier National Park (Dood et al. 2006). The second demographic criterion regarding distribution had been met with 22 of 23 BMUs occupied from 1999-2004, including occupancy in the Mission Mountains (Dood et al. 2006). The mortality criteria have not been met. Allowable, annual human-caused

mortality for the period from 1999-2004 was calculated to be 12 (4% of the minimum population size) but the 6-year average of grizzly bear mortalities that occurred during this time was 20 (Dood et al. 2006). Similarly, the allowable, annual human-caused female mortality limit was 3.6 individuals (1.2% of the minimum population size), but the actual 6-year average of females dying each year during this time period was 9.0 (Dood et al. 2006). In summary, the mortality limits for total human-caused mortality were exceeded from 2001-2004 and the mortality limits for female mortality were exceeded every year from 1997-2004.

Since 2004, we have continued to monitor grizzly bear mortality in the NCDE. Between 2005 and 2008, there were 70 (2005=25; 2006=14; 2007=20; 2008=11) known human-caused grizzly bear mortalities, or an average of 17.5 per year. We have no estimate of <u>minimum</u> population size because we no longer document females with cubs so we do not know what the allowable, annual human-caused mortality would have been for 2005-2009. However, an extensive DNA-based population estimate conducted in 2004 estimated a <u>total</u> population size of 765 (Kendall et al. 2009), which is at least twice the most recent minimum population estimate made using sightings of females with cubs. Additionally, Mace and Roberts (2011) estimated the NCDE grizzly bear population was increasing at a rate of 3% per year between 2004 and 2009. Therefore, the total population size and the positive, increasing trend indicate that human-caused mortality in this ecosystem has been low enough (i.e., sustainable) to allow population growth.

(3) For the CYE, the 1993 demographic criteria are: 1) 6 females with cubs over a running 6-year average inside the recovery zone or within 10 miles of its boundaries, excluding Canada; 2) 18 of 22 BMUs occupied by females with young from a running 6-year sum of verified sightings and evidence; and 3) known human-caused mortality not to exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, human-caused mortality of females should not exceed 1.2% of the population estimate for a given year. These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. Presently, grizzly bear numbers are so small in this ecosystem that the goal for mortality is 0 human-caused mortalities.

<u>STATUS</u>: In the CYE, none of the 1993 demographic recovery criteria have been met. The population goal of 6 females with cubs has not been met. In 2008, the 6-year running average was 2.0 females with cubs. The distribution criterion has not been met with only 12 of 22 BMUs occupied by females with young. Demographic criteria for 0 mortality also have not been met. In 2008, the running 6-year average of total human-caused mortality was 0.8 animals per year including 0.5 female each year. The FWS is in the process of updating the 1993 Recovery Plan because new science and techniques are available.

(4) For the SE, the 1993 demographic criteria are: 1) 6 females with cubs over a running 6-year average both inside the recovery zone and within a 10-mile area immediately surrounding the recovery zone, *including* Canada; 2) 7 of 10 BMUs on the U.S. side occupied by females with young from a running 6-year sum of verified sightings and evidence; and 3) known human-caused mortality not to exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30% of this 4% mortality limit shall be females. These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. Presently, grizzly bear numbers are so small in this ecosystem that the mortality goal is 0 human-caused mortalities.

***STATUS:** In the SE, none of the 1993 demographic recovery criteria have been met. The population goal of 6 females with cubs has not been met. In 2008, the 6-year running average was 0.5 female with cubs (Wakkinen et al. 2009). The distribution criterion has not been met with only 4 of 10 BMUs occupied by females with young (Wakkinen et al. 2009). Demographic criteria for 0 mortality also have not been met. Although there was only 1 mortality of a male grizzly bear in 2008, the running 6-year average of total human-caused mortality was 2.5 animals per year including 1.2 females each year (Wakkinen et al. 2009). The FWS is in the process of updating the 1993 Recovery Plan as there are new science and techniques available.*

(5) In 1996, the FWS supplemented the 1993 Recovery Plan with specific recovery criteria for the BE (FWS 1996). This supplement recommended 5 management actions to work toward recovery and included a sub-goal of having 14 females with cubs over a running 6-year average (FWS 1996). A distribution criterion was not established but was to be determined at a future date (FWS 1996). The sub-goal for human-caused mortality was set at 0 until a population of at least 90 grizzly bears is established, after which human-caused mortality is not to exceed 4% of the minimum population estimate, with no more than 30% of this 4% to be females (FWS 1996).

***STATUS:** In the BE, none of these demographic criteria have been met. There is not a grizzly bear population in this ecosystem and no bears have moved into the area and survived, although 1 male grizzly bear was killed by a black bear hunter in the northern portion of the BE Experimental Population Area in 2007 (for more information, see section 2.3.1.2).*

(6) In 1997, the FWS supplemented the 1993 Recovery plan with specific recovery criteria for the NCASC (FWS 1997). This supplement listed five "priority recovery actions" for the North Cascades (FWS 1997) but did not establish specific demographic criteria for numbers of females with young, BMUs occupied, or sustainable levels of human-caused mortality due to a lack of information for the ecosystem (FWS 1997). The supplement established a desired goal of 0 for human-caused mortalities (FWS 1997).

<u>STATUS</u>: In the NCASC, there have been 0 grizzly bear mortalities. However, we are not meeting recovery goals in the NCASC and we do not have a verified grizzly population on the U.S. side at this time, although there was a confirmed sighting of a lone grizzly bear (sex unknown) for the first time since 1996 in September 2010 (Zimmer 2011) (for more information, see section 2.3.1.2).

The 1993 Grizzly Bear Recovery Plan also identified sources of indirect mortality caused by poor habitat management which should be modified to address Factor A (Present or threatened destruction, modification or curtailment of its habitat or range).

Habitat Recovery Criteria: To address Factor A, we work with the major public land management agencies in each ecosystem to develop threshold habitat values necessary to support a viable population in that ecosystem. On public lands, these efforts address secure habitat, road densities, human developed sites, livestock allotments, and conflict prevention. On private lands, efforts are focused on preventing conflicts so that private lands do not become unsustainable mortality sinks for each population.

<u>STATUS</u>: The status of these efforts in each ecosystem is discussed below under section 2.3.2.1 Present or Threatened Destruction, Modification or Curtailment of its Habitat or Range.

Regulatory Mechanisms: To address Factor D (The inadequacy of existing regulatory mechanisms), the 1993 Recovery Plan states that recovery in each ecosystem will be achieved by meeting the above demographic criteria and by " … demonstrating the existence of adequate regulatory mechanisms for population and habitat management through the development of a conservation strategy for each ecosystem" (FWS 1993).

<u>STATUS</u>: To date, a conservation strategy has not been developed for any of the grizzly bear ecosystems in the lower 48 States outside of the Yellowstone DPS boundaries.

In 1996, the FWS supplemented the 1993 Recovery Plan with specific recovery actions for the BE (FWS 1996). These actions were: 1) upon completion of an Environmental Impact Statement (EIS), publish a Proposed Rule to designate grizzly bears reintroduced into the BE as a nonessential experimental population, solicit public comments, and publish a final rule; 2) initiate a public information program designed to inform the public on grizzly bear recovery efforts; 3) develop a schedule for implementation of appropriate management measures; 4) continue to evaluate reported sightings of grizzly bears in the BE; and 5) at the end of the first 5-year period (i.e., 2001), revise the sub-goals and review a plan of action for the next 5-year period (FWS 1996).

***STATUS:** Recovery action 1) has been achieved. A Draft EIS was released in July 1997 with a Final EIS released in March 2000 followed by a Record of Decision (ROD) and Final Rule in November 2000. In June 2001, we published a notice of intent to reevaluate this ROD and proposed rule to remove the supporting nonessential experimental rule. However, this regulation and the associated nonessential experimental rule remain in effect as the proposed reevaluation and associated removal were never finalized. Even though the ROD and final rule remain in effect, they were never implemented. Recovery action 2) is ongoing. Recovery action 3) is currently suspended due to lack of funding. Recovery action 4) is active and ongoing and all reports are followed up and surveys have been underway to look for additional bears in the BE area in 2008 and 2009. Recovery action 5) has not been accomplished.*

In 1997, the FWS supplemented the 1993 Recovery Plan with specific recovery actions for the NCASC (FWS 1997). This supplement listed five "priority recovery actions" for the NCASC (FWS 1997): 1) develop a strategy for implementation of the North Cascades grizzly bear recovery chapter; 2) develop an intensive ongoing educational program to provide information about grizzly bears and grizzly bear recovery to the public; 3) initiate the National Environmental Policy Act (NEPA) process to evaluate options to recover this population including augmenting the existing population by moving a small number of bears into the ecosystem; 4) conduct an intensive research and monitoring effort to determine grizzly bear population size and distribution, habitat use, and home ranges in the North Cascades; and 5) implement the IGBC Guidelines (USFS 1986).

***STATUS:** Action 1) has not been implemented due to lack of funding. Action 2) has been highly successful. The Grizzly Bear Outreach Project began in Okanogan County in 2002 then expanded to serve all counties within the NCASC by 2007. The project's mission to promote an accurate understanding of grizzly bears and their recovery in the NCASC is achieved through community education and involvement. To date, the Grizzly Bear Outreach Project has held more than 800 meetings; given 198 presentations; begun a Bear Smart Program to prevent bear/human conflicts; distributed over 2,000 posters, 3,000 fact sheets, 2,000 bear identification sheets, and 65,000 informational brochures throughout the NCASC; been featured in 78 press articles; created and distributed 2 radio public service announcements; and conducted multiple public knowledge and attitude surveys to hone their outreach efforts. Action 3) has not been fully implemented due to lack of funding. Action 4) has been implemented in the form of an intensive DNA hair survey conducted in 2010 and 2011. This effort is attempting to determine grizzly bear population size and distribution. Results are pending. Action 5) has been implemented but not formally institutionalized in the National Forests' respective Land and Resource Management Plans (LRMPs).*

2.3 Background Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 Information on Grizzly Bear Biology and Life History

Species Description – Grizzly bears are generally larger and more heavily built than other bears (Craighead and Mitchell 1982; Schwartz et al. 2003b). Grizzly bears can be distinguished from black bears, which also occur in the lower 48 States, by longer, curved claws, humped shoulders, and a face that appears to be concave (Craighead and Mitchell 1982). A wide range of coloration from light brown to nearly black is common (LeFranc et al. 1987). Spring shedding, new growth, nutrition, and coat condition all affect coloration. Guard hairs (long, course outer hair forming a protective layer over the soft underfur) are often pale in color at the tips; hence the name "grizzly" (Craighead and Mitchell 1982). In the lower 48 States, the average weight of grizzly bears is generally 200-300 kilograms (kg) (400-600 pounds (lb)) for males and 110-160 kg (250-350 lb) for females (Craighead and Mitchell 1982). Grizzly bears are long-lived mammals, generally living to be around 25 years old (LeFranc et al. 1987).

Taxonomy – Grizzly bears (*Ursus arctos horribilis*) are vertebrates that belong to the Class Mammalia, Order Carnivora, and Family Ursidae. The grizzly bear is a member of the brown bear species (*U. arctos*) that occurs in North America, Europe, and Asia; the subspecies *U. a. horribilis* is limited to North America (Rausch 1963; Servheen 1999). Early taxonomic descriptions of *U. arctos* based primarily on skull measurements described more than 90 subspecies (Merriam 1918), but this was later revised to 2 subspecies in North America: *U. a. middendorfi* on the islands of the Kodiak archipelago in Alaska and *U. a. horribilis* in the rest of North America (Rausch 1963). The two North American subspecies approach of Rausch (1963) is generally accepted by taxonomists today, and is the approach we use.

Behavior and Life History – Although adult grizzly bears are normally solitary (Nowak and Paradiso 1983), home ranges of adult bears frequently overlap and bears are not considered territorial (Schwartz et al. 2003b). Home range size is affected by resource availability, sex, age, and reproductive status (LeFranc et al. 1987; Blanchard and Knight 1991). The *annual* home range of adult male grizzly bears in the lower 48 States is typically 2-3 times the size of an adult female's annual home range whereas the *lifetime* home range of an adult male grizzly bear is typically 3-5 times that of an adult female (LeFranc et al. 1987). In general, home range sizes of females are less variable than those of males (LeFranc et al. 1987). Generally, females with cubs-of-the-year have the smallest home range sizes (Blanchard and Knight 1991). In the lower 48 States, annual

home range sizes for female grizzly bears are approximately 400 sq km (150 sq mi) (LeFranc et al. 1987). For males, ***annual*** home ranges vary from 286-1,398 sq km (110-540 sq mi), but average approximately 800 sq km (309 sq mi) (LeFranc et al. 1987). In the GYA, the ***lifetime*** home range size of a female is 884 sq km (341 sq mi) whereas the lifetime home range size of a male is 3,757 sq km (1,451 sq mi) (Blanchard and Knight 1991). The large home ranges of grizzly bears, particularly males, enhance genetic diversity in the population by enabling males to mate with numerous females (Blanchard and Knight 1991; Craighead et al. 1995). Grizzly bear population densities of 1 bear per 20-33 sq km (8-13 sq mi) have been reported in Glacier National Park (Martinka 1976; Kendall et al. 2008), but most populations in the lower 48 States are much less dense (LeFranc et al. 1987). For example, estimates of grizzly bear densities in the GYA range from 1 bear per 50 sq km (20 sq mi) to 1 bear per 80 sq km (30 sq mi) (Blanchard and Knight 1980; Craighead and Mitchell 1982).

Grizzly bears display a behavior called natal philopatry in which dispersing young establish home ranges within or overlapping their mother's (Waser and Jones 1983; Schwartz et al. 2003b). This type of movement makes dispersal across landscapes a slow process. Females establish home ranges an average of 9.8-14.3 km (6.1-8.9 mi) away from the center of their mother's home range, whereas males generally disperse further, establishing home ranges roughly 29.9-42.0 km (18.6-26.0 mi) away from the center of their mother's (McLellan and Hovey 2001; Proctor et al. 2004a).

Grizzly bears have a promiscuous mating system (Hornocker 1962; Craighead and Mitchell 1982; Schwartz et al. 2003b) with genetic studies confirming that cubs from the same litter can have different fathers (Craighead et al. 1998). Mating occurs from May-July with a peak in mid-June (Craighead and Mitchell 1982; Nowak and Paradiso 1983). Age of first reproduction and litter size may be related to nutritional state (Stringham 1990; McLellan 1994; Hilderbrand et al. 1999; Mattson 2000). Although females mate from mid-May through early July, their fertilized embryos are not implanted into the uterus until late fall, once enough nutrition is attained to survive the winter and nurse cubs for 2-3 months inside the den (Schwartz et al. 2003a, 2003b, 2006a). Age of first reproduction varies from 3-8 years of age, and litter size varies from 1-4 cubs (Schwartz et al. 2003b). Cubs are born in the den in late January or early February and remain with the female for 2-3 years before the mother will again mate and produce another litter (Schwartz et al. 2003b). Grizzly bears have one of the slowest reproductive rates among terrestrial mammals, resulting primarily from the late age of first reproduction, small average litter size, and the long interval between litters (Nowak and Paradiso 1983; Schwartz et al. 2003b). Given the above factors and natural mortality, it may take a single female 10 years to replace herself in a population (FWS 1993). Grizzly bear females cease breeding successfully some time in their mid- to late 20s (Schwartz et al. 2003a).

For 3-6 months during winter, grizzly bears enter dens in an adaptive behavior which increases survival during periods of low food availability, deep snow, and low air temperature (Craighead and Craighead 1972). Grizzly bears in the lower 48 States spend between 4 and 6 months in dens beginning in October or November (Linnell et al. 2000). During this period, they do not eat, drink, urinate, or defecate (Folk et al. 1976; Nelson 1980). Hibernating grizzly bears exhibit a marked decline in heart and respiration rate, but only a slight drop in body temperature (Nowak and Paradiso 1983). Due to their relatively constant body temperature in the den, hibernating grizzly bears can be easily aroused and have been known to exit dens when disturbed by seismic or mining activity (Harding and Nagy 1980) or by human activity (Swenson et al. 1997). Both males and females have a tendency to use the same general area to hibernate year after year, but the same exact den is rarely used twice by an individual (Schoen et al. 1987; Linnell et al. 2000). Females display stronger area fidelity than males and generally stay in their dens longer, depending on reproductive status (Judd et al. 1986; Schoen et al. 1987; Linnell et al. 2000).

In preparation for hibernation, bears increase their food intake dramatically during a stage called hyperphagia (Craighead and Mitchell 1982). Hyperphagia is defined simply as overeating (in excess of daily metabolic demands) and occurs throughout the 2-4 months prior to den entry (i.e., August–November). During hyperphagia, excess food is deposited as fat, and grizzly bears may gain as much as 1.65 kg/day (3.64 lb/day) (Craighead and Mitchell 1982). Grizzly bears must consume foods rich in protein and carbohydrates in order to build up fat reserves to survive denning and post-denning periods (Rode and Robbins 2000). These layers of fat are crucial to the hibernating bear as they provide a source of energy and insulate the bear from cold temperatures, and are equally important in providing energy to the bear upon emergence from the den when food is still sparse relative to metabolic requirements (Craighead and Mitchell 1982).

Although the digestive system of bears is essentially that of a carnivore, bears are successful omnivores, and in some areas may be almost entirely herbivorous (Jacoby et al. 1999; Schwartz et al. 2003b). Grizzly bears are opportunistic omnivores with high diet variability among individuals, seasons, and years (pp. 14867, 14932-14933 in the Yellowstone Final Rule, Appendix A) (Mattson et al. 1991a; Mattson et al. 1991b; Schwartz et al. 2003b; LeFranc et al. 1987; Felicetti et al. 2003; Felicetti et al. 2004). Grizzly bears will consume almost any food available including living or dead mammals or fish, insects, and garbage (Knight et al. 1988; Mattson et al. 1991a; Mattson et al. 1991b; Schwartz et al. 2003b). In areas where animal matter is less available, berries, grasses, roots, bulbs, tubers, seeds, and fungi may be important in meeting protein requirements (LeFranc et al. 1987; Schwartz et al. 2003b).

Grizzly bears display great diet plasticity and switch food habits according to which foods are available. Mattson et al. (1991a) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have alternative options in years when preferred foods are scarce. In the GYA, Blanchard and Knight (1991) noted that, "After 10 years of food habits data collection, new feeding strategies continued to appear annually in this population." Mattson (1997) found that grizzlies in the GYA " … used ungulates the most during years when they used pine seeds the least." Similarly, Felicetti et al. (2003) documented that in years of poor pine nut production, "72 percent of GYA grizzly bears make minimal use of pine nuts while consuming more ungulate meat."

2.3.1.2 Abundance, Population Trends, and Demographic Features

TABLE 1. Estimated Grizzly Bear Population Size and Population Growth Rate by Recovery Zone.

Recovery Zone	Estimated Population Size	Trend (% change annually)
Greater Yellowstone Area	582[a]	+4, 7%[b]
Northern Continental Divide	765[c]	+3%[d]
Cabinet-Yaak	42[e]	–3.8%[e]
Selkirk	80[f]	+1.9%[g]
North Cascades	<20	unknown
Bitterroot	0	n/a

[a] Haroldson 2010, Interagency Grizzly Bear Study Team annual report
[b] Harris et al. 2006
[c] Kendall et al. 2009
[d] Mace and Roberts 2011
[e] Kasworm et al. 2010
[f] Proctor et al. in press; Wakkinen 2010
[g] Wakkinen and Kasworm 2004

Greater Yellowstone Area. Based on sightings of females with cubs of the year, Haroldson (2010) estimated the total population size for the GYA population at 582 (95% confidence interval (95% CI=523-641) (TABLE 1) in 2009. Using these same data, Haroldson (2010) estimated the GYA population was increasing in size at approximately 4.2% (95% CI=3-5.6%) annually in 2009. Using radio-collared grizzly bears and a known fate modeling approach, Harris et al. (2006) obtained a similar estimate of annual population growth for the GYA population from 1983 to 2002, with an estimate between 4% ((95% CI=-3.1-9.3%) and 7% (95% CI=0.3-13%). For more details regarding GYA demographic features, please refer to section 2.2.3 Recovery Criteria From the 1993 Recovery Plan and Status of Each, the Yellowstone Final Rule (72 FR 14866, March 29, 2007, Appendix A), the latest Interagency Grizzly Bear Study Team (IGBST) Annual Reports (online at http://nrmsc.usgs.gov/products/IGBST), and Schwartz et al. 2006c, "Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem" (Wildlife Monographs).

Northern Continental Divide Ecosystem. Kendall et al. (2009) used noninvasive sampling methods and capture-mark-recapture models to estimate there were 765 grizzly bears in the NCDE in 2004 (TABLE 1). The NCDE population of grizzly bears is contiguous with grizzly bears in Canada (Proctor et al. in press). Kendall et al. (2009) provided an accurate estimate of how many animals there were in 2004, the year of sampling, but did not address population trend (i.e., is the population increasing, decreasing, or stable).

In 2004, the NCDE subcommittee and MFWP initiated an ecosystem-wide research project to determine the trend of the NCDE grizzly bear population. Data collection occurred from 2004-2009. Since 2004, the team captured and monitored 95 different female grizzly bears in the U.S. and Canada for trend monitoring. These individuals were well distributed throughout the NCDE and included multiple ages. In 2011, Mace and Roberts (2011) used these data to determine the NCDE grizzly bear population was increasing at a rate of 3% per year (95% CI=0.928–1.102) during this time (2004-2009). Using these same data, Mace and Roberts (2011) calculated dependent cub survival to be 0.612 (95% CI=0.300-0.818); yearling survival to be 0.682 (95% CI=0.258–0.898); subadult female survival to be 0.852 (95% CI=0.628–0.951); and adult female survival to be 0.952 (95% CI=0.892–0.980).

Cabinet-Yaak Ecosystem. The CYE recovery zone is estimated to contain at least 42 grizzly bears (TABLE 1) (Kasworm et al. 2010). Separate population estimates were made for the Cabinet Mountains and the Yaak River drainage because there is not any documented movement of grizzly bears between these two portions of the recovery zone. The Cabinet Mountains lie south of the Yaak River drainage and contain about 60% of the recovery zone. There were a minimum of 16 individuals in the Cabinet Mountains and 26 individuals in the Yaak portion of the recovery zone (Kasworm et al. 2010). There are another estimated 24 grizzly bears in Canada directly across the border from the Yaak; however, some of these individuals are probably the same as those counted in the U.S. (Proctor et al. in press). These animals in Canada are increasingly isolated from larger populations north of Canadian Highway 3 by human activities in the intervening valley. Proctor et al. (in press) documented male movement (i.e., genetic connectivity) across this valley but no successful female movement (i.e., demographic rescue) across this valley. This population estimate is similar to our 1999 estimate of 30-40 bears in the CYE (64 FR 26725, May 17, 1999).

High rates of known mortality from 1999-2009 (3.3 mortalities per year) suggest the Yaak River portion of this population has most likely been decreasing (Kasworm et al. 2010). Wakkinen and Kasworm (2004) documented a population declining at a rate of 3.6% annually in 2002 (95% CI=0.844-1.063). Additional mortality and reproductive data were added to the trend calculation in 2009 and resulted in a 78% chance the

Yaak River portion of the CYE population is declining (Kasworm et al. 2010). Kasworm et al. (2010) calculated the rate of decline to be 3.8% of the population annually (TABLE 1). This analysis determined that subadult female survival was the most influential demographic factor on overall population trend. It is important to note that all mortality associated with the trend calculation occurred in the Yaak River portion of this population. The Cabinet Mountains portion has been augmented by MFWP and the FWS with eight different female bears between 1990 and 2009. The trend calculation did not include the addition of these bears; however, it appears that the Cabinet Mountains segment of this population has actually increased in size since the start of augmentation in 1990 (Kasworm et al. 2010). This increase is largely due to the reproductive output of a successful augmentation bear, her offspring which also have reproduced, and the augmentation of 5 additional individuals between 2005 and 2009.

In order to use computer modeling techniques to calculate a population growth rate with a confidence interval, we use survival and reproduction data from female radio-collared bears (Hovey and McLellan 1996, Mace and Waller 1998). Specific parameters calculated include: adult female survival, subadult female survival, yearling survival, cub survival, age at first parturition, interbirth interval, and mean litter size (Mace and Waller 1998). For the CYE (Kasworm et al. 2010), adult female survival=0.933 (95% CI=0.809-1.0); subadult female survival=0.781 (95% CI=0.562-0.952); yearling survival=0.851 (95% CI=0.529-1.0); cub survival=0.581 (95% CI=0.419-0.742); age at first parturition=6.5 years (95% CI=6.0-7.0); interbirth interval=3 years (95% CI=1.9-4.1); and mean litter size=2.06 (95% CI=1.91-2.21).

Selkirk Mountains Ecosystem. Based in part on the results of Wielgus et al. (1994), the FWS estimated the total population size for grizzly bears in the SE to be 46 in 1999 (64 FR 26725, May 17, 1999). Since the Wielgus study, Proctor et al. (in press) compiled data from multiple sources and conducted DNA-based population surveys (Proctor et al. 2007) to estimate a population size of 88 grizzly bears in the SE, with 30 in the U.S. and 58 in Canada (Proctor et al. in press). While this population estimate represents a substantial increase in bears in the Selkirks since 1999, it must be interpreted cautiously until more accurate data are available (TABLE 1). The estimate for the U.S. portion of the SE is based on expert opinion (Wakkinen 2010). The IDFG is currently working on a population estimate for the U.S. portion of the SE that will present a more scientifically rigorous estimate. It is estimated that the population of grizzly bears in the SE is slowly increasing at a rate of 1.9% annually (95% CI=0.922-1.098) (TABLE 1) (Wakkinen and Kasworm 2004). As in the CYE, Wakkinen and Kasworm (2004) found that subadult female survival had the largest influence on overall population trend.

Wakkinen and Kasworm (2004) calculated adult female survival, subadult female survival, yearling survival, cub survival, age at first parturition, interbirth interval, and mean litter size. For the SE, adult female survival=0.936 (95% CI=0.872-0.999); subadult female survival=0.900 (95% CI=0.703-1.097); yearling survival=0.784 (95% CI=0.606-0.963); cub survival=0.875 (95% CI=0.750-1.000); age at first parturition=6.5 years (95% CI=6.1-6.9); interbirth interval=3.5 years (95% CI=2.8-4.3); and mean litter size=2.18 (95% CI=1.93-2.43).

***North Cascades Ecosystem*.** Based on expert opinion and a detailed database of sightings and their credibility, the population in the NCASC is estimated to be fewer than 20 animals within the 9,500 sq mi (24,605 sq km) recovery zone. The population in adjacent B.C. is estimated to be less than 25 grizzly bears within a 9,800 sq km (3,784 sq mi) area (North Cascades GBRT 2004). The Recovery Plan for Grizzly Bears in the North Cascades of B.C. recommends population augmentation on the Canadian side of the border (North Cascades GBRT 2004).

To thoroughly assess the presence of grizzlies in the NCASC, we systematically surveyed for bears during 2010 and 2011 using barbed wire DNA hair corrals and cameras. These surveys can establish presence of species but cannot be used to establish absence. Sites were constructed according to the methods of Woods et al. (1999). Heat- and motion-triggered cameras were placed at as many sites as possible to document the reproductive status of bears (i.e., are cubs present?) and to serve as a supplemental sampling method in case animals did not leave a hair sample. During 2010, we placed 191 hair corrals throughout the study area which was focused on North Cascades National Park and adjacent National Forests. While these systematic surveys have not documented grizzly bears in the American portion of the NCASC yet, a hiker photographed a lone grizzly bear (sex unknown) in the Upper Cascade River drainage south of North Cascades National Park in September 2010.. This is the first time a grizzly bear has been documented in the American portion of the NCASC since 1996 (Almack et al. 1993). No data are available about specific demographic rates (i.e., survival, reproduction, etc.).

Bitterroot Ecosystem. In September 2007, a male grizzly bear was mistakenly shot by a black bear hunter in the northern Bitterroot Mountains of Idaho. Based on the bear's genetic signature, it came from the SE. This grizzly bear mortality was within the Bitterroot Nonessential Experimental Population Area (FWS ROD 2000). The Final EIS for grizzly bear reintroduction defined a population as, " … at least two different female grizzly bears with young or one female seen with different litters in two different years in an area … greater than 10 miles from the nearest non-experimental grizzly bear population recovery zone boundary" (FWS 2000). At this point, we do not consider the BE to be occupied by a population of grizzly bears.

To thoroughly assess the presence of grizzlies in the BE, we systematically surveyed for bears during 2008 and 2009 using barbed wire DNA hair corrals and cameras. These surveys can establish presence of species but cannot be used to establish absence. Sites were constructed according to the methods of Woods et al. (1999). Heat- and motion-triggered cameras were placed at as many sites as possible to document the reproductive status of bears (i.e., are cubs present?) and to serve as a supplemental sampling method in case animals did not leave a hair sample. During 2008 and 2009, we placed 139 hair corrals throughout the study area which was focused on the northern Bitterroot Mountains between U.S. Highway 12 in Idaho and Montana Highway 200 and between Missoula, Montana, and Avery, Idaho. We did not obtain any photos of grizzly bears. The hair samples from 2009 are being analyzed by the genetics lab, but we know that there were no grizzly bear hair samples from 2008. While we did not document any grizzlies in the study area, our sampling methods do not allow us to conclude they are absent from the area. For example, in the CYE, another low-density population with 15 individuals over an area roughly half the size of our BE study area, we generally document 1 or 2 bears annually using the same methods. Our failure to document grizzly bears in this area indicates that if they are regularly occupying the BE, there are very few individuals and they exist at very low densities.

2.3.1.3 Current and Historic Distribution

The range and numbers of grizzlies were reduced to less than 2% of their historical levels by the 1930s, approximately 125 years after first contact with European settlers (see FIGURE 1, inset) (FWS 1993; Mattson et al. 1995; Servheen 1999). Of 37 grizzly populations present in 1922, only 5 remained by 1975 (Servheen 1999). Current range and distribution of grizzly bears in the lower 48 States has increased since 1975, although there are no published data with which to make direct comparisons among all ecosystems.

Estimates of grizzly bear distribution vary widely depending on the methods used and the questions trying to be answered. When asking where someone may possibly encounter a grizzly bear, the answer is very different than asking where someone would *expect* to encounter a grizzly bear. The most conservative estimates of distribution and long-term occupancy rely on locations of females with young. This metric best answers where someone would *expect* to encounter grizzly bears. In contrast, an estimate of distribution based on grizzly bear mortalities or locations of grizzly bear conflicts would encompass a much larger area because adult males and dispersing subadult males roam more widely than females and consequently, experience higher conflict and mortality risks. This metric may best answer the question of where someone could *possibly* encounter a grizzly bear but it may not be likely. These different metrics that can be used to estimate grizzly bear distribution are not directly comparable and must be used appropriately depending on the question being asked.

Historical Distribution – Prior to the arrival of Europeans, the grizzly bear occurred throughout much of the western half of the contiguous U.S., central Mexico, western Canada, and most of Alaska (see FIGURE 1, inset) (Roosevelt 1907; Wright 1909; Merriam 1922; Storer and Tevis 1955; Rausch 1963; Herrero 1972; Mattson et al. 1995; Mattson and Merrill 2002; Schwartz et al. 2003b). Although the grizzly bear was listed as threatened in the entire lower 48 States (40 FR 31734), there are large expanses of land included in this listing where grizzlies did not occur historically (Servheen 1990, Mattson and Merrill 2002). Specifically, we know that grizzly bears did not historically occur in all or parts of 33 eastern, midwestern, and southern States where the species is currently listed due to this error in the original listing (i.e., Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, portions of Minnesota and Iowa east of the 95th meridian, portions of Oklahoma east of the 97th meridian, and portions of Texas east of the 100th meridian). A correction to the original listing to remove this error would not change the status of grizzly bears in the lower 48 States other than those listed above.

Current Distribution

Greater Yellowstone Area. Grizzly bears are well distributed throughout the recovery zone and have expanded their range approximately 48% since the 1970s (Schwartz et al. 2002). For detailed information about grizzly bear distribution within the GYA, please see the Yellowstone Final Rule (72 FR 14866, March 29, 2007, Appendix A), Schwartz et al. (2002), and Schwartz et al. (2006b).

Northern Continental Divide Ecosystem. Grizzly bears are well distributed throughout the NCDE recovery zone and someone would expect to encounter a grizzly bear there. Between 1999 and 2004, 22 of 23 BMUs were occupied by females with young (Dood et al. 2006). Since 2004, it has been recognized that sighting bears in the NCDE is difficult due to dense vegetation in many areas. Due to this, there has been limited effort to collect sighting data on adult females with young; therefore, distribution of sightings has been unavailable since 2004. The demographic recovery criteria are currently under revision. Based on conflicts and mortalities, we know that grizzly bear range has expanded outside of the recovery zone boundaries to the east and to a lesser degree to the west and south. A male grizzly bear was documented approximately 80 miles east of the recovery zone boundary in 2009, and both males and females are becoming increasingly common in river bottoms between the recovery zone boundaries and Interstate 15 to the east. There have been several different grizzly bears with cubs

documented using habitat west of Highway 93 since 2002, including at least nine records of female grizzly bears in the Salish Mountains south of Eureka, Montana, and one record of a female with offspring in the upper Ninemile drainage west of Missoula, Montana. At the southern end of this ecosystem, there have been three male grizzly bears documented south of Interstate 90 since 2002. The Grizzly Bear Management Plan for Western Montana identifies 37,460 sq km (14,463 sq mi) of the NCDE as occupied by grizzly bears, including some intervening habitat between the NCDE and the CYE (Dood et al. 2006). This number is based on a combination of radio-collared females, known mortality locations, and expert opinion and includes all lands where someone may possibly encounter a grizzly bear.

Cabinet-Yaak Ecosystem. Between 2004 and 2009, female grizzly bears with young were observed in 11 of 22 BMUs with 5 of 8 BMUs occupied in the Yaak portion of the recovery zone and 6 of 14 BMUs occupied in the Cabinet Mountains portion of the recovery zone (see Figure 4 in Kasworm et al. 2010, p. 19). While the Yaak portion of the recovery zone is connected with Canadian populations to the north, the Canadian population of bears is becoming increasingly fragmented from the rest of Canada by Canadian Highway 3 (Proctor et al. in press). Of additional concern, there are no known movements by grizzly bears between the Yaak and Cabinet portions of this recovery zone (Proctor et al. 2004b). Further, three of the five BMUs between the Yaak and Cabinet Mountains portions of the recovery zone have not been occupied by grizzly bears in the last 6 years.

Between 2001 and 2009, there have been three female grizzly bear mortalities south of Highway 200 near Noxon, Montana, and one observation of a female with young in 2007. In June 2009, a male grizzly bear was killed near Rose Lake, Idaho, approximately 27 km (17 mi) southeast of Coeur d'Alene. This bear was killed just north of Interstate 90 approximately 72 km (45 air miles) southwest of the CYE recovery zone boundary. This grizzly bear had genetics similar to bears in the Cabinets and the northern portion of the NCDE. Because four grizzly bears were moved from the northern NCDE into the Cabinets in the early 1990s (Kasworm et al. 2007), it is not currently possible to distinguish between genetic material from the Cabinet Mountains and the northern NCDE (Paetkau 2009). However, it is reasonable to conclude that this bear dispersed from the Cabinet Mountains, 72 km (45 mi) away, instead of the northern NCDE (130 mi (209 km) away) due to the distance.

Selkirk Mountains Ecosystem. Based on trend estimates, the SE grizzly bear population is increasing slowly (Wakkinen and Kasworm 2004). However, between 2003 and 2008, female grizzly bears with young were observed in only 4 of 10 BMUs. This is at least partially attributed to funding limitations that reduce the amount of effort put into sighting, trapping, and radio-collaring grizzlies in the SE (Wakkinen et al. 2009).

***North Cascades Ecosystem*.** The distribution of grizzly bears within the NCASC is unknown due to a lack of data. Very few credible sightings and reports exist. A recent confirmed sighting in the U.S. occurred October 21, 2010. There are a few credible reports from north of the border in the B.C. portion of this ecosystem.

***Bitterroot Ecosystem*.** Although one male grizzly bear was killed within the Bitterroot Experimental Population Area in 2007, we have yet to document a population or any female bears within the BE. Because we have not documented a population or any female bears in the BE, we view the BE as currently unoccupied as per the definition of a population of grizzly bears in the Bitterroot EIS (FWS 2000).

2.3.2 Five Factor Analysis (threats, conservation measures, and regulatory mechanisms)

In the lower 48 States, grizzly bears currently exist in five areas identified as grizzly bear recovery zones (FWS 1993). Our analysis was conducted within these five recovery zones. Although bears do exist outside these boundaries, their exact distribution is unknown, changing, and/or debated, depending on which data sets are used. For the purposes of this status review (i.e., determining if grizzly bears in the lower 48 States outside of the Yellowstone DPS still warrant protection under the ESA), these recovery zones are representative of current conditions and will provide an accurate portrayal of current threats, conservation efforts, and overall status.

When considering the amount and distribution of designated recovery zones, there are 73,006 sq km (28,188 sq mi) of suitable habitat in designated recovery areas in the lower 48 States outside of the Yellowstone grizzly bear DPS boundaries and an additional 2,680 sq km (1,035 sq mi) in Canada. This suitable habitat is distributed in five ecosystems in the lower 48 States and part of Canada: 1) the NCDE (23,137 sq km / 8,933 sq mi); 2) the CYE (6,758 sq km / 2,609 sq mi); 3) the SE (3,020 sq km / 1,166 sq mi in the U.S. and 2,680 sq km / 1,035 sq mi in Canada); 4) the NCASC (25,108 sq km / 9,694 sq mi); and 5) the BE (14,983 sq km / 5,785 sq mi). In the GYA, we have formally defined and analyzed the suitable habitat available within the ecosystem. For a full analysis of the threats within this suitable habitat, an area nearly twice the size of the recovery zone (46,035 sq km / 17,774 sq mi), please refer to pp. 14911-14919 in the Yellowstone Final Rule (72 FR 14866, March 29, 2007, Appendix A).

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range.

Background – At the time of listing in 1975, the FWS identified habitat destruction, modification, and range curtailment as major contributing factors leading to the listing of the grizzly bear as a threatened species under the ESA (40 FR 31734-31736, July 28, 1975). The decreases in historical range, the isolated nature of extant populations, the building of

roads and trails in formerly secure grizzly bear habitat, and livestock practices on National Forests contributed to the 1975 listing (40 FR 31734-31736, July 28, 1975). Since 1975, habitat protection measures have focused primarily on providing secure habitat for bears to minimize the opportunity for human-caused mortality. The IGBC was created in 1983 to coordinate and implement management efforts across multiple Federal lands and different States within the various recovery zones. Its objective was to modify land management practices on Federal lands that supported grizzly bear populations to provide security and maintain or improve habitat conditions for the grizzly bear. Since 1986, National Forest and National Park plans have incorporated the Guidelines (USFS 1986) to manage grizzly bear habitat in the lower 48 States.

The Guidelines defined five management categories for Federal lands within which grizzly bear habitat could be managed differently depending on its importance to the population. These different management categories favored grizzly bear uses over human uses to varying degrees while emphasizing actions that contributed to recovery and conservation (USFS 1986). The Guidelines created uniform definitions of grizzly bear/human conflicts (incidents in which bears kill or injure people, damage property, kill or injure livestock, damage beehives, obtain anthropogenic (man-made) foods, or damage or obtain garden produce, orchard fruits, or compost) and nuisance bears (those that seek human food in human-use areas, kill lawfully present livestock, or display unnatural aggressive behavior toward people) (USFS 1986).

The National Forests and National Parks delineated BMUs within each recovery zone to aid in managing habitat and monitoring population trends. Each BMU was further subdivided into subunits. The BMUs are analysis areas that approximate the *lifetime* size of a female's home range, while subunits are analysis areas that approximate the *annual* home range size of adult females. Subunits are around 100 sq mi (259 sq km) in size and provide the optimal scale for evaluation of seasonal feeding opportunities and landscape patterns of food availability for grizzly bears (Weaver et al. 1986). The BMUs and subunits were identified to provide enough quality habitat and to ensure that grizzly bears were well distributed across the recovery zone (FWS 1993).

Management improvements made as a result of the Guidelines include, but are not limited to—1) Federal and State agency coordination to produce nuisance bear guidelines for quick response, resolution, and minimization of grizzly bear/human confrontations; 2) reduced motorized access route densities through restrictions, decommissioning, and closures; 3) highway design considerations to facilitate population connectivity; 4) closure of some important habitat areas to all human access in National Parks or Tribal Wilderness Areas during certain seasons that are particularly

important to grizzlies; 5) closure of many areas to oil and gas leasing, or implementing restrictions such as no surface occupancy; 6) reduction and/or elimination of sheep allotments; and 7) expanded education programs to reduce the number of grizzly mortalities caused by preventable grizzly bear/human conflicts. Overall, adherence to the Guidelines has changed land management practices on Federal lands to increase security and to maintain or improve habitat conditions for the grizzly bear.

Secure habitat is important to the survival and reproductive success of grizzly bears, especially adult female grizzly bears (Mattson et al. 1987; IGBC 1994; Schwartz et al. 2010). Grizzly bear habitat security is primarily achieved by managing motorized access which—1) minimizes human interaction and reduces potential grizzly bear mortality risk; 2) minimizes displacement from important habitat; 3) minimizes habituation to humans; and 4) provides habitat where energetic requirements can be met with limited disturbance from humans (Mattson et al. 1987; McLellan and Shackleton 1988; McLellan 1989; Mace et al. 1996; Mattson et al. 1996). In 1998, an interagency task force examined motorized access management and produced recommendations to standardize definitions and methods (IGBC 1998). This report recommended three parameters to include as components of access management: 1) Open Motorized Route Density (OMRD); 2) Total Motorized Route Density (TMRD); and 3) Secure Habitat. The OMRD includes roads and trails that are open to wheeled motorized use without restriction. The TMRD includes roads and trails open to motorized wheeled access and those with restrictions. Secure Habitat contains no open motorized routes or any roads that receive administrative use and is expressed as a percentage of the analysis area that meets this definition (e.g., 75% of a BMU subunit may be considered Secure Habitat). The IGBC recommended that each recovery zone develop specific criteria for route densities and Secure Habitat based on female grizzly bears monitored in the recovery zone, other research results, and social or other management considerations. Details of how each recovery zone has implemented these recommendations are below in this section and in section 2.3.2.4 Inadequacy of regulatory mechanisms.

The Wilderness Areas are considered long-term Secure Habitat because they are protected from new road construction by Federal legislation. In addition to restrictions on road construction, the Wilderness Act of 1964 (Pub. L. 88-577) also protects designated wilderness from permanent human habitation and increases in developed sites. The Wilderness Act allows livestock allotments existing before the passage of the Wilderness Act and mining claims staked before January 1, 1984, to persist within Wilderness Areas, but no new grazing permits or mining claims are allowed. If pre-existing mining claims are pursued, the plans of operation are subject to Wilderness Act restrictions on road construction, permanent human habitation, and developed sites.

"Timbering practices" were identified in 1975 as activities which may compromise grizzly bear habitat (40 FR 31734, July 28, 1975). The primary impacts to grizzly bears associated with extractive activities such as timber harvest, mining, and oil and gas development are increases in road densities, with subsequent increases in human access, grizzly bear/human encounters, and human-caused grizzly bear mortalities (McLellan and Shackleton 1988, 1989; Mace et al. 1996). Although seismic exploration associated with oil and gas development or mining may disturb denning grizzly bears (Harding and Nagy 1980; Reynolds et al. 1986), actual den abandonment is rarely observed, and there has been no documentation of such abandonment by grizzly bears in the lower 48 States (Hegg 2010; Kasworm 2010; Servheen 2010).

The 1975 listing identified " … livestock use of surrounding national forests" as detrimental to grizzly bears " … unless management measures favoring the species are enacted" (40 FR 31734, p. 31734). While grizzly bears frequently coexist with cattle without depredating them, when grizzly bears encounter domestic sheep, they are often attracted to them and depredate the sheep (Jonkel 1980; Knight and Judd 1983; Orme and Williams 1986; Anderson et al. 2002). If repeated depredations occur, managers either relocate the bear or remove it from the population, resulting in such domestic sheep areas becoming population sinks (Knight et al. 1988). As referenced in previous paragraphs, the implementation of the Guidelines led to the reduction of many livestock allotments with an emphasis on sheep allotments. Available information regarding livestock allotments for each recovery zone is reported below, by area.

Human developed sites can impact bears through temporary or permanent habitat loss and displacement, unsecured bear attractants, increased length of time of human presence, and increased human disturbance to surrounding areas. Developed sites refer to sites developed or improved for human use or resource development. Examples include campgrounds, trailheads, lodges, summer homes, restaurants, visitor centers, oil and gas exploratory wells, production wells, active mining operations, and work camps. The primary concerns for grizzly bears related to developed sites are direct mortality from bear/human encounters, food conditioning, and habituation of bears to humans (Mattson et al. 1987). Habituation occurs when grizzly bears encounter humans or developed sites frequently, and without negative consequences, so that the bears no longer avoid humans and areas of human activity (FWS 1993). Habituation does not necessarily involve human-related food sources. Food conditioning occurs when grizzly bears receive human-related sources of food and thereafter seek out humans and human use areas as feeding sites (FWS 1993). Gunther (1994) noted that grizzly bear management in Yellowstone National Park has shifted from problems involving food-conditioned bears to problems involving habituated (but not food-conditioned) bears seeking natural foods near developed sites or along roadsides.

Because of the issues associated with developed sites, unregulated residential development is a concern in and around grizzly bear recovery zones. Only a small subset of this development undergoes Section 7 consultation via a Federal nexus. The sale of private lands that were traditionally commercial forest lands to other private owners for real estate development has led to an increase in private residential development. Residential development that occurs on private lands by private entities does not undergo Federal consultation under Section 7 of the ESA unless there is a Federal nexus to this development. This means that these rural subdivisions are not required to consult with the FWS or mitigate for grizzly bear impacts under the ESA even if they are developing within grizzly bear recovery zones or surrounding occupied habitat. In the States of Washington, Wyoming, Montana, and Idaho, most residential development regulation is at the county government level.

As human population densities increase, the frequency of encounters between humans and grizzly bears also increases, which can result in more human-caused grizzly bear mortalities due to a perceived or real threat to human life or property (Mattson et al. 1996). This outcome happens because human population growth results in corresponding increases in both the number of people recreating in grizzly bear habitat and human site developments.

Human populations in the northern Rocky Mountains, and the rest of the U.S., are expected to increase by 31% between 2000 and 2030 (NPA Data Services 2009). In the 12 western Montana counties where grizzly bears are, or are expected to be in the next few decades, the human population is projected to increase by roughly 115,000 residents between 2007 and 2030 (from 350,061 in 2007 to 465,450 by 2030) (NPA Data Services 2008). Similarly, in the Washington counties where grizzlies are expected to be, total human populations are expected to increase by roughly 1,117,000 people by 2030 (from 3,354,300 in 2005 to 4,471,916 by 2030) (Washington Office of Financial Management 2007). We anticipate similar levels of population growth in Idaho counties given that the West, as a region, is projected to increase at rates faster than any other region (U.S. Census Bureau Population Division 2005). Increasing human populations do not necessarily lead to declining predator populations, when adequate management programs are in place with policies that promote the conservation of the species (Linnell et al. 2001) such as mortality control, research and monitoring, and outreach and education about living with wildlife.

The FWS has no authority to limit or manage future human population growth. Current levels of human use on public lands are managed to limit resource impacts to the National Forests and National Parks. As human populations and recreational activity have increased, additional regulations have been implemented to limit bear/human conflicts such as the food storage orders and comprehensive State and Federal education programs that explain how to prevent conflicts and manage encounters with bears.

In 1975, “trail construction in … areas which were formerly inaccessible” and “increasing human use of Yellowstone and Glacier National Parks” were identified as possible threats to grizzlies (40 FR 31734, July 28, 1975). The FWS recognized that increasing recreational use of grizzly bear habitat could be detrimental if not properly managed. Based on current recreation and human population growth trends, the number of people recreating in grizzly bear habitat is expected to increase (USFS 2006a; Cordell et al. 2008; NPA Data Services 2008, 2009; USFS 2009). The primary concerns associated with recreational activities are the same as those with developed sites: displacement, direct mortality from bear/human encounters and habituation of bears to humans (Joslin and Youmans 1999; White et al. 1999; FWS 2002). Snowmobiling and Off Road Vehicle (ORV) use have the potential to negatively impact individual grizzly bears although population level impacts have not been documented.

Many of these recreational activities, such as snowmobiling and ORV use, can be regulated through motorized access management and travel planning. The potential impacts of non-motorized recreational activities such as hiking, cross-country skiing, and hunting on grizzly bears are mitigated most effectively through educational outreach. Most grizzly bear/human conflicts with people recreating on National Forest lands are related to hunting (Servheen et al. 2004) (please see our discussion of this source of mortality under Factor C below). These surprise encounters and misidentifications frequently result in grizzly bear mortalities. Most conflicts between grizzly bears and people recreating in grizzly bear habitat can be avoided if proper educational materials are received and followed.

The FWS considers limitations or restrictions on human population growth and recreation to be unrealistic and feels that these issues are best addressed through access management, limitations on site development, and educational outreach. With these mitigation measures in place, we do not consider human population growth or recreation levels to be a threat to grizzly bear populations in the lower 48 States.

Snowmobiling has the potential to disturb bears while in their dens and after emergence from their dens in the spring. Because grizzly bears are easily awakened in the den (Schwartz et al. 2003b) and have been documented abandoning den sites after seismic disturbance (Reynolds et al. 1986), the potential impact from snowmobiling must be considered. We found no studies in the literature specifically addressing the effects of snowmobile use on any denning bear species and the information that is available is anecdotal in nature (FWS 2002).

Disturbance in the den has the potential to result in energetic costs (increased activity and heart rate inside the den) and possibly den abandonment, ultimately causing a decline in physical condition of the individual or even cub mortality (Graves and Reams 2001). Although the potential for this type of disturbance while in the den certainly exists, Reynolds et al. (1986) found that grizzly bears denning within 1.4-1.6 km (0.9-1.0 mi) of active seismic exploration and detonations moved around inside their dens but did not leave them. Harding and Nagy (1980) documented two instances of den abandonment during fossil fuel extraction operations. One bear abandoned its den when a seismic vehicle drove directly over the den (Harding and Nagy 1980). The other bear abandoned its den when a gravel mining operation literally destroyed the den (Harding and Nagy 1980). Reynolds et al. (1986) also examined the effects of tracked vehicles and tractors pulling sledges. In 1978, there was a route for tractors and tracked vehicles within 100 meters (m) (328 feet (ft)) of a den inhabited by a male. This male was not disturbed by the activity nor did he abandon his den at any point. Reynolds et al. (1986) documented only one instance of *possible* den abandonment due to seismic testing (i.e., detonations) within 200 m of a den (Reynolds et al. 1986). This bear was not marked but an empty den was reported by seismic crews.

Swenson et al. (1997) monitored 13 different grizzly bears for at least 5 years each and documented 18 instances of den abandonment, 12 of which were related to human activities. Although many of these instances (n=4) were hunting related (i.e., gunshots fired within 100 m (328 ft) of the den), 2 occurred after "forestry activity *at* the den site," 1 had moose and dog tracks within 10 m of a den, 1 had dog tracks *at* the den site, 1 had ski tracks within 80-90 m from a den, 1 had an excavation machine working within 75 m of a den, and 2 were categorized as "human related" without further details (Swenson et al. 1997). Swenson et al. (1997) found that 72% (13 of 18) of dens were abandoned between November and early January, before pregnant females give birth. After abandoning a den, bears moved an average of 5.1 km (3.2 mi) before establishing another den site, although 56% of bears moved $\leq$2 km (1.2 mi) (Swenson et al. 1997). Despite these relatively short distances, Swenson et al. (1997) found that 60% (n=5) of female bears that abandoned a den site before giving birth (i.e., in November or December) lost at least one cub in or near their new den site whereas only 6% (n=36) of pregnant females that did not abandon their dens during the season lost a cub in or near their den. In summary, the evidence we have about the potential for disturbance while denning and den abandonment from nearby snowmobile use is extrapolated from other studies examining the impacts of human activities other than snowmobiling and identify themselves as "anecdotal" in nature (Swenson et al. 1997) or have sample sizes so small they cannot be legitimately applied to assess population-level impacts (Harding and Nagy 1980, Reynolds et al. 1986).

Because bear emergence from the den often overlaps with snowmobiling seasons, the potential for disturbance once emerged exists. In general, when animals are disturbed by human activities, they move away from those activities or minimize the time spent near them (Harding and Nagy 1980; Linnell et al. 2000). However, females with cubs-of-the-year are less mobile than other age and sex classes and tend to remain near their den site for longer periods (Craighead and Craighead 1972; Haroldson et al. 2002). In the GYA, females with cubs restricted most of their movements to within 3 km of den sites until late May. Of particular concern is the potential impact snowmobile disturbance may have on females with cubs when they first emerge from the den (Haroldson et al. 2002). Whether displaced by activity at the den site or in spring foraging habitat, there would be an increased energetic cost if separated from their young (Graves and Reams 2001). There are no reports of litter abandonment by grizzlies in the lower 48 States due to snowmobiling activity (Hegg 2010; Servheen 2010).

Our best information suggests that current levels of snowmobile use are not appreciably reducing the survival or recovery of grizzly bears. While the potential for disturbance exists, monitoring for 3 years did not document any disturbance on the Gallatin National Forest (Gallatin National Forest 2006). Monitoring will continue to support adaptive management decisions to limit snowmobile use in areas where disturbance is documented or likely to occur.

Greater Yellowstone Area Recovery Zone. For details on the current status of habitat threats to grizzly bears in the GYA, please refer to the Yellowstone Final Rule (72 FR 14866, March 29, 2007, Appendix A).
Northern Continental Divide Ecosystem Recovery Zone. The NCDE is contained entirely within the State of Montana. Of the 23,137 sq km[3] (8,933 sq mi) within the NCDE, 78% (17,980 sq km / 6,942 sq mi) are federally owned, 4% (937 sq km / 362 sq mi) are State owned, 7% (1,580 sq km / 610 sq mi) are Tribally owned, 10% (2,369 sq km / 915 sq mi) are privately owned, and 1% is either water (271 sq km / 105 sq mi) or owned by city/county government (0.4 hectare (ha) (1 acre (ac)). Federal ownership is primarily divided among Glacier National Park (17%) and the Flathead National Forest (40%) with the Lewis and Clark, Helena, Lolo, and Kootenai National Forests managing most of the remaining Federal lands (20%) within the NCDE. Thirty percent (6,995 sq km / 2,701 sq mi) of all lands inside the NCDE are designated Wilderness Areas.

[3] This number is slightly different than the number in the 1993 recovery plan due to improved and more accurate GIS data layers and mapping.

The Flathead, Kootenai, Lewis and Clark, Lolo, and Helena National Forests, and the Glacier National Park have implemented motorized access management throughout the NCDE, commonly referred to as the "A-19 Amendment." These access management standards vary by BMU subunit, depending on how much land is within Federal ownership. For subunits in which the USFS owns at least 75% of the land, the "19-19-68" rule applies. This rule is based upon area-specific research (Mace et al. 1996). For OMRDs (defined as any routes open to motorized access for any period between April 1-November 30 (i.e., non-denning season)), densities cannot exceed 1.6 km / 2.6 sq km (1 mi / sq mi) in more than 19% of each subunit. For TMRDs (defined as any routes open to motorized use during any part of the year), densities cannot exceed 3.2 km / 2.6 sq km (2 mi / sq mi) in more than 19% of each subunit. Finally, each subunit must contain at least 68% Secure Habitat, defined as areas greater than 500 m (1,640 ft) from an open road and at least 1,012 ha (2,500 ac) in size (USFS 1995). For subunits in which the USFS owns less than 75% of the total acreage and, therefore, their ability to meet the above standard is severely limited, the A-19 standard becomes no net increase in road densities and no net decrease in Secure Habitat on USFS lands.

In the NCDE, there are 23 BMUs and 126 BMU subunits. Of these 126 subunits, 13 do not meet their current standard for OMRD, 11 do not meet the TMRD standard, and 21 do not meet the applicable minimum Secure Habitat standard. Despite these shortcomings, grizzly bear habitat security in the NCDE is improving. In 2008, the average portion of each subunit containing OMRD greater than 1.6 km / 2.6 sq km (1 mi / sq mi) was 14%; the average portion of each subunit containing TMRD greater than 3.2 km / 2.6 sq km (2 mi / sq mi) also was 14%; and an average of 70% of each subunit was Secure Habitat. There are 10 subunits for which complete road and habitat security data are not available. These subunits are contained wholly or partially within lands managed by either the Blackfeet Tribe or the Confederated Salish and Kootenai Tribes. Once all subunits are in compliance with their motorized access management standards, motorized access will not threaten grizzly bears within the NCDE. Until that time, current levels of access management are insufficient to eliminate this threat completely.

Developed sites were not specifically identified in 1975 as a threat to grizzly bears but the 1975 listing made it clear that human-caused mortality in areas that were " … formerly inaccessible" and that "increasing human use" of grizzly bear habitat were a threat to grizzlies in the lower 48 States (40 FR 31734, July 28, 1975). Developed sites can contribute to both of these potential threats. There are not specific standards limiting developed sites within the NCDE on National Forest lands and it is currently unknown how many developed sites there are.

Timber harvest has decreased on all five National Forests within the NCDE from approximately 450 million board feet in 1975 to 100 million board feet in recent years (2003-2008). There are currently 31 oil and gas leases within the NCDE: 30 on the Lewis and Clark National Forest and 1 on the Helena National Forest. In 1997, the Lewis and Clark National Forest decided to no longer allow surface occupancy for oil and gas. In 2006, these lands on the Lewis and Clark National Forest and some areas of the Flathead National Forest were withdrawn from any future leasing under the mining laws and mineral leasing laws permanently by Public Law 109-432, the Tax Relief and Health Care Act of 2006. While this law prohibited the establishment of new leases, it did not eliminate leases that existed at the time the law was passed. Many leases on Federal lands that existed at the time Public Law 109-432 was passed have been voluntarily retired and 0% of the Lewis and Clark National Forest's portion of the NCDE allows surface occupancy for oil and gas. The single oil and gas lease held on the Helena National Forest does not have an operating plan or Notice of Intent to operate (Shanley 2009). Similarly, on the Flathead National Forest, there are no Plans of Operation or Notices of Intent to operate any mines. Although this National Forest has been rated as having "moderate to high potential" for oil and gas (Portner 2003), a Court decision in 1985 specified that no activity could proceed on existing leases until an EIS was completed (Flathead National Forest 2011). The Flathead National Forest currently has no plans to initiate such an EIS and does not consider a decision on this matter "pressing" due to limited funding for analysis, little public support or demand, and a lack of applications for permits to drill on existing leases (Flathead National Forest 2011). On both the Kootenai and Lolo National Forest lands within the NCDE, there are no active hardrock mining or oil and gas leases (Brewer 2010). There is one mine within the NCDE on the Helena National Forest called the Cotter Mine. There is some copper and silver exploration occurring but activity is low (Shanley 2009). Due to the restrictions on motorized access in place, we do not consider these levels of timber harvest, mining, or oil and gas development a threat to grizzly bears in the NCDE.

Until recently, there were several proposals before the Canadian government for large-scale industrial coal and gas developments in the upper North Fork Flathead River basin in B.C. directly north of and upstream from Glacier National Park. If these proposals were fully implemented there could be significant impacts on grizzly bear connectivity between the NCDE and contiguous grizzly populations in Canada north of Canadian Highway 3. On February 18, 2010, the B.C. Premier announced that mining, oil, gas, and coal development were no longer permissible land uses in the Canadian portion of the North Fork Flathead River (B.C. Office of the Premier 2010). Following that were efforts from U.S. Senators pursuing a similar ban in the U.S. portion of the

north fork of the Flathead River in the form of Senate Bill 3075, the North Fork Watershed Protection Act of 2010. Shortly after its introduction, ConocoPhilips relinquished its interest in more than 100 oil and gas leases covering over 688 sq km (266 sq mi) on Federal lands in the U.S. portion of the North Fork Flathead River (Anderson 2010). Between June and September 2010, other energy development companies followed suit and relinquished their interests in 429 sq km (250 sq mi) of leases, some of which were held by multiple companies. Altogether, 74% (181,960 / 238,077 acres) of all existing lease acreages held in this area on public lands, representing 66% (76 / 115) of all leases in the North Fork of the Flathead, have been relinquished (Anderson 2011). These voluntary retirements represent a substantial step toward long-term protection from fossil fuel development in the U.S. portion of the Flathead River basin.

There is one sheep allotment within the NCDE on the Helena National Forest. There also are 34 cattle and 8 horse/mule allotments within the NCDE on National Forests. There are some cattle allotments on Tribal Lands administered by the Confederated Salish and Kootenai Tribes, but exact numbers were not available. Overall, the relatively low livestock density translates into very few grizzly bear mortalities related to livestock depredation on public lands. For example, between 1980 and 2008, there were only three grizzly bear mortalities related to livestock depredations on public land. This accounts for less than 1% of all known grizzly bear mortalities during this time in the NCDE. The number of livestock allotments on National Forests within the NCDE is not expected to increase. At their current levels, livestock allotments on public land within the NCDE are not a threat to grizzly bears in the lower 48 States.

Recreation is expected to increase in the NCDE. Currently, approximately 2.0 million people visit Glacier National Park every year. The Glacier National Park maintains 151 trails that cover 745.6 miles and 65 backcountry campgrounds that host an average of 26,663 people each year between May and October (NPS 2010). The National Visitor Use Monitoring Program estimates that 1,124,000 people visited the Flathead National Forest in 2005 (National Visitor Use Monitoring Program 2006a). The Flathead National Forest has 1,151 miles of trails in its 3 Wilderness Areas and another 682 miles of non-motorized trail outside of Wilderness Areas, and 302 miles of motorized trails. Specific trail data for the other National Forests are not available. This access into grizzly bear habitat will not threaten bears in the NCDE if adequate educational outreach continues to be funded and implemented.

The National Forests in the NCDE have some late season snowmobiling that overlaps with the non-denning season (April 1-November 30) and thus has the potential to disrupt individual grizzly bears. There is no snowmobiling allowed inside Glacier National Park or any designated Wilderness Area during any time of the year. On the Lewis and Clark

National Forest, there is no snowmobiling allowed during the non-denning period in the Birch-South area and once the ROD signed in March 2009 is fully implemented, there will be no snowmobile activity allowed in the Badger-Two Medicine area. The Flathead National Forest currently allows snowmobiling on groomed routes in Canyon Creek until April 14. There also are 13 sq km (5 sq mi) of open terrain at Sixmile open until April 20; 71 sq km (27 sq mi) of open terrain in the Challenge/Skyland area open until May 14; and 129 sq km (50 sq mi) of open terrain in the Lost Johnny area open until May 31. On the Kootenai National Forest, there is limited snowmobiling in the Ten Lakes Wilderness Study Area occurring after April 1.

On the Lolo National Forest, Seeley Lake within the NCDE is a major snowmobile destination area. Groomed snowmobile routes and snowmobile play areas are concentrated outside the recovery zone except for the large block of former Plum Creek Timber land in the Mission Subunit, and on National Forest land in the lower elevation areas in the Swan Subunit and in the Dun Creek drainage in the Mor-Dun Subunit. The Monture, North Scapegoat, South Scapegoat, and Rattlesnake Subunits are dominated by Wilderness and Roadless areas where snowmobile use is restricted by area closures or topography. Spring road closures are in place around Morrell Falls, Richmond Peak, and Clearwater Lake to specifically protect grizzly bear from snowmobile and other motorized disturbance during the non-denning period from April 1-June 30. There are 2 groomed snowmobile routes totaling 94 miles on the edge of Secure Habitat. All 817 sq km (315 sq mi) of Secure Habitat are closed to snowmobile use year long. There are 201 sq km (78 sq mi) outside Secure Habitat within the recovery zone open to snowmobile use.
On the Helena National Forest, Lincoln is a popular snowmobile destination and draws in riders from Great Falls, Helena, Missoula, and elsewhere. The snowmobile season begins after most den entry on December 1, but there is currently no season end date. Most of the snowmobile use occurs north of Highway 200 due to the better snow conditions, more miles of groomed and ungroomed trails and the Copper Bowls play area retains snow late into the season. Snowmobile use has occurred as late as early July in the Copper Bowls in years of heavy snow accumulations.

The Helena National Forest is currently in formal consultation with the FWS for their Winter Travel Plan. The proposed selected alternative would impose season dates of December 2 (to allow for the latest possible closure of the big game season) through March 31 for all lands in the recovery zone with the exception of the 13 sq km (5 sq mi) Copper Bowls play area which would allow snowmobiling through May 31. In total, there are approximately 749 sq km (289 sq mi) of Helena National Forest lands in the recovery zone. Of the 411 sq km (159 sq mi) outside the

Scapegoat Wilderness, 65% (265 sq km / 103 sq mi) is currently open to winter motorized use. Under the selected alternative 57% (234 sq km / 90 sq mi) would be open to winter motorized use. There are currently 173 miles of groomed routes. This would not change under the proposed selected alternative. The total miles of ungroomed routes are unknown, but snowmobilers are able to travel most existing roads during the winter months.

While both snowmobile and ORV use are expected to increase on National Forests, this potential threat to grizzly bears will be at least partially mitigated through travel planning and the large amount of Secure Habitat and Wilderness Area. For instance, in 2001 the Flathead National Forest amended their LRMP to eliminate wheeled motorized travel off of designated routes with a few specific exceptions. Similarly, if the proposed selected alternative is implemented for the Helena National Forest's Winter Travel Plan, there would be less area open to snowmobile use and most areas would be closed to snowmobiling on March 31 of each year (Brewer 2010).

Within the NCDE, there are several habitat conservation measures in place (or pending) with non-Federal partners. These include formal Habitat Conservation Plans (HCPs) with the Burlington Northern Santa Fe (BNSF) Railway, the MDNRC, and other habitat management plans like the Swan Valley Conservation Agreement and the Montana Legacy Project. All of these habitat programs serve a similar purpose: to improve and conserve grizzly bear habitat in the NCDE.

An HCP is a long-term management plan prepared under the ESA to conserve threatened and endangered species (16 USC 1531 et seq.). Section 10 of the ESA authorizes a landowner to develop a conservation plan to minimize and mitigate, to the maximum extent practicable, any impact to threatened and endangered species while conducting lawful activities on their lands. An HCP is part of the application for obtaining an incidental take permit from the FWS in accordance with Section 10(a)(1)(B) of the ESA. An Incidental Take Permit allows the permit holder a certain level of "unavoidable" mortality of a federally listed species that is incidental to otherwise lawful activities.

The BNSF Railway line that runs between East Glacier and West Glacier on the southern boundary of Glacier National Park is about 85 miles long and located largely within the wild and scenic corridor of the Middle Fork Flathead River. Between 1984 and 2008, BNSF trains killed 38 grizzly bears and orphaned 2 cubs in this area. The BNSF Railway requested an incidental take permit from the FWS and in 2002 began developing an HCP with assistance from the FWS. Following a public scoping period and interagency input, a draft HCP was presented to the FWS in 2005.

Since that time, the HCP has undergone revisions and updates, is near completion, but negotiations on the final mitigation commitments are stalled. The proposed HCP would, in part, minimize food attractants from getting on the railroad tracks and keep the tracks clean of spilled grain, to the extent practicable. Mitigation may also include reducing human-caused mortality in the corridor through measures such as providing bear resistance garbage containers where needed.

The MDNRC released a draft HCP in 2009 for forest management activities on most of its forested State lands throughout western Montana, including lands occupied by grizzly bears in the NCDE and the CYE (MDNRC 2009). The proposed alternative would guide management of activities on 598 sq km (231 sq mi) of State lands within the NCDE recovery zone and an additional 295 sq km (114 sq mi) of occupied habitat outside the recovery zone (MDNRC 2009). The MDNRC developed their HCP and habitat mitigation measures in cooperation with the FWS to address the needs of several listed species, including the grizzly bear. If finalized, the proposed alternative (Alternative 2) would: 1) provide additional outreach focused on avoiding bear encounters and storing food properly, 2) minimize roads in key bear habitats (avalanche chutes and riparian areas), and 3) suspend motorized activities within 1 km (0.6 mi) of a den site (MDNRC 2009). On MDNRC lands included in the proposed alternative that are within designated recovery zones, no new grazing licenses would be allowed and motorized management activities in denning habitat would be prohibited (MDNRC 2009). Additionally, in areas outside of recovery zones that are currently occupied, new open road construction would be minimized, vegetative cover would be retained, there would be spring restrictions on forest management activities, and restrictions on livestock grazing to minimize bear/livestock conflicts would be implemented (MDNRC 2009).

The Swan Valley Conservation Agreement is a collaborative document that guides management of multiple use lands owned by the USFS, Plum Creek Timber Company, and the MDNRC in the upper Swan Valley that occur within FWS identified linkage zones. It commits the signing parties to cooperatively manage motorized access and timber harvest on these lands so that there are not too many projects occurring simultaneously. This Conservation Agreement was successfully implemented by all parties and all affected subunits met their criteria for motorized access management. The Conservation Agreement has a clause for automatic annual renewal and is still in place. These lands will continue to be managed with wildlife habitat security in mind through the Montana Legacy Project discussed below.

The Montana Legacy Project is a cooperative effort among The Nature Conservancy, The Trust for Public Land, and multiple State and Federal partners throughout western Montana. Although the Legacy Project is not specifically designed to conserve grizzly bear habitat, it will benefit grizzly bears by consolidating land ownership patterns and management of over 1,255 sq km (484 sq mi) owned by Plum Creek Timber so that sustainable timber harvesting, public access to these lands for recreation, and important wildlife habitat are maintained. These lands are distributed throughout western Montana with 266 sq km (103 sq mi) in the Swan Valley (part of the NCDE) and the remaining lands in edge habitats of the NCDE that may serve as connective habitat between the NCDE and the BE in the foreseeable future. The Nature Conservancy and The Trust for Public Land agreed to purchase the land from Plum Creek Timber Company initially, then sale or donate these lands to Federal, State, and private owners. The vast majority of these lands will become federally or State owned and any lands that are sold into private ownership will have safeguards attached to them so that the integrity of wildlife habitat is maintained.

Cabinet-Yaak Ecosystem Recovery Zone. The CYE recovery zone (approximately 6,758 sq km / 2,609 sq mi) is located primarily in northwestern Montana with small portions in northern Idaho. The CYE is approximately 90% Federal, 5% State, and 5% private lands. The Kootenai National Forest manages approximately 72% (Kootenai National Forest 2009, p. 8) of lands within the CYE recovery zone with the Idaho Panhandle National Forest and Lolo National Forest administering the remaining Federal lands within the recovery zone. Major private land owners in the recovery zone include Plum Creek and Stimson Timber Companies. The relative distribution of bears across this ownership pattern is unknown, but is believed to be proportionate to land ownership (i.e., approximately 90% of the population lives on the 90% of public land within this recovery zone). In Canada, the portion of B.C. directly north of the CYE recovery zone is largely Crown land (public) with the exception of the Moyie and Kootenay River valleys. Within the CYE recovery zone, 5.6% (381.5 sq km / 147 sq mi) is designated Wilderness Area.

In the late 1970s, the USFS began restricting motorized vehicle use on some roads within the CYE recovery zone. Most road restrictions have been accomplished with gates or permanent barriers. Gates have been used in cases where restrictions are seasonal to protect specific habitat at critical times of the year or in areas that are scheduled for additional timber management.

Habitat security is believed to have declined in the CYE recovery zone until the late 1980s when LRMPs implemented access management through OMRD standards (Summerfield et al. 2004). The USFS developed criteria for road access within the CYE recovery zone's 22 BMUs. In 1987, the Kootenai and Idaho Panhandle National Forests LRMPs proposed that a minimum of 70% of each BMU would be "effective habitat" (USFS 1987). Effective habitat is defined as an area greater than 0.40 km (0.25 mi) away from open roads, active timber sales, or active mining operations (Christensen and Madel 1982). This standard was based on bear research from other recovery areas (Christensen and Madel 1982). In 2000, 6 of 21 BMUs[4] in the CYE were below standard with effective habitat ranging from 60-69% (USFS 2002, Table 3-5).

To fully implement the Guidelines regarding motorized access, the Kootenai National Forest, Lolo National Forest, and Idaho Panhandle National Forest conducted an EIS analysis to evaluate alternatives for access management relating to grizzly bears in the CYE and SE recovery zones including standards for Secure Habitat, OMRD, and TMRD (USFS 2002). These standards were based on grizzly bear monitoring results from the CYE and SE recovery zones (Wakkinen and Kasworm 1997). This analysis suggested that additional access management beyond that achieved by the 70% effective habitat standard was required to provide Secure Habitat for CYE grizzly bears. In this 2002 analysis, the concept of "effective habitat" was replaced by Secure Habitat. While effective habitat had to be $\geq$400 m (1,312 ft) from an open road, Secure Habitat must be $\geq$500 m (1,640 ft) from any open roads, gated roads, and high-use trails (USFS 2009). However, high-use trails are not defined or quantified. Therefore, Secure Habitat has a more restrictive definition than effective habitat and better addresses grizzly bear habitat security needs. The FWS issued a biological opinion on the preferred alternative proposed by the National Forests (FWS 2004).

Standards for access management in the CYE and SE grizzly bear recovery zones were established through a ROD (USFS 2004). This decision established BMU-specific levels for Secure Habitat, OMRD, and TMRD that in most BMUs meet or improve upon habitat security for grizzly bears as suggested in Wakkinen and Kasworm (1997). At the conclusion of 2005, 8 of 22 BMUs in the CYE recovery zone met the three standards specified. The remaining 14 BMUs were on schedule for proposed implementation as identified in the biological opinion (FWS 2004). At the time, more than half of the BMUs met the standard for at least one or two of the three proposed standards.

[4] Habitat effectiveness was not calculated in BMU #22 for this analysis because it was not required by the Lolo National Forest's LRMP at this time.

The 2004 biological opinion and ROD were litigated by the Alliance for the Wild Rockies and the Cabinet Resource Group in two separate cases. In 2006, the Court ruled in favor of the USFS access management plan in the Alliance for the Wild Rockies case (CV 04-216-M-DWM) but in favor of the plaintiffs on one count in the Cabinet Resource Group case (CV 04-236-M-DWM). The Court set aside the access management EIS and remanded it back to the USFS. In April 2009, the affected National Forests released a revised Draft Supplemental EIS for Motorized Access Management Within the SE and CYE Grizzly Bear Recovery Zones (USFS 2009). This Draft Supplemental EIS re-visits two alternatives in detail and proposes Alternative E as the preferred alternative. Alternative E provides for different levels of OMRD, TMRD, and Secure Habitat to be set for individual BMUs and in areas of known grizzly bear occupancy that are outside of the recovery zone boundaries (USFS 2009).

As of 2008, several of the 22 BMUs within the CYE do not meet the proposed access management standards: 8 do not meet the proposed OMRD standards; 10 do not meet the proposed TMRD standards; and 9 do not meet the proposed standards for Secure Habitat (Idaho Panhandle National Forest and Kootenai National Forest 2009). Five of the BMUs are in compliance with all three proposed standards and eight BMUs meet at least two of the proposed standards. In 2008, an average of 33% of each subunit contained open motorized route densities greater than 1 mi / sq mi; an average of 27% of each subunit contained total motorized route densities greater than 2 mi / sq mi; and an average of 58% of each subunit was Secure Habitat. Some of these BMUs contain State, County, or private roads over which the USFS has no jurisdiction. Although access management measures have not yet achieved desired goals for habitat protection, it is expected that full implementation of the proposed access management standards would be complete by December 2019 (USFS 2009).

In mapped areas (see FIGURE 3, USFS 2009) of known grizzly bear occupancy outside of the recovery zone, the USFS has proposed several protective measures regarding motorized access management. If the preferred alternative is selected, the USFS will not allow increases in open or total road densities above the baseline values shown in Table 3 of the Draft Supplemental EIS (USFS 2009). Also, timber harvest activities in these areas would be coordinated across multiple watersheds to minimize disturbance from road use to grizzly bears (USFS 2009). Finally, the USFS will submit annual reports to the FWS summarizing compliance with the Amendments (USFS 2009).

Overall, motorized route densities have been reduced and Secure Habitat has increased in the CYE since the grizzly was listed (Summerfield et al. 2004). Between 2002 and 2006, there was a 7% reduction in the kilometers of open motorized routes from 3,985 km (2,475 mi) to

3,716 km (2,308 mi). During this same time period, there was a 6% reduction in total motorized routes from 6,221 km (3,864 mi) to 5,830 km (3,621 mi). Upon full implementation of the Motorized Access Management Amendments within CYE grizzly bear recovery zone, road densities and Secure Habitat will be managed in a way that contributes to the conservation and recovery of the grizzly bear. Further monitoring of the population and cause-specific mortality will determine the success of this management strategy.

There are not specific standards limiting developed sites within the CYE on National Forest lands and it is currently unknown how many developed sites there are.

Timber harvest on National Forest lands within the CYE recovery zone has decreased since 1987(USFS 2009). On the Idaho Panhandle National Forest and Kootenai National Forest, the number of acres harvested has declined with the total volume of timber harvested declining at a faster rate (USFS 2009). This trend is expected to remain stable or continue to decrease upon full implementation of the proposed Amendments for access management standards because less suitable timber will be accessible for harvest (USFS 2002, p. 3-104; USFS 2009, pp. 156-157). There are no oil or gas leases within the CYE recovery zone.

There are a number of commercial-scale mining leases within or adjacent to the CYE. These mining leases all occur on the Kootenai National Forest. In 2006 the FWS issued a biological opinion for the restart of the Troy Silver Mine (FWS 2006). This facility was not operational between 1993 and 2004 due to low mineral prices. It is now operating and extracting over 100,000 pounds of silver and 15.5 million pounds of copper annually (Revett 2009). Two large silver and copper mines also have been proposed within the Cabinet Mountains--one in the Rock Creek drainage operated by the Revett Silver Company and the second in the Libby Creek drainage administered by Noranda Minerals Corporation. Revett Silver Company's Rock Creek Mine proposal was approved in 2003 and a biological opinion was issued in 2003 (FWS 2003). The Rock Creek Mine would operate for about 30 years, extracting 10,000 tons of ore per day. The permit area for the mine would include a 631-ha (1,560-ac) staging area. The maximum number of people employed by the mine would be approximately 450 during various phases of construction, and about 340 during operation. In 1993, the Kootenai National Forest and the State of Montana issued an approval to Noranda Minerals Corporation for the Montanore project, but there has been no construction at the site and Noranda abandoned the project because of production costs and low metal prices. However, in 2004, Mines Management Incorporated announced plans to embark on a new permitting process for this deposit. The new mine proposal includes an operational life of 15-20 years and employment of about 250 people and is currently undergoing scoping through the NEPA.

These two mine sites are about 10 km (6 mi) apart from one another on each side of the Cabinet Mountains Wilderness. Several conservation groups filed a legal challenge against the 2003 biological opinion. The 2005 court decision in the case set aside the biological opinion and remanded the opinion back to the FWS for reconsideration. In 2006, a new biological opinion was issued (FWS 2006). Measures to offset the impacts of mining activity as identified in the biological opinion include habitat replacement through acquisition and easements, additional game warden and bear management specialist positions, and wildlife resistant garbage facilities. Section 7 requires adequate measures to ensure the project is not likely to jeopardize the continued existence of the species by engaging in any activity that reduces the survival and recovery of that species through negative changes in reproduction, numbers, or distributions. The mitigation measures for the proposed mine would offset impacts of the project and may improve habitat and population status for this population.

Livestock grazing on the Kootenai National Forest and Idaho Panhandle National Forest has decreased since 1987 (FWS 2006). Within the CYE recovery zone, there are two cattle allotments on the Kootenai National Forest (Sullivan 2010). On the Lolo National Forest, there are currently 2 livestock grazing operations on the edge of BMU 22 in the CYE: 1) a special use permit for about 6 horses and 2) an allotment for about 30 cow/calf pairs. To date, there have been no grizzly bear/livestock conflicts associated with livestock use of National Forests within the CYE and we do not consider this type of land-use at its current levels a threat to grizzly bears there.

The Kootenai National Forest received 1.11 million visits by people recreating between October 2001 and September 2002 (USFS 2009). Of the total number of visits, approximately 60% occurred within or adjacent to the SE or CYE recovery zones. Similarly, the Idaho Panhandle National Forest received an estimated 855,000 visits between October 2002 and September 2003 (USFS 2009). Approximately half of these total visits occurred in the National Forest's north zone, which includes the SE and CYE recovery zones. According to the Draft Supplemental EIS for motorized access management in the CYE and SE, high-use trails are counted against calculations of "core habitat." Because of this consideration of the effects of high-use trails on grizzly security and the management of this security we do not consider the current levels of recreational use in the CYE and SE a threat to grizzlies at this time.

Within the CYE recovery zone, there are 59 miles of groomed snowmobile trails and 281 miles of ungroomed routes (USFS 2009). Off-route use occurs on approximately 180 sq km (70 sq mi) within the recovery zone. Both on- and off-route snowmobile travel combined

occurs on about 6-9% of modeled denning habitat within the CYE (USFS 2009). Neither the Kootenai nor the Idaho Panhandle National Forests have drafted a winter travel plan for snowmobile use in the CYE (USFS 2009).

Land acquisition and exchange has placed additional areas within this recovery zone in the public domain and may benefit the long-term conservation of the species. There have been two major land exchanges in particular that have been beneficial to grizzly bear habitat within the CYE. In 1997 the Kootenai National Forest completed a land exchange in which 87 sq km (33 sq mi) of land owned by Plum Creek Timber Company were placed in public ownership. Almost all of this land was within the CYE grizzly bear recovery zone. In 2005, the MFWP acquired almost 5 sq km (2 sq mi) in the Bull River Valley between the East and West Cabinet Mountains. A conservation easement on an adjacent 2 sq km (1 sq mi) was accepted from the Avista Company. The area, now known as the Bull River Wildlife Management Area, provides linkage of public land across the river valley and will have value for a number of species including bull trout, westslope cutthroat trout, grizzly bear, lynx, and bald eagle.

Because the CYE relies on connectivity with Canada for its long-term conservation, the cumulative effects of timber harvest, mining, recreation, and road building in B.C. have the potential to affect the CYE grizzly bear population. In 1995, the B.C. Provincial government developed a grizzly bear conservation strategy (B.C. Ministry of Environment, Lands, and Parks 1995). A major goal of the B.C. Grizzly Bear Conservation Strategy is to ensure effective, enhanced protection and management of habitat through land use planning processes, new protected areas, and the Forest Practices Code. Many of these processes are ongoing, and have not had the opportunity to achieve the stated goals of grizzly bear habitat protection. Currently there is little access management occurring on lands being used for timber production directly north of the International border in the Yaak and Moyie River drainages. However, Gilnockie Provincial Park was established in 1995 just north of the international border in the upper Yaak River drainage. The 29-sq km (11-sq mi) park is managed similarly to U.S. Wilderness Areas with little road access.

The MDNRC released a draft HCP in 2009 for forest management activities on most of its forested State lands throughout western Montana, including lands occupied by grizzly bears in the CYE (MDNRC 2009, pp. ES-4, ES-6, ES-7). The proposed alternative would guide management of activities on 25 sq km (10 sq mi) of State lands within the CYE recovery zone and an additional 49 sq km (19 sq mi) of occupied habitat outside the recovery zone (MDNRC 2009). For details on the proposed alternative, please see the ‘NCDE’ portion of this section above.

Selkirk Mountains Ecosystem Recovery Zone. The SE recovery zone is located primarily in northern Idaho but also includes portions of Washington and Canada. It encompasses 5,700 sq km (2,201 sq mi) of the Selkirk Mountains of northeastern Washington, northern Idaho, and southern B.C. Approximately 47% of the recovery zone is in B.C. with the remainder in the U.S. The 1993 Recovery Plan defined a portion of the SE recovery zone within Canada so that it was at least 5,180 sq km (2,000 sq mi) in size. This size would promote the Recovery Plan's goal of establishing a population of 100 grizzly bears in the SE (FWS 1993) based on the known grizzly bear density in the GYA at the time of 1 bear per 50 sq km (20 sq mi) (Blanchard and Knight 1980). In Canada, land ownership is roughly 65% Crown (public) land and 35% private. In the U.S. portion of the SE recovery zone, land ownership is approximately 80% Federal, 15% State, and 5% private lands. Within the SE recovery zone, 3% (162 sq km / 62 sq mi) is designated Wilderness Area.

Standards for access management in the Selkirk Mountains grizzly bear recovery zone were established through a ROD in 2004 (USFS 2004). This decision established BMU-specific levels for Secure Habitat, OMRD, and TMRD that, in most BMUs, meet or improve upon habitat security for grizzly bears as suggested by Wakkinen and Kasworm (1997). The Court set aside this 2002 access management EIS and remanded it back to the USFS. In April 2009, the affected National Forests released a revised Draft Supplemental EIS for Motorized Access Management Within the SE and CYE Grizzly Bear Recovery Zones (USFS 2009). This Draft Supplemental EIS proposes Alternative E as the preferred alternative which provides for different levels of OMRD, TMRD, and Secure Habitat to be set for individual BMUs and in areas of known grizzly bear occupancy outside of the recovery zone (USFS 2009). As in the CYE, Secure Habitat was defined as those areas $\geq$500 m (1,640 ft) from any open roads, gated roads, and high-use trails (USFS 2009).

As of 2008, several of the 10 BMUs within the SE recovery zone do not meet their proposed access management standards: 2 do not meet the proposed OMRD standards; 3 do not meet the proposed TMRD standards; and 3 do not meet the proposed standards for Secure Habitat (Idaho Panhandle and Kootenai National Forests 2009). Five of the BMUs are in compliance with all three proposed standards. There are no road or habitat security data available for the 10th BMU, which is administered by the Idaho Department of Lands, and the proposed access management Amendments do not apply to this BMU. In 2008, an average of 35% of each subunit contained OMRD >1.6 km / 2.6 sq km (1 mi / sq mi); an average of 29% of each subunit contained TMRD >3.2 km / 2.6 sq km (2 mi / sq mi); and an average of 53% of each subunit was Secure Habitat. Although access management measures have not yet achieved desired goals for habitat protection, it is expected that full implementation of the proposed access management standards would be complete by

December 2019 (USFS 2009). Upon full implementation of the Motorized Access Management Amendments within SE grizzly bear recovery zone, road densities and Secure Habitat will be managed in a way that contributes to the conservation and recovery of the grizzly bear because they establish BMU-specific levels for Secure Habitat, OMRD, and TMRD that in most BMUs meet or improve upon habitat security levels for grizzly bears suggested by Wakkinen and Kasworm (1997). Further monitoring of the population and cause specific mortality will determine the success of this management strategy.

In mapped areas (see FIGURE 3; USFS 2009) of known grizzly bear occupancy outside of the recovery zone, the USFS has proposed several protective measures regarding motorized access management. If the preferred alternative is selected, the USFS will not allow increases in OMRD or TMRD above the baseline values shown in Table 3 of the Draft Supplemental EIS (USFS 2009). Also, timber harvest activities in these areas would be coordinated across multiple watersheds to minimize disturbance from road use to grizzly bears (USFS 2009). Finally, the USFS will submit annual reports to the FWS summarizing compliance with the Amendments (USFS 2009).
Overall, there have been decreases in the amount of road construction and timber harvest in the SE recovery zone. From 2002-2006, there was a 6% reduction in the kilometers of open motorized routes from 858 km (533 mi) to 810 km (503 mi). However, during this same time period, there was a 3% increase in total motorized routes from 1,394 km (866 mi) to 1,435 km (891 mi). On the Colville National Forest, there have been 23 miles of road constructed in recovery habitat since 1975 and 150 miles of road closed since 1975. In addition, any new roads constructed in recovery habitat on the Colville National Forest are closed to nonadministrative motorized use. Both the number of acres affected and the volume of timber harvested have decreased since 1987 (USFS 2009). The volume of timber harvested has decreased at a faster rate than the number of acres harvested due to changes in management direction and silvicultural prescriptions (USFS 2009).

There are not specific standards limiting developed sites within the SE on National Forest lands and it is currently unknown how many developed sites there are.

There are no known oil or gas reserves within the SE recovery zone and there are currently no oil or gas leases on these National Forest lands. Similarly, there are no mining claims or plans of operation within the SE recovery zone.

There are currently three cattle allotments in the SE recovery zone in the U.S. and at least one in the B.C. portion. There are no sheep allotments. The two cattle allotments on the Idaho Panhandle National Forest affect roughly 3% (60 / 2,056 sq km) of the SE recovery zone (Allen 2010). The

Colville National Forest is preparing to update the allotment management plan for a cattle allotment in the LeClerc BMU. This new management plan may include a sunset clause to retire the allotment when the permittee retires, due to issues with multiple threatened and endangered species (i.e., grizzly, caribou, lynx, bull trout). Timber harvest trends will likely remain stable or continue to decrease upon full implementation of the proposed access management standards because less suitable timber will be accessible for harvest (USFS 2002, p. 3-104; USFS 2009, pp. 156-157).

The Kootenai National Forest received 1.11 million visits by people recreating between October 2001 and September 2002 (USFS 2009). Of the total number of visits, approximately 60% occurred within or adjacent to the SE or CYE recovery zones. Similarly, the Idaho Panhandle National Forest received an estimated 855,000 visits between October 2002 and September 2003 (USFS 2009). Approximately half of these total visits occurred in the National Forest's north zone, which includes the SE and CYE recovery zones. Because of consideration of the effects of high-use trails on grizzly security and the management of this security we consider the current levels of recreational use in the CYE and SE not a threat to grizzlies at this time.
The Colville National Forest published its first official Motor Vehicle Use Map in 2008. This is the culmination of a Travel Planning process and it means that motorized travel on the forest is now legally restricted to designated roads and trails identified on the Use Map. Off-road travel is prohibited except to access a campsite within 300 feet of a designated route. There are few open roads identified on the Use Map in recovery habitat and no motorized trails or areas identified in recovery habitat. The Colville National Forest has been educating the public about using the Motor Vehicle Use Map, and enforcing the travel restrictions on the map. Use of roads in recovery habitat has declined as a result. The Idaho Panhandle National Forest has not completed a Travel Plan.

Snowmobile use of recovery habitat on the Colville National Forest is relatively light and there is very little overlap with suitable grizzly bear denning habitat due to restrictions, topography, and vegetation. Based on winter monitoring, snowmobile use on the Colville is stable. Within the SE recovery zone, there are 14 miles of groomed snowmobile trails and 10 miles of ungroomed routes (USFS 2009). Off-route use occurs on approximately 30 sq km (12 sq mi) within the recovery zone. Both on- and off-route snowmobile travel combined occurs on about 6-9% of modeled denning habitat within the SE, but use is not permitted after April 1 on a portion of these affected acres. While the Colville National Forest has not drafted a Winter Travel Plan, the Idaho Panhandle National Forest is in the process of completing a Winter Travel Plan to address the Selkirk Mountain Range for both caribou and grizzly bears (USFS 2009).

There is one Conservation agreement between the FWS, the Colville National Forest, and Stimson Lumber Company regarding forest management in the LeClerc BMU, where there is checkerboard land ownership. This Conservation Agreement requires Stimson and the Colville National Forest to leave hiding cover within created openings, along open roads, and within riparian habitats. Stimson also is required to log during the winter in some areas to reduce disturbance and report logging activities and road entries to the Colville National Forest annually. This Conservation Agreement is useful in the LeClerc BMU because Stimson is not required to conserve Secure Habitat or manage for TMRD or OMRD.

Because the SE relies on connectivity with Canada for its long-term conservation, the cumulative effects of timber harvest, mining, recreation, and road building in B.C. have the potential to affect the SE grizzly bear population. In general, there are few specific habitat management guidelines for grizzly bears in Canada. There are no designated BMUs. There is no measure of road density, road management, or Secure Habitat, etc. There is one cattle grazing allotment in the Boundary Lake area, south of Highway 3 within the SE recovery zone. There are active mining claims in the area but no large-scale mining operations. While snowmobile use in increasing, there are significant restrictions on snowmobile use because of mountain caribou (Wakkinen 2009).

The Nature Conservancy of Canada recently purchased 550 sq km (213 sq mi) of private land within the SE recovery zone in Canada. The location of these lands directly connects to an existing network of parks and wildlife management areas, creating a contiguous protected area of more than 1,012 sq km (391 sq mi) enough for wide-ranging animals like mountain caribou and grizzly bear to maintain connectivity with U.S. populations of these species. There is currently a team of managers and biologists writing a management plan for the area that includes considerations for grizzly bears and caribou. This private land purchase represents a significant improvement to grizzly bear habitat in the SE recovery zone.

North Cascades Ecosystem Recovery Zone. The NCASC recovery zone is one of the largest contiguous blocks of Federal land in the lower 48 States. The recovery zone is approximately 25,108 sq km (9,694 sq mi) in north-central Washington State. The recovery zone is composed of about 88% Federal lands with approximately 11% (2,751 sq km / 1,062 sq mi) managed by North Cascades National Park, 28% (7,080 sq km / 2,734 sq mi) by the Mount Baker-Snoqualmie National Forest, 47% (11,939 sq km / 4,610 sq mi) by the Wenatchee and Okanogan National Forests; 6% managed by State agencies; and 6% are private lands (FWS 1997). About 43% of the recovery zone is designated

Wilderness Area (10,842 sq km / 4,186 sq mi) and another 15% (3,806 sq km / 1,470 sq mi) is managed as a Wilderness Area although it is not congressionally designated.

Within the NCASC recovery zone, there are 42 BMUs. Although there are not any motorized access standards that include OMRD and TMRD data, the Federal land management agencies in the NCASC manage for no net loss of Secure Habitat from 1997 baseline values (USFS 1997). This interim direction allowed for one change to be made in Secure Habitat in each BMU without review by the NCASC ecosystem subcommittee. This criterion of "no net loss" has been met for all BMUs with the following changes in Secure Habitat made since 1997: two situations in which a small reduction in Secure Habitat was approved in BMUs that contained more than 90% secure habitat; and minor reductions in Secure Habitat proposed due to high-use trail construction in some BMU's currently exceeding 80% Secure Habitat. These latter changes have not occurred yet but they are proposed in the Ross Lake National Recreation Area General Management Plan that is currently undergoing public comment. In the NCASC, Secure Habitat is defined as the area which is >500 m (1,640 ft) from any open motorized access route or high-use non-motorized access route. A high-use trail is defined as receiving $\geq$20 parties/week once or more in either the early (den emergence thru July 15) or late seasons (July 16-denning). The amount of Secure Habitat varies by BMU, ranging from 21-92%, with an average of 59% secure.

The Okanogan and Wenatchee National Forests recently began the process of revising their LRMP's and creating Travel Management Plans. When completed, motorized travel on these National Forests will be legally restricted to designated roads and trails identified on a Motorized Vehicle Use Map. Off-road travel will be prohibited except to access a campsite with 300 feet of a designated route.

There are not specific standards limiting developed sites within the NCASC on National Forest lands and it is currently unknown how many developed sites there are.

Between 2001 and 2008, the Mount Baker-Snoqualmie National Forest harvested an average of 4,000,000 board feet annually. However, this annual harvest ranged from 154,000-12,000,000 during this time and there is no discernible trend. That being said, the Northwest LRMP has greatly reduced the total amount of timber harvest on National Forests in the NCASC recovery zone from levels observed in the 1980s. There are currently two active mines within the NCASC recovery zone with an additional plan of operation to resume operations at the Apex Gold Mine currently under consideration (Gay 2010). There are currently five proposed geothermal drilling leases within the NCASC recovery zone

(Gay 2010). The Mt. Baker- Snoqualmie National Forest recommended that the BLM approve 4 of these leases that are on that Forest with a decision regarding the fifth expected after an environmental analysis is completed (Griffin 2011). There are no oil and gas developments on Federal lands within the NCASC recovery zone. With nearly 60% of this recovery zone managed as Wilderness, these levels of resource extraction do not threaten grizzly bears in this ecosystem.

Within the National Forests, there are livestock grazing allotments on roughly 13% (3,348 sq km / 1,293 sq mi) of lands. More specifically, there are currently 26 active and 6 inactive livestock allotments on National Forest within the NCASC recovery zone. This includes 21 active cattle allotments and 5 active sheep allotments. There have been no grizzly bear/livestock conflicts in the NCASC recovery zone.

The NCASC recovery zone is close to major urban centers and receives more recreational use than other recovery zones. The USFS predicts a 4% annual increase in recreation use in the National Forests of the NCASC. The Mount Baker-Snoqualmie National Forest received approximately 1,899,100 visits in 2005, including 291,000 visits to Wilderness Areas (National Visitor Use Monitoring Program 2006b). The Okanogan National Forest received roughly 397,000 visits in 2005, including 59,600 visits to Wilderness Areas (National Visitor Use Monitoring Program 2006c). The Wenatchee National Forest received approximately 2,130,800 visits in 2005, with roughly 129,900 visits to Wilderness Areas (National Visitor Use Monitoring Program 2006d). Of the total number of visits, approximately 75% were for recreational purposes, 11% were just passing through, and 7% stopped to use the restroom (National Visitor Use Monitoring Program 2006b, 2006c, 2006d). The interim direction that currently guides management of Secure Habitat in the NCASC defined Secure Habitat as >500 m (1,640 ft) from any motorized access route or high-use non-motorized access route (USFS 1997). In this way, the interim direction will address increases in recreation since non-motorized access routes receiving $\geq$20 parties per week will no longer meet the definition of Secure Habitat which could lead to a net loss in Secure Habitat that would have to be mitigated by an increase in Secure Habitat somewhere else within that BMU (USFS 1997).

Because connectivity with Canadian populations of grizzly bears is vital to the long-term conservation of grizzlies in the NCASC, the cumulative effects of timber harvest, recreation, and road building in B.C. can affect grizzly bears in the NCASC. In 1995, the B.C. Provincial government developed a grizzly bear conservation strategy (B.C. Ministry of Environment, Lands, and Parks 1995). A major goal of the B.C. Grizzly Bear Conservation Strategy is to ensure effective, enhanced protection and management of habitat through land use planning processes, new

protected areas, and the Forest Practices Code. Given the development of a recovery plan for the Canadian Cascades (see below), there has been more attention given to habitat protection here than in other areas of B.C. Whether these habitat protections have been implemented fully or achieved the stated goals is unknown.

In 2004, the North Cascades GBRT released a grizzly bear recovery plan for the Canadian North Cascades. This Recovery Plan applies to the Canadian North Cascades Grizzly Bear Population Unit, a 9,800 sq km (3,784 sq mi) area directly adjacent the U.S. Grizzly NCASC recovery zone (North Cascades GBRT 2004). The GBRT identified two types of lands within the North Cascades Grizzly Bear Population Unit in Canada: 1) integrated resource management lands and 2) protected areas (North Cascades GBRT 2004). Roughly 20% of the area contained within the North Cascades Grizzly Bear Population Unit in Canada (1,900 sq km / 734 sq mi) is within Provincial Parks or other protected areas (North Cascades GBRT 2004). Provincial Parks in the Canadian Cascades are primarily managed for recreation activities with little road access, site development, or resource extraction. In contrast, integrated resource management lands are a part of B.C.'s working landbase and working forest. These areas are open to commercial activities and resource development (e.g., forestry, range, mining, energy, commercial recreation, infrastructure, etc.), within the legal constraints of applicable Canadian laws, regulations and policies. Currently, there is an extensive network of secondary roads built primarily for timber extraction. In fact, outside of the B.C. Manning and Cathedral Provincial Parks, there is no point in the Canadian North Cascades that is more than 7 km (4 mi) from a road or clearcut (North Cascades GBRT 2004).

There are four different HCPs in place with various entities in the NCASC: 1) Cedar River Watershed HCP; 2) West Fork Timber HCP (formerly Murray Pacific); 3) City of Tacoma, Tacoma Water HCP; and 4) the Plum Creek HCP:

(1) The City of Seattle's Cedar River HCP was approved in April 2000 and covers water withdrawal activities and instream flows on the Cedar River plus watershed management activities in 364 sq km (141 sq mi) of the upper Cedar River watershed. The HCP covers 83 species including grizzly bear. The permit term is for 50 years. Some of the conservation measures that benefit grizzly bears include road decommissioning (38% of roads in the watershed), reintroduction of anadromous fish populations, upper watershed closed to public access, and removal of fish passage barriers.

(2) When completed in 1993, the West Fork Timber HCP only covered spotted owls, but was modified in 1995 to cover grizzlies and many other species. It covers approximately 214 sq km (83 sq mi) for 100 years. This HCP involved covenants associated with the land. Their conservation measures include: landscape-level commitments to provide spotted owl dispersal habitat; watershed analysis and riparian prescriptions to provide stream buffers and address unstable slopes; habitat reserves (including stream and wetland areas) that will be at least 10% of vegetated areas; and protection of unique habitats such as talus slopes and caves. There are specific provisions protecting active grizzly bear den sites. There also are a variety of road management provisions including avoidance of construction through talus slopes, minimizing the total miles of road within the tree farm, and controlling public access.

(3) The City of Tacoma's Green River HCP was approved in July 2001. It covers water withdrawal activities on the Green River and forest management on approximately 61 sq km (23 sq mi) in the upper Green River watershed. The HCP covers 32 species of fish and wildlife including grizzly bear. The permit term is 50 years. Conservation measures that benefit grizzly bears include: restoration of anadromous fish populations in the upper watershed, removal of fish passage barriers, management of trash, road closures and road abandonment, prohibition of firearms in vehicles of contractors, and grizzly bear den protection, if present.

(4) The Plum Creek HCP, completed in 1996, was amended several times -- most notably in association with a large land exchange. However, there have been numerous conservation sales -- some associated with the land exchange and others completely separate. The HCP acreage has gone from about 688 sq km (266 sq mi) in 1996 to less than 486 sq km (188 sq mi) currently -- wholly due to conservation sales and transferring ownership to the Federal government. The largest effect of these land exchange and sales with respect to grizzly bears is that the lands that were within the recovery zone have mostly become Federal ownership now. The HCP addressed vertebrate species and used a combination of watershed analysis, riparian and unstable slope prescriptions, committed to maintaining certain amounts of the landscape in various forest stages and types, as well as protected unique habitats such as talus, caves, cliffs, forested and non-forested wetlands, seeps, and springs. Measures specifically designed to address grizzlies within the recovery zone include: 1) habitat mapping and analysis of road densities, hiding/thermal cover, and forage/prey habitat to evaluate the quantity and quality of grizzly bear habitat on 467 sq km (180 sq mi) in the planning area; 2) Plum Creek began immediately implementing a series of "Best Management Practices"

within the grizzly bear recovery zone to facilitate natural recovery including road closures, road-density targets, maintenance of visual cover along open and some other roads, and firearm prohibitions for company and contractor personnel; and 3) upon confirmation of grizzly bears in the planning area, Plum Creek would implement additional protective measures to reduce the potential for conflict, death, and displacement of resident bears including additional road closures, retention of cover in harvest units so that no point in the unit is more than 600 feet from effective hiding cover, and seasonal timing restrictions on forest operations.

Bitterroot Ecosystem Recovery Zone. The BE recovery zone is the largest contiguous block of federally designated Wilderness Area in the lower 48 States. The Experimental Population Area is approximately 67,528 sq km (26,073 sq mi), including approximately 16,187 sq km (6,250 sq mi) of designated Wilderness Area. Habitat conditions in the BE were described in detail in the Final EIS for Grizzly Bear Recovery in the BE (FWS 2000). For the purposes of this review, habitat conditions in the BE have not changed significantly and we do not view habitat destruction or modification as a threat to grizzly bears in the BE.

Summary of Factor A. Roughly 32% of all suitable habitat inside recovery zone boundaries that are currently occupied by grizzly bear populations is within a designated Wilderness Area (26,980 of 84,703 sq km (10,417 of 32,704 sq mi)). This includes 8,600 sq km (3,320 sq mi) in the GYA; 6,995 sq km (2,700 sq mi) in the NCDE; 381 sq km (147 sq mi) in the CYE; 162 sq km (62 sq mi) in the SE; and 10,842 sq km (4,186 sq mi) in the NCASC recovery zones. Additionally, of the 22,783 sq km (8,797 sq mi) of suitable habitat in the GYA outside of the recovery zone, 30% (6,799 sq km (2,625 sq mi) is within a designated Wilderness Area (72 FR 14866, March 29, 2007). The average amount of Secure Habitat in each recovery zone ranges from 53% in the SE to 70% in the NCDE. There have been significant improvements in habitat management throughout the range of the species. While not every habitat issue is completely and adequately addressed there are plans and actions in place to address most known threats.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes.

The original 1975 listing for grizzly bears equated overutilization with any type of human-caused mortality. Within this context, the Rule stated that "overutilization" was resulting in " … a continual loss of animals through indiscriminate illegal killing … control operations … and livestock depredations." We now address human-caused mortality from illegal kills, management removals, livestock depredations, defense of life and property, mistaken identity, and accidental take as a type of "predation" in Factor C below.

No grizzly bears have been legally removed from the lower 48 States in the last 34 years for commercial or educational purposes. Several grizzly bears have been removed for scientific or recreational purposes. For a complete discussion of Factors B and C in the GYA, please refer to pp. 14920-14922 of the Yellowstone Final Rule (72 FR 14866, March 29, 2007) and the IGBST's report in response to high grizzly bear mortalities in 2008 (Servheen et al. 2009).

Since 1980, there have been 83 grizzly bear mortalities for recreational purposes (i.e., legal grizzly bear hunting) in the NCDE and in adjacent population units in Canada. In Montana, there was a legal grizzly bear hunting season until 1991. Between 1980 and 1991, there were 81 grizzly bear mortalities in the NCDE during the legal grizzly bear hunting season for recreational purposes. This hunting season in the lower 48 States was suspended permanently in 1991 (57 FR 37478, August 19, 1992). Since 1991, there have been an additional two grizzly bears with home ranges spanning the U.S./Canadian border north of the CYE removed for recreational purposes during legal Canadian grizzly bear hunting seasons. These mortalities of bears originally captured and marked in the U.S. illustrate the biological connectivity across the international border. There has not been a legal grizzly bear hunting season in Canada directly north of the North Cascades since 1974, due to the tenuous status of that population in Canada (North Cascades GBRT 2004). Similarly, there is no longer a grizzly bear hunting season in Canada north of the SE or CYE recovery zones. In light of these proactive measures to halt Canadian grizzly bear hunting seasons, we do not consider grizzly bear hunting in Canada to be a threat to grizzly bears in the lower 48 States. However, we will continue to monitor grizzly bear mortalities in B.C. hunting districts to ensure these do not compromise connectivity between Canada and the U.S. In the absence of the ESA's protections, recreational mortalities within the U.S. may increase but those within Canada would probably remain relatively stable because they are independent of the ESA.

In total, there have been 29 grizzly bears in the lower 48 States that have died for scientific purposes between 1980 and 2008. These mortalities were accidental mortalities from research trapping and handling. Between 1980 and 2008, there were nine trapping related mortalities in the GYA (72 FR 14866, March 29, 2007, p. 14920). Between 1982 and 2009, there were 2 research trapping mortalities (Kasworm et al. 2010) in the CYE (of 36 total grizzly captures). During this same time period, there were 14 grizzly bear mortalities related to research handling (i.e., scientific purposes) in the NCDE recovery zone. The other four grizzly bear mortalities that occurred for scientific purposes in the NCDE involved intentional relocations of bears to the CYE in order to augment that population. These bears were counted as mortalities in the NCDE because they were removed from the ecosystem.

In sum, a total of 112 grizzly bears from the lower 48 States have died since 1982 (when detailed mortality record keeping began) for scientific or recreational purposes. Mortalities for recreational purposes due to unregulated hunting are not a threat to grizzly bears in the lower 48 States because legal grizzly bear hunting seasons have been closed within the U.S. All but two hunting units in adjacent grizzly bear habitat in Canada have been closed and these are north of the NCDE. Mortalities related to scientific research or conservation efforts comprise 2.7% (29 / 1,072) of all mortalities in the lower 48 States between 1980 and 2008. Scientific overutilization is not a threat to grizzly bears in the lower 48 States because of rigorous protocols dictating proper bear capture, handling, and drugging techniques. Mortalities in the NCDE for augmentation purposes in other recovery ecosystems are an acceptable, discretionary source of mortality for grizzly bears in the lower 48 States. Overall, overutilization for commercial, recreational, scientific, or educational purposes is not a threat to the grizzly bears in the lower 48 States as it comprises very little of overall mortality. When grizzly bears are no longer protected by the ESA, we will require that States choosing to implement a grizzly bear hunting season do so based on sustainable mortality limits to ensure this form of take does not threaten the population.

2.3.2.3 Disease or predation.

This section covers disease, natural mortality, and predation. Human-caused mortality was identified as a threat to grizzly bears under Factor B in the 1975 listing (40 FR 31734, July 28, 1975). Because human-caused mortalities from illegal killing, management removals, livestock depredations, defense of life or property, mistaken identity, and accidental take is not for recreational, commercial, scientific, or educational purposes, we evaluate human-caused mortality under Factor C in this review (a similar approach was taken in the recent Yellowstone Final Rule, Appendix A).

Disease – This factor was not identified as a threat to grizzly bears in the original listing. The recovery plan indicates that parasites and disease do not appear to be significant causes of natural mortality among bears (Jonkel and Cowan 1971; Mundy and Flook 1973; Rogers and Rogers 1976). While many diseases are present and monitoring will continue, the available evidence continues to support the finding at the time of listing. Because there are no significant differences regarding this factor since 2007, for an analysis of this factor in the GYA, please refer to the Yellowstone Final Rule (pp. 14920-14922, Appendix A).

Researchers have documented grizzly bears with brucellosis (type 4), clostridium, toxoplasmosis, canine distemper, canine parvovirus, canine hepatitis, leptospirosis, and rabies (Zarnke 1983; LeFranc et al. 1987;

Zarnke and Evans 1989; Marsilio et al. 1997; Zarnke et al. 1997). The most common internal parasite noted in grizzly bears is *Trichinella* for which 62% of grizzly bears tested positive from 1969-1981 (Greer 1982). Disease screening of captured black and grizzly bears in the CYE, SE, and NCDE recovery zones during 2000 showed antibody levels consistent with exposure to several diseases, but no clinical sign of disease (Port et al. 2001). Effects of these levels of incidence are unknown but negative impacts to vital rates or bears showing symptoms of these diseases have not been documented. Despite this lack of observed data indicative of symptoms or population level impacts, monitoring will continue.

The MFWP operates a wildlife laboratory at Bozeman. One of the laboratory's objectives is to necropsy wildlife specimens suspected of being diseased, parasitized, or dying of unknown causes, to identify the cause of death (Aune and Schladweiler 1995). Tissue samples are examined by Veterinary Pathologists at the State Diagnostic Laboratory. Though disease was not considered a threat at the time of listing, we will continue to have dead grizzly bears processed through a laboratory to determine cause of death and to maintain baseline information on diseases and parasites occurring in grizzly bears. This action will serve to continue monitoring these agents as potential mortality sources. If disease is later determined to be a threat, we will evaluate and adopt specific measures to control the spread of any disease agent and treat infected animals, where such measures are possible. These measures will depend on the disease agent identified.

Although grizzly bears have been documented with a variety of bacteria and other pathogens, parasites, and disease, fatalities are uncommon (LeFranc et al. 1987) and population-level impacts on grizzly bears have not been documented (Jonkel and Cowan 1971; Mundy and Flook 1973; Rogers and Rogers 1976). Based on 30 years of monitoring in grizzly bear ecosystems, natural mortalities in the wild due to disease are rare (IGBST 2005) and it is likely that mortalities due to any of these bacteria or pathogens are negligible components of total mortality. Disease is likely to remain an insignificant factor in population dynamics into the foreseeable future.

Natural Predation and Mortality – Grizzly bears are occasionally killed by other bears. Adult grizzly bears kill cubs, subadults, or other adults (Stringham 1980; Dean et al. 1986; Hessing and Aumiller 1994; McLellan 1994; Schwartz et al. 2003b). This source of natural grizzly bear mortality seems to occur rarely (Stringham 1980) and there were only 30 known grizzly bear mortalities in the lower 48 States between 1980 and 2008 attributed to this type of natural predation: 14 in the GYA; 13 in the NCDE; and 3 in the CYE. Overall, these types of aggressive interactions among grizzly bears are rare and are likely to remain an insignificant factor in population dynamics into the foreseeable future.

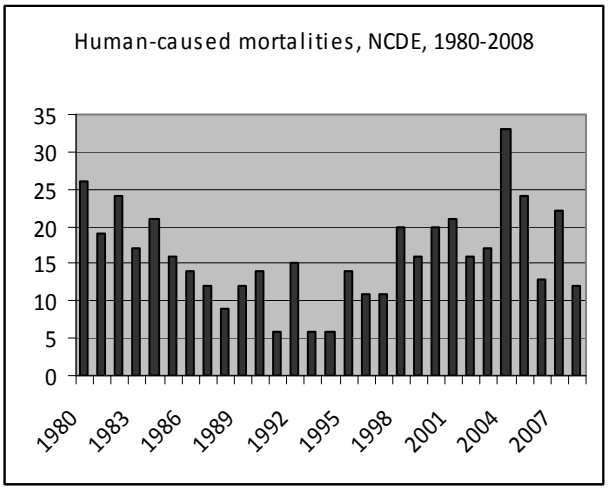
Other sources of natural mortality in grizzly bears include starvation and natural events such as avalanches or fires. For a complete discussion of this type of natural mortality in the GYA, please see p. 14920 of the Yellowstone Final Rule (Appendix A). In the lower 48 States outside of the GYA, natural mortalities accounted for 8.5% (24 / 284) of all known mortalities between 1999 and 2008. This included 15 natural mortalities in the NCDE; 9 in the CYE; and 0 that we are aware of in the SE (TABLE 2). This is comparable to the natural mortality rate of 11.4% in the GYA (Servheen et al. 2004). All nine of the natural mortalities in the CYE occurred between 1999 and 2002. While there have not been any known natural mortalities since 2002 in the CYE, in light of the natural mortality levels observed from 1999-2002, the FWS remains vigilant regarding this factor and continues to monitor natural mortality to determine if it becomes a threat to the population at some point in the future. Monitoring of this factor will continue, but natural predation and mortality do not appear to be limiting the population at this point. Our figures for natural mortality in the SE may be incomplete. In recent years, natural mortalities in the SE have gone largely undetected because there is no active research trapping program. Overall, the level of natural mortality observed in the lower 48 States is not unusual. Even without the protections of the ESA, natural mortality would not threaten grizzly bear populations.

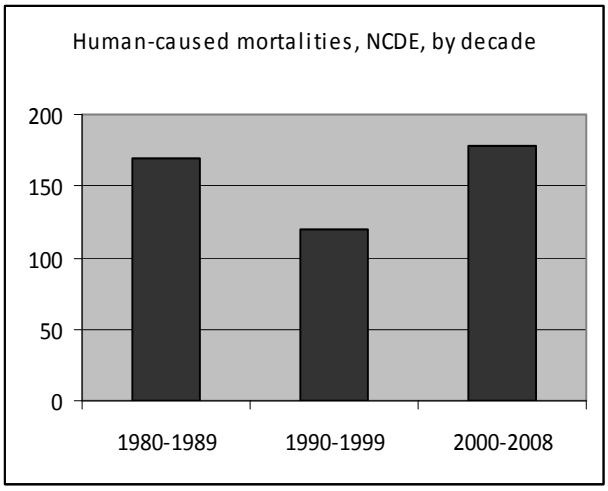
Human Predation – Humans have historically been the most effective predators of grizzly bears. Excessive human-caused mortality is the driving factor behind grizzly bear declines during the 19th and 20th centuries (Leopold 1967; Koford 1969; Servheen 1990, 1999; Mattson and Merrill 2002; Schwartz et al. 2003b), eventually leading to their listing as a threatened species in 1975. Grizzlies were seen as a threat to livestock and to humans and, therefore, an impediment to westward expansion. The Federal government, as well as many of the early settlers in grizzly bear country, was dedicated to eradicating large predators. Grizzly bears were shot, poisoned, and killed wherever humans encountered them (Servheen 1999). By the time grizzlies were listed under the ESA in 1975, there were only a few hundred grizzly bears remaining in the lower 48 States in less than 2% of their former range (see FIGURE 1, inset) (FWS 1993). For a detailed discussion of human-caused mortality in the GYA, please refer to pp. 14920-14922 of the Yellowstone Final Rule and to Servheen et al. (2004; 2009).

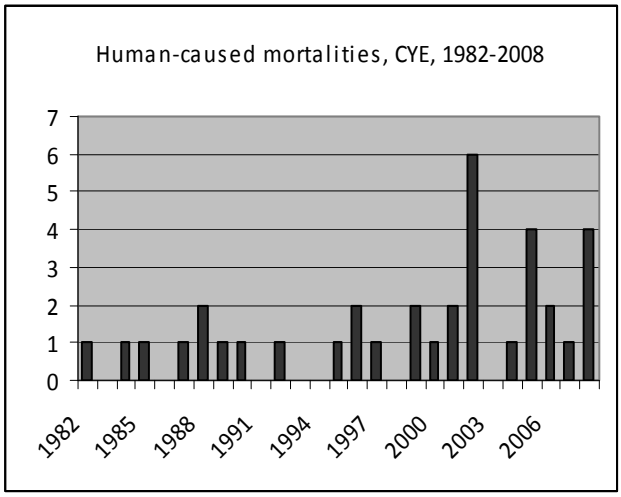
Outside of the GYA, from 1999-2008, a total of 284 known grizzly bear deaths occurred in the lower 48 States. An analysis of mortality sources from the previous decade reflects on-the-ground conditions and provides management priorities. Of these grizzly bear mortalities, 88% (250 / 284) were human-caused, 8.5% (24 / 284) were natural, and 3.5% (10 / 284) were from unknown causes. Since 1975, levels of human-caused

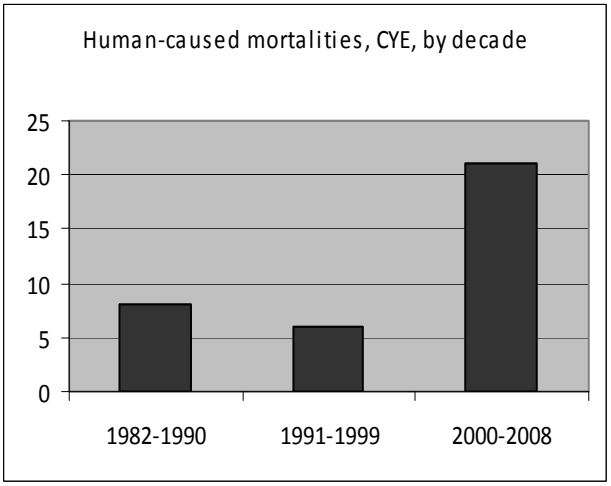
mortality have remained relatively constant in the NCDE although there was a moderate increase in the current decade over previous decades (FIGURE 2). Human-caused mortality has increased in both the CYE and SE, particularly in the current decade (FIGURE 2). Although humans remain the single greatest cause of mortality for grizzly bears (McLellan et al. 1999; Servheen et al. 2004), the NCDE grizzly bear population appears to be doing well with a large population size and ongoing range expansion, as evidenced by confirmed locations of grizzly bears and human-caused mortalities well outside the recovery zone boundaries (see section 2.3.1.5). This population increase and expansion at the same time the human population was increasing in western Montana may partially explain the apparent increase in human-caused mortalities over the last decade (FIGURE 2). Similarly, the SE grizzly bear population is slowly increasing in size (Wakkinen and Kasworm 2004). In contrast, human-caused mortality in the CYE recovery zone appears to be the limiting factor for population growth and range expansion in this recovery zone. Besides the 1 human-caused grizzly bear mortality at the northern edge of the BE Experimental Population Area, there have been no known human-caused mortalities in the BE or NCASC recovery zones.

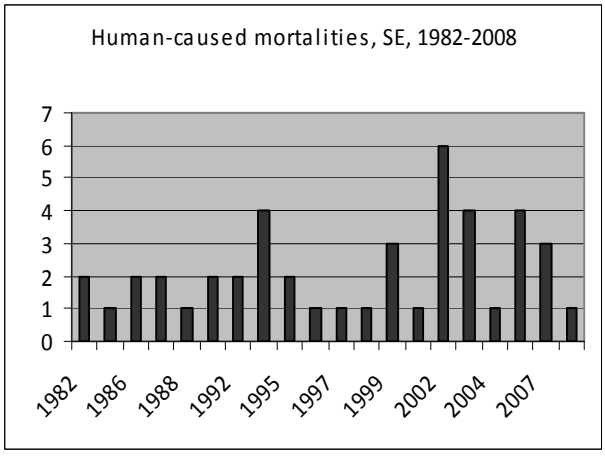
Below, we consider specific causes of human predation in the last decade (1999-2008) including illegal killings, defense of life and property, and management removals (see TABLE 2). For the NCDE, we report all known mortalities occurring between 1999 and 2008 inside and outside of the recovery zone boundary for bears known to have originated in the NCDE, excluding mortalities in Canada. For the CYE, we report all known mortalities occurring between 1999 and 2008 in the recovery zone or within 10 miles of the boundary, including 10 miles into B.C. and any bears that were radio-collared in the U.S. and later died in Canada. For the SE, we report all known mortalities occurring between 1999 and 2008 in the recovery zone or within 10 miles of the boundary, including in B.C.











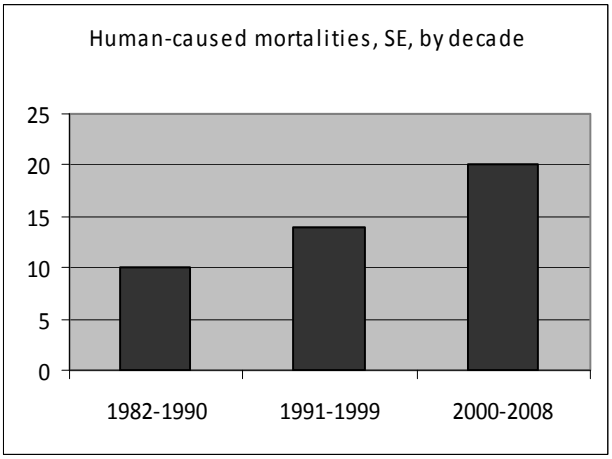


FIGURE 2. Human-caused grizzly bear mortalities over time by year and decade in the NCDE, CYE, and SE, 1980-2008. There are no data from the NCASC or BE. For detailed spatial and temporal analyses of human-caused mortalities in the GYA, please refer to Servheen et al. (2004), pp. 14920-14922 of the Yellowstone Final Rule (Appendix A), and Servheen et al. (2009).

We define vandal killing as malicious, illegal killing of grizzly bears. From 1999-2008, vandal killing accounted for 26% (66 / 250) of human-caused mortalities in the lower 48 States outside of the GYA with 51 mortalities in the NCDE; 9 in the CYE; 5 in the SE; and 1 near Anaconda, Montana. People may kill grizzly bears for several reasons, including a general perception that grizzly bears in the area may be dangerous, frustration over depredations of livestock, or to protest land use and road use restrictions associated with grizzly bear habitat management (Servheen et al. 2004). Regardless of the reason, vandal killing continues to occur.

This level of illegal take occurred during a period when illegal killing was enforceable by Federal prosecution although most cases are prosecuted by States due to the high burden of proof needed to prosecute under the ESA. State and Federal law enforcement agents cooperate to ensure consistent enforcement of laws protecting grizzly bears. Prosecutors and enforcement personnel work together to make recommendations to all jurisdictions, counties, and States on uniform enforcement, prosecution, and sentencing related to illegal grizzly bear kills. If grizzly bears were not protected under the ESA, they would be listed as game animals in their respective States and would be legally protected from unregulated killing. Illegal killing is a significant source of mortality for all 3 recovery ecosystems in the lower 48 States outside of the GYA (TABLE 2). While we recognize vandal killings will never be eliminated entirely, reducing this source of human-caused mortality is desirable in the NCDE if other levels of human-caused mortality also remain high. Due to the low population sizes in the CYE and SE recovery zones, continued mortality control is necessary for their recovery.

One way to address vandal killing is to change human values, perceptions, and beliefs about grizzly bears and Federal regulation of public lands (Servheen et al. 2004). To address the concerns of user groups who have objections to land use restrictions that accommodate grizzly bears, Federal and State agencies market the benefits to multiple species of restricting motorized access. For example, both Montana and Wyoming have recommendations for elk habitat security similar to those for grizzly bears (less than 1.6 km / 2.6 sq km (1 mi / sq mi)) and this level of motorized access meets the needs of a variety of wildlife species, while maintaining reasonable opportunities for public access. To address the concerns of citizens who feel that grizzly bears are a threat to their safety or their lifestyle, Information and Education (I&E) programs aim to change perspectives about the danger and behavior of grizzly bears (for a detailed discussion of I&E programs, see section 2.3.2.5).

Under threatened status, it is illegal for private citizens to kill grizzly bears unless it is in self defense (50 CFR § 17.40) or, in Canada, defense of property. From 1999-2008 "defense of life or property" kills accounted for 9% (23 / 250) of all mortalities in the lower 48 States outside of the GYA: 20 mortalities in the NCDE; 3 in the CYE; and 0 in the SE. These grizzly bear/human conflicts were primarily hunting-related although many also involved human site developments, campsites, and one livestock-related incident. In the NCDE, 60% (12 / 20) of grizzly bears killed in self defense were hunting-related. These deaths occur during surprise encounters in heavy cover, at hunter-killed carcasses or gut piles, or when packing out carcasses. Some "defense of life" grizzly bear mortalities are unavoidable but Federal and State agencies have many options to potentially reduce these conflicts (Servheen et al. 2004). By promoting the use of bear spray and continuing I&E programs, some of these grizzly bear deaths may be avoided. Of self defense mortalities in the NCDE, 35% (7 / 20) were related to front-country or back-country developed sites and/or attractants. Overall, because of the relative infrequency of these mortalities, we do not consider self-defense human-caused mortality to be a threat to grizzly bears in the lower 48 States although continuing education and outreach is necessary to keep these mortalities at a sustainable level.

Humans kill grizzly bears unintentionally with vehicles or by mistaking them for other species when hunting. From 1999-2008, nearly 32% (80 / 250) of all human-caused grizzly bear mortalities in the lower 48 States outside of the GYA were accidental or unintentional. This includes 22 mortalities due to collisions with vehicles, 28 from collisions with trains, 16 associated with mistaken identification, and 14 related to capturing and handling. Measures to reduce vehicle and train collisions with grizzly bears include removing other wildlife carcasses from the road or tracks so that grizzly bears are not attracted to these areas (Servheen et al. 2004), keeping the tracks clean of spilled grain, and reducing human-caused mortality in nearby residential areas by providing bear resistant garbage containers where needed. Cost-effective mitigation efforts to facilitate safe crossings by wildlife are voluntarily incorporated in road construction or reconstruction projects on Federal lands within suitable grizzly bear habitat. For example, a multi-year plan to expand U.S. Highway 93 from Evaro to Polson, Montana, includes more than 50 wildlife crossing structures in this 54-mile stretch of highway. This highway expansion and wildlife mitigation project includes a crossing structure in a key crossing area where multiple grizzly bear mortalities have occurred (i.e., Post Creek).

Mistaken identification by hunters is more manageable than other unintentional deaths. Mistaken identification accounted for 6% (12 / 201) of human-caused mortalities in the NCDE; 13% (3 / 23) in the CYE; 4%

(1 / 23) in the SE; and 1 mortality in the BE Experimental Population Area. There also was one other mistaken identification mortality of a male grizzly bear near Rose Lake, Idaho. This incident involved a landowner mistakenly shooting a bear he thought was a black bear feeding on depredated livestock. This type of human-caused predation is a manageable source of mortality. Many I&E programs are targeted at hunters to emphasize patience, awareness, and correct identification of targets so that grizzly bear mortalities from inexperienced black bear and ungulate hunters are reduced. Beginning in license year 2002, the State of Montana required that all black bear hunters pass a Bear Identification Test before receiving a black bear hunting license (see http://fwp.state.mt.us/bearid/ for more information and details). The average number of grizzly bears mistakenly killed in Montana each year, before this test was required, was 1.3. The average number of grizzly bears mistakenly killed each year since 2002, when the test became mandatory, is 1.4. While these numbers do not demonstrate a decrease in this source of mortality, we do not consider this difference biologically significant. The mandatory bear identification test has been successful in keeping mistaken identification kills from increasing in Montana while the number of black bear hunters increased from 9,118 in 1996 to 10,125 in 2003, the last year these data are available (MFWP 2010). Montana also includes grizzly bear encounter management as a core subject in basic hunter education courses (Dood et al. 2006). While the State of Idaho emphasizes correct bear identification throughout its hunting regulations and publications, a bear identification test is voluntary at this time. Similarly, in Washington State, where the SE mistaken identification mortality occurred, black bear hunters are not required to take a bear identification test although there is a voluntary bear identification test on the WDFW website (http://wdfw.wa.gov/hunting/bear_cougar/bear/index.html).

The last source of human predation on grizzly bears is associated with management removal of nuisance bears following grizzly bear/human conflicts. Effective nuisance bear management benefits the conservation of grizzly bear populations by promoting tolerance of grizzly bears, minimizing illegal killing of bears by citizens, and educating the public about how to avoid conflicts. The current nuisance bear protocol is described in the Guidelines (USFS 1986). It emphasizes the individual's importance to the entire population, with females receiving a higher level of protection than males. Location, cause of incident, severity of incident, history of the bear, health, age, and sex of the bear, and demographic characteristics are all considered in any relocation or removal action. State and NPS bear managers consult with the FWS, each other, and other relevant Federal agencies (i.e., USFS, BLM) before any nuisance bear management decision is made. The Guidelines emphasize removal of the human cause of the conflict when possible, or management and education actions to limit such conflicts (USFS 1986). In addition, an I&E team

coordinates the development, implementation, and dissemination of programs and materials to aid in preventative management of human/bear conflicts. Successful management of grizzly bear/human conflicts requires an integrated, multiple-agency approach to keep human-caused grizzly bear mortality within sustainable levels.

Between 1999 and 2008, management removals accounted for 26% (65 / 250) of all human-caused grizzly bear mortalities in the lower 48 States outside of the GYA (TABLE 2). We define management removals as those associated with nuisance bear behavior (USFS 1986). While removal of nuisance bears is necessary to protect the public, the ultimate source of the conflict that led to nuisance bear behavior is usually manageable. The majority of management removals result from conflicts at site developments involving unsecured attractants such as garbage, human foods, pet/livestock/wildlife foods, livestock carcasses, and wildlife carcasses. In fact, 18% (46 / 250) of known human-caused mortalities between 1999 and 2008 were related to human developed sites: 37 in the NCDE; 3 in the CYE; and 6 in the SE. These conflicts involved food-conditioned bears actively seeking out human sources of food or bears that are habituated to human presence seeking natural sources of food in areas that are near human structures or roads. While these mortalities are clearly related to human attractants, they also are related to attitudes and personal levels of knowledge about and tolerance toward grizzly bears. Both State and Federal I&E programs are aimed primarily at reducing grizzly bear/human conflicts proactively by educating the public about potential grizzly bear attractants. To address public attitudes and knowledge levels, I&E programs present grizzly bears as a valuable public resource while acknowledging the potential dangers associated with them (for a detailed discussion of I&E programs, see section 2.3.2.5).

Management removals due to grizzly bear conflicts with livestock accounted for nearly 6% (15 / 250) of known human-caused mortalities between 1999 and 2008, all of which occurred in the NCDE. Several steps to reduce livestock conflicts have been implemented. The USFS and NPS have phased out most livestock allotments within the recovery zone boundaries. As practicable, livestock grazing permits on public lands in grizzly habitat include special provisions regarding reporting of conflicts, proper food and attractant storage procedures, and carcass removal. The USFS also has closed sheep allotments to resolve conflicts with species such as bighorn sheep. Ninety-three percent (14 / 15) of all livestock-related mortalities in the NCDE occurred either on private land (53%) or Tribal land (40%). All six livestock-related mortalities occurring on Tribal land were on the Blackfeet Indian Reservation. Active management of individual nuisance bears is required. Removal of repeat depredators of livestock has been an effective tool for managing grizzly bear/livestock conflicts as most depredations are done by a few individuals

(Jonkel 1980; Knight and Judd 1983; Anderson et al. 2002). While we do not consider these levels of mortality a threat to grizzly bears in the NCDE or the lower 48 States at this time, continued efforts to reduce these mortalities on private and Tribal lands should be undertaken. If grizzlies were not protected under the ESA, in Montana a grizzly bear caught in the act of attacking or killing livestock could be killed by a private citizen (87-3-130 MCA). While there are no instances of this occurring while grizzly bears were delisted in the GYA DPS boundaries for more than 2 years, this potential source of mortality would be heavily monitored and revised appropriately if mortalities from this source indicated a long-term trend or problem.

The different recovery ecosystems face similar challenges related to human-caused mortality but the severity of each source of mortality varies by ecosystem. In the NCDE, the top three sources of human-caused mortality are: management removals (27%), illegal kills (25%), and trains (12%) (TABLE 2). Most of these management removals (67%) were related to site developments and unsecured attractants. The remaining management removals were related to livestock (27%), or unnaturally aggressive bears or human injuries and fatalities (5%). In the CYE, the top sources of human-caused mortality are: illegal kills (39%) then management removals, self defense, mistaken identification, and trains each accounting for 13% of human-caused mortalities (TABLE 2). In the SE, the top three sources of human-caused mortality are: defense of property in B.C. (39%), management removals (30%); and illegal kills (22% (TABLE 2). These management removals are primarily related to orchards in B.C. and improperly stored garbage and attractants on private lands.

TABLE 2. Known grizzly bear mortalities from all causes, 1999-2008 in the CYE, SE, and NCDE. This time period reflects our most recent knowledge about mortality sources and the most relevant management challenges. For detailed information on the spatial and temporal aspects of human-caused mortalities in the GYA, please see pp. 14920-14922 of the Yellowstone Final Rule, Servheen et al. (2004 and 2009).

	CABINET-YAAK ECOSYSTEM		SELKIRK ECOSYSTEM		NORTHERN CONTINENTAL DIVIDE ECOSYSTEM		OTHER*	
cause (all sources)	**# mortalities**	**% total**	**# mortalities**	**% total**	**# mortalities**	**% total**	**# mortalities**	***TOTALS***
natural	9	28%	dd**	-	15	7%		**24**
unknown/undetermined	0	0%	0	0%	10	4%		**10**
human-caused	23	72%	23	100%	201	89%	3	**250**
total mortalities	**32**		**23**		**226**		**3**	**284**
human-caused mortalities	**# mortalities**	**% human-caused**	**# mortalities**	**% human-caused**	**# mortalities**	**% human-caused**		
augmentation***	0	0%	0	0%	4	2%		
automobile collision	0	0%	1	4%	21	10%		
capture related	1	4%	0	0%	13	6%		
defense of life	3	13%	0	0%	20	10%		
defense of property****	0	0%	9	39%	0	0%		
illegal - malicious	9	39%	5	22%	51	25%	1	
legal hunting in B.C.	1	4%	0	0%	0*****	0%		
management removal	3	13%	7	30%	55	27%		
mistaken identification	3	13%	1	4%	12	6%	2	
train	3	13%	0	0%	25	12%		

* Three male grizzly bears were killed in areas well outside of recovery zones: 1 near Anaconda, Montana in 2005; 1 in the northern portion of the Bitterroot Experimental Population Area in 2007; and 1 near Rose Lake, Idaho in 2009.

** Because of inadequate funding, we are data deficient about natural mortalities in the SE.

*** When bears are relocated from the NCDE to the CYE, they are counted as mortalities in the NCDE.

**** In the B.C. portion of the SE, it is legal for citizens to kill grizzly bears in defense of property.

***** Mortalities in the NCDE from legal hunting in Canada are not recorded.

Summary of Factor C. In sum, between 1999 and 2008 grizzly bears in the lower 48 States outside of the GYA incurred an average of 25 human-caused grizzly bear mortalities per year: 20.1 in the NCDE; 2.3 in the CYE; and 2.3 in the SE. Between 1980 and 2002, grizzly bears in the GYA incurred an average of 12.6 mortalities per year (Servheen et al. 2004). Despite these mortalities, both the GYA and NCDE populations are abundant with evidence of range expansion. Similarly, the SE population is estimated to be slowly increasing (Wakkinen and Kasworm 2004). In contrast, the CYE population is most likely declining (Wakkinen and Kasworm 2004; Kasworm et al. 2010). Disease and natural predation are not currently a threat to grizzly bears in the lower 48 States. In the CYE, the FWS may reconsider natural mortality in the future if monitoring indicates natural mortalities may be a threat to the population. Humans are directly or indirectly responsible for the 89% of grizzly bear deaths in the lower 48 States outside of the GYA and 73% within the GYA. This source of mortality can be effectively managed through nuisance bear management and I&E programs.

Grizzly bear populations in the CYE and SE recovery zones appeared to be responding to protective measures that reduce human-caused mortality prior to 1999, but human-caused mortality and high levels of natural mortality during 1999-2002 eroded much of the population gains in the CYE. Due to the small population size, inherently low growth rates of grizzly bear populations, and potential fragmentation with Canadian populations, the recovery plan goal for human-caused mortality in these recovery zones is 0 (FWS 1993). The increase in human-caused mortality from 0.6 mortalities/year from 1989-1998 to 2.3 mortalities/year from 1999-2008 indicate that human-caused mortality (i.e., human predation) is a threat to grizzly bears in the CYE. While the increase in human-caused mortality in the SE from an average of 1.1 mortalities/year from 1989-1998 to 2.3 mortalities/year from 1999-2008 also could indicate that human-caused mortality (i.e., human predation) is a threat to grizzly bears in the SE, the positive population trend complicates this interpretation.

Human-caused mortality is a threat to grizzly bear populations when total mortality is unsustainable (i.e., causes a long-term decline in population growth rate). At this point, we do not consider human-caused mortality to be a threat to grizzly bears in the NCDE or the GYA, both of which have increasing trends. In the SE and CYE, human-caused mortality is a threat because of the small population size (<100) in these ecosystems.

2.3.2.4 Inadequacy of existing regulatory mechanisms.

The lack of regulatory mechanisms to control take and protect habitat was a contributing factor to grizzly bear population declines (40 FR 31734-31736, July 28, 1975). Upon listing under the ESA, the

grizzly bear immediately benefited from a Federal regulatory framework that included regulation of take (defined under the ESA to include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct); consultation for any Federal project and recommended measures to prevent habitat destruction or degradation if such activities harm individuals of the species; the commitment that Federal agencies ensure their actions will not likely jeopardize the continued existence of the species; and the requirement to develop and implement a recovery plan for the species. In light of these protective measures, the ESA is considered an adequate regulatory mechanism for the conservation of grizzly bears in the lower 48 States at this time. This section of the status review will explore the adequacy of regulatory mechanisms outside of the ESA to see if those mechanisms, or lack thereof, are adequate to conserve grizzly bears in the lower 48 States at this time.

Regulatory mechanisms relevant to grizzly bears outside of the ESA consist primarily of Federal laws, Federal Regulatory and Planning frameworks for habitat management (i.e., National Forest Management Act), and State laws. Other conservation mechanisms include agency Management Plans and Conservation Strategies that coordinate management, population monitoring, and mortality control. Since 1986, National Forest and National Park plans have incorporated the Guidelines (USFS 1986) to manage grizzly bear habitat in the lower 48 States. These Guidelines (USFS 1986) focus on improving habitat quality and limiting human-caused mortality resulting from grizzly bear/human conflicts with an emphasis on the importance of motorized access management.

Regulatory Mechanisms

Motorized Access Management. Roughly 32% of all suitable habitat inside recovery zone boundaries that are currently occupied by grizzly bear populations is within a designated Wilderness Area (26,980 of 84,703 sq km (10,417 of 32,704 sq mi)). This includes 8,600 sq km (3,320 sq mi) in the GYA; 6,995 sq km (2,700 sq mi) in the NCDE; 381 sq km (147 sq mi) in the CYE; 162 sq km (62 sq mi) in the SE; and 10,842 sq km (4,186 sq mi) in the NCASC recovery zones. Additionally, of the 22,783 sq km (8,797 sq mi) of suitable habitat in the GYA outside of the recovery zone, 30% (6,799 sq km / 2,625 sq mi) is within a designated Wilderness Area (72 FR 14866, March 29, 2007). The Wilderness Areas are considered long-term Secure Habitat because they do not allow motorized access and are protected from new road construction by Federal legislation. In addition to restrictions on road construction, the Wilderness Act of 1964 (Pub. L. 88-577) prevents permanent human habitation and increases in developed sites. The Wilderness Act allows livestock allotments existing before the passage of the Wilderness Act and mining

claims staked before January 1, 1984, to persist within Wilderness Areas, but no new grazing permits or mining claims can be established after these dates. If preexisting mining claims are pursued, the plans of operation are subject to Wilderness Act restrictions on road construction, permanent human habitation, and developed sites. Because the Wilderness Act of 1964 does not allow road construction, developed sites, new livestock allotments, or new oil, gas, and mining developments in designated Wilderness Areas; approximately 11,345 sq km of secure grizzly bear habitat in the lower 48 States outside of the GYA is protected by this regulatory mechanism.

In the GYA, motorized access management is currently managed according to the Guidelines and the corresponding management categories. If the protections of the ESA were removed, the Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests would be reinstated. This Amendment provides strict habitat protections including no net loss of Secure Habitat and no net increases in livestock allotments or developed sites in the entire recovery zone (USFS 2006b). For more information on conservation and regulatory mechanisms in the GYA, please see pp. 14922-14926 of the Yellowstone Final Rule (Appendix A).

In the NCDE, motorized access management has been formally institutionalized to varying degrees into National Forest and National Park Management Plans. The Flathead National Forest, which manages 40% (9,552 sq km / 3,688 sq mi) of all lands within the NCDE, formally amended their LRMP with access management standards called the A-19 Amendment (discussed above in Factor A). On the Lolo, Kootenai, Helena, and Lewis and Clark National Forests within the NCDE, motorized access standards similar to the A-19 Amendment have been informally incorporated into management activities but not formally amended to National LRMPs. Similarly, Glacier National Park has not formally incorporated motorized access management standards into its Superintendent's Compendium but has successfully implemented motorized access management within its borders.

In the CYE and SE, the Kootenai, Lolo, and Idaho Panhandle National Forests conducted an EIS analysis to evaluate alternatives for access management relating to grizzly bears in the CYE and SE recovery zones (USFS 2002). Standards for access management in the CYE and SE grizzly bear recovery zones were established through a ROD (USFS 2004).

In 2006, the Court set aside the access management EIS and remanded it back to the USFS (CV 04-236-M-DWM). In April 2009, the affected National Forests released a revised Draft Supplemental EIS for Motorized

Access Management Within the SE and CYE Grizzly Bear Recovery Zones (USFS 2009). At this point, a ROD has not been issued so these motorized access management standards have not been formally amended to their respective LRMPs in the CYE or SE.

In the NCASC recovery zone, motorized access management standards have not been formally amended to LRMPs. Although there are not any motorized access standards that include OMRD and TMRD data, the Federal land management agencies in the NCASC manage for no net loss of Secure Habitat from 1997 baseline values (USFS 1997). This habitat management approach was interim direction signed by the three Forest Supervisors at the time but it remains in effect until superseded by a formal amendment to Forest and Park Plans (USFS 1997). The Okanogan and Wenatchee National Forests recently began the process of revising their LRMP's.

In the BE recovery zone, motorized access management standards for grizzly bear habitat conservation have not been amended to LRMPs.

Food Storage Orders. The IGBC Guidelines (USFS 1986) specified that at developed recreation sites, dispersed recreation sites, special use campsites, and fire camps all human and prepared livestock or pet food and human refuse will be made unavailable to grizzly bears through proper storage, handling, and disposal. The guidelines stated that in areas where survivorship of individual grizzly bears is considered important for recovery or conflicts have been documented that special care be taken for attractant storage and game meat storage at camps.

In 1995, the Flathead, Helena, Lewis and Clark, and Lolo National Forests issued a Special Food Storage Order designed to minimize grizzly bear/human conflicts in the NCDE recovery zone. Storage of food, garbage and other attractants in a secure manner is required when visiting these National Forests. These requirements are intended to prevent attracting grizzly bears into camps or other forest activities. The Kootenai National Forest, which administers approximately 2% (466 / 23,137 sq km) of lands within the NCDE recovery zone, has voluntary food storage guidelines but no mandatory food storage order. To date, the National Forests that comprise the majority of the CYE and SE recovery zones have varying requirements for food storage but only the Colville National Forest has mandatory requirements. The Colville National Forest implemented a forest-wide food storage order in 1989. The Kootenai National Forest implemented forest-wide voluntary food storage guidelines in 2001 that emphasized public I&E (USFS 2009). In 2006, the Idaho Panhandle National Forest implemented a temporary food storage order along the shoreline of Priest Lake and a voluntary food storage order across the remainder of the forest. Both of these orders

remain in effect (USFS 2009). Although the Lolo National Forest has a food storage order in effect in their portion of the NCDE recovery zone, there is no similar order in place in their portion of the CYE recovery zone. Special use permits on all forests contain some food storage requirements. There also are no mandatory food storage orders on the National Forests that manage 75% of grizzly bear habitat within the NCASC recovery zone. However, North Cascades National Park does have a food storage order in effect. The lack of mandatory Food Storage Orders on Federal lands within the SE, BE, and NCASC recovery zones contributes to grizzly bear mortality risk and we consider the lack of this regulatory mechanism to be a threat to long-term survival of grizzlies in the lower 48 States outside of the GYA.

Many grizzlies in the NCDE, SE, and CYE recovery zones die because of garbage or other attractant-related conflicts on private lands. Montana State Law prohibits the deliberate feeding of wildlife other than birds. More specifically, Montana Code 87-3-130 (2001) prohibits citizens from " … purposely or knowingly attracting bears with supplemental feed attractants." Four bears were removed from the CYE population between 1995 and 2008 as part of management actions necessary to resolve attractant-related conflicts occurring on private land. In the SE, there have been at least five grizzly bear mortalities between 1982 and 2008 on private lands related to poor garbage storage. These incidents may increase as human populations increase unless proper sanitation and attractant storage protocols are followed. Conflicts arising on private land because of improperly stored attractants are a potential threat to grizzly bears in the lower 48 States and are generally not subject to Section 7 consultation under the ESA. At this point in time, there are no city, county, or State laws specifically requiring secure garbage storage on private lands although the city of Missoula, Montana, on the southwestern edge of the NCDE recovery zone is considering an ordinance to this effect.

Oil and Gas Development. In 1997 the Lewis and Clark National Forest decided to no longer allow surface occupancy for oil and gas. In 2006, these lands were withdrawn under the mining laws and mineral leasing laws permanently by Public Law 109-432. Therefore, the Lewis and Clark National Forest's portion of the NCDE is protected from any future oil and gas developments requiring surface occupancy. Similarly, on the Flathead National Forest, which has been rated as having "moderate to high potential" for oil and gas, a Court decision in 1988 and the Tax Relief and Health Care Act of 2006 have prevented any oil and gas leases from operating and such leases are not expected to increase in the foreseeable future. Due to the relatively low potential for oil and gas on the remaining National Forest lands within the NCDE, this type of development is not a threat to grizzly bears in this ecosystem.

Developed Sites. At this point in time, none of the National Forests within grizzly bear recovery zones have limits on developed sites. If the protections of the ESA were removed, the GYA population would have a habitat standard incorporated into all six GYA National LRMPs directing that there can be no net increase in developed sites within the recovery zone from what was present in 1998, a time when the population was increasing in size and expanding its range.

Livestock Allotments. At this point in time, there are no regulatory mechanisms preventing increases in livestock developments in any recovery zone. If the protections of the ESA were removed for the GYA grizzly bear population, this would automatically trigger implementation of a 2006 Record of Decision (USFS 2006b) directing that there can be no net increase in livestock allotments within the recovery zone from what was present in 1998.

Conservation and Management Plans

Travel Planning. The USFS released its final Travel Management Rule for managing recreational Off Highway Vehicle (OHV) use on the National Forests in November 2005 (70 FR 68264, November 9, 2005; USFS 2001). The Rule provides a framework for each National Forest to identify and designate roads, trails, and areas suitable for motorized use, and prohibits use of motor vehicles off the designated system. When travel planning is completed, motorized travel is legally restricted to designated roads and trails identified on a Motorized Vehicle Use Map and off-road travel is prohibited except to access a campsite with 300 feet of a designated route. Most National Forests are creating a motorized travel plan for "over snow" use (i.e., "winter use") and traditional motorized use separately. Travel planning is not the same thing as amending motorized access management standards for grizzly bears to a National LRMP although the outcome could be similar: fewer areas open to motorized travel. Travel Planning does not incorporate a Secure Habitat standard and, therefore, may be insufficient by itself to adequately protect grizzly bear habitat. However, it is an important tool in managing motorized access on National Forests.

In the GYA, travel planning has been completed by all affected National Forests except the Beaverhead-Deerlodge and Shoshone. In the NCDE, CYE, and SE, travel planning has been completed by all affected National Forests. In the NCASC, travel planning has not been completed by any National Forest but the Okanogan and Wenatchee have initiated the travel planning process. In the BE, the Payette and Boise National Forests have completed travel planning but the Clearwater, Bitterroot, Salmon, and Nez Perce National Forests have not.

Motorized access management will benefit grizzly bears whether implemented via the IGBC Standards or a comprehensive Travel Plan. Currently, some forests in the NCDE and all forests in the CYE, SE, and NCASC recovery zones lack formally incorporated IGBC motorized access standards in their National LRMPs. Many of these National Forests are currently in the process of either amending their National LRMPs or developing comprehensive motorized Travel Plans. Overall, a lack of motorized travel management is not currently a threat to grizzly bears in the lower 48 States because of the numerous motorized access management standards amended (or pending) to relevant National LRMPs for grizzly bear habitat conservation and the high amounts of Wilderness Areas within most recovery zones. Additionally, in some National Forests that have not yet amended their LRMPs with Motorized Access Standards for grizzly bear habitat conservation, the travel restrictions being implemented are more restrictive than the recommended IGBC motorized access management standards (e.g., Lewis and Clark National Forest). In these cases, the lack of IGBC motorized access management standards is not a threat to grizzly bears. While the majority of National Forests in grizzly bear habitat have not completed winter travel planning, there are no data to indicate this is a threat to grizzly bears in the lower 48 States (FWS 2002).

Harvest Management. The States of Idaho and Washington have maintained closed hunting seasons for grizzly bears in the lower 48 States since the animal was listed in 1975. The State of Montana allowed grizzly bear hunting in the NCDE recovery zone until 1991. If the protections of the ESA were removed today, it is likely that the States of Idaho, Montana, and Wyoming would resume a conservative hunting season. In the GYA, this hunting season would be guided by the Conservation Strategy and the State and Tribal management plans to ensure that any harvest is within sustainable mortality limits. For the NCDE and the Montana portion of the CYE, a management plan exists (Dood et al. 2006) that incorporates conservative hunting as a potential management tool. This management plan specifies that any hunting would be " … conservatively applied, and only after the best available scientific data indicate that the population can sustain a predetermined level of take" (Dood et al. 2006). Furthermore, the State of Montana has a law that limits the number of grizzlies a person may take in his or her lifetime to one (Montana Code § 87-2-702) (Dood et al. 2006). It is unknown whether the States of Idaho and Washington would institute a hunting season in the SE if this population was not protected by the ESA. Likewise, it is unknown but unlikely that a hunting season would be instituted in the NCASC since there has only been one documented sighting there since 1996.

The Canadian Provinces of B.C. and Alberta are responsible for managing grizzly bear populations within their borders. The B.C. does not allow grizzly bear hunting in areas directly adjacent to the NCASC, CYE, or SE recovery zones in the lower 48 States with the exception of the NCDE. While B.C. allows a legal hunting season north of the NCDE, Alberta does not. All grizzly bear hunting seasons in Alberta were suspended in 2006 (Alberta Grizzly Bear Recovery Team (Alberta GBRT) 2008). Grizzly bear hunting has not been allowed in the Canadian North Cascades Grizzly Bear Population Unit since 1974. The B.C. closed the hunting season in the area directly north of the CYE recovery zone in the 1970s, but there is an area in B.C. between the CYE and SE recovery zones where spring hunting was allowed until recently. A grizzly bear was killed by a B.C. hunter there in 1988 and in 2005. In response to these mortalities that occurred between two threatened populations, the government of B.C. cancelled hunting in these intervening hunting units. In light of conservative mortality quotas and the willingness to manage adaptively, current grizzly bear hunting seasons in Canada are not a threat to grizzly bears in the lower 48 States at this time. In the absence of protections by the ESA, it is unknown but unlikely that Canadian authorities would increase hunting seasons because the restrictions that are in place in Canada are independent of the protections of the ESA.

U.S. Fish and Wildlife Service Grizzly Bear Recovery Plan. The 1993 Grizzly Bear Recovery Plan currently guides our management and conservation actions related to grizzly bear recovery in the lower 48 States. As discussed previously, these criteria have not been updated since the 1993 Recovery Plan was released. Many criteria are not measurable criteria pertaining to specific threats but instead are goals that provide a benchmark for measuring progress toward recovery. The FWS is in the process of updating the 1993 Recovery Plan as there are new science and techniques available.

The 1993 Grizzly Bear Recovery Plan would not guide management in the absence of the ESA so here we discuss management and conservation plans that would guide management in place in the absence of the ESA. These include a Western Montana Grizzly Bear Management Plan (Dood et al. 2006) and several Canadian Recovery Plans (B.C. Ministry of Environment, Lands, and Parks 1995; North Cascades GBRT 2004; Alberta GBRT 2008).

Western Montana Grizzly Bear Management Plan. The Western Montana Grizzly Bear Management Plan is relevant to grizzly bears in the NCDE and CYE. It covers actions by MFWP, but it cannot change or regulate actions on public lands. Its goal is to manage for recovered grizzly bear populations in the NCDE and CYE and re-establish connectivity among these two core areas--the BE and the GYA. To

achieve these goals, the Plan addresses conflict management and prevention, habitat monitoring and management, and population monitoring and management, harvest management, enforcement, research needs, and funding. The Plan recognizes the need for a broader Conservation Strategy or post delisting management plan in the NCDE (Dood et al. 2006). The development of a post-delisting management plan or conservation strategy is a task in the Grizzly Bear Recovery Plan. Work on a conservation strategy for the NCDE began in May 2009. This conservation strategy will establish habitat criteria and standards, which will then be implemented into LRMPs via forest plan amendments and amendments to park management and Tribal management plans. Population criteria and standards also will be established in the conservation strategy and these will be applied and implemented via a Memorandum of Understanding post-delisting. These same criteria will be inserted in the revised recovery plan, which also is in development simultaneous with the NCDE conservation strategy.

Canadian Management Plans. The NCDE, CYE, SE, and NCASC recovery zones all adjoin grizzly bear habitat in Canada. There are roughly 25,000-27,000 grizzly bears in Canada (McLellan and Banci 1999; Ross 2002). Connectivity with grizzly bear populations in Canada is critical to grizzly bear recovery in the NCDE, NCASC, SE, and CYE recovery zones. Although population numbers in Canada are high, there are several smaller, vulnerable populations at the southern extent of their range where their contiguity with U.S. grizzly bear populations is critical. Grizzly bears in Canada are considered a species of "special concern" under the SRA. This designation is given to those species that are particularly sensitive to human activities or natural events and is not necessarily related to current threat levels or extinction risk.

The SRA requires that the Provinces prepare a management plan for species of special concern and their habitat in cooperation with appropriate Provincial and territorial ministers, and in consultation with landowners, lessees, and other persons whom may be directly affected by the management plan (SRA 2003). To this end, in 1995 the B.C. Provincial government developed a grizzly bear conservation strategy (B.C. Ministry of Environment, Lands, and Parks 1995) and in 2008, the Alberta government released a grizzly bear recovery plan (Alberta GBRT 2008).

A major goal of the B.C. Grizzly Bear Conservation Strategy is to ensure effective, enhanced protection and management of habitat through land use planning processes, new protected areas, and the Forest Practices Code. This Conservation Strategy identified multiple "Population Units" within B.C. and assigned conservation status to each unit based on habitat capability and current population size (North Cascades GBRT 2004). For Population Units identified as "threatened," the Conservation Strategy

mandates that a comprehensive recovery plan be developed to provide direction on the restoration of those units. In B.C., the Population Units contiguous with the North Cascades, Selkirk, and Cabinet/Yaak recovery zones are all classified as "threatened" (North Cascades GBRT 2004). The Population Unit directly adjacent to the NCDE in B.C. is not considered "threatened" but the adjacent Population Unit in Alberta is recommended for "threatened" status (North Cascades GBRT 2004; Alberta GBRT 2008). This is due to small population size in Alberta, low reproductive rates, limited connectivity with populations outside Alberta, and habitat alteration (Alberta GBRT 2008).

In 2004, the North Cascades GBRT released a Recovery Plan for the North Cascades Grizzly Bear Population Unit in Canada. The goal of this Recovery Plan is to restore the North Cascades Grizzly Bear Population Unit to "Viable status" (North Cascades GBRT 2004). To achieve this goal, the Recovery Plan focuses on habitat conservation, connectivity with other grizzly bear populations, increasing current population size, conflict prevention, mortality control, and interagency coordination. Recovery Plans for the threatened Population Units directly adjacent to the SE and CYE recovery zones have not been developed yet. The governments of the U.S. and B.C. have expressed their commitment to recover grizzly bears in the North Cascades through a Memorandum of Understanding between the Provincial government and the IGBC (North Cascades GBRT 2004).

The Alberta Grizzly Bear Recovery Plan establishes a goal of achieving a self-sustaining population of grizzly bears over the long term. The Recovery Plan details how recovery is achievable, and considers feasibility of recovery from biological, technical and social perspectives. The Recovery Plan outlines actions to be implemented during the next 5 years. These actions focus on reducing human-caused mortality through habitat conservation, research, and outreach programs. In sum, these Canadian management plans provide a regulatory framework within which grizzly bears in Canada are managed independently of the ESA. That being said, full implementation of these management plans has yet to be realized and habitat protections are largely outside the authority of these Canadian plans.

Forests in Canada are under the jurisdiction of Provinces. In general, there are two types of forest ownership: 1) community forest managed by local government, a First Nation, or a group for the benefit of the local community; and 2) woodlot forest managed by private licensees through the Woodlot License Program. In general, forest management in Canada is decentralized and non-uniform. As such, regulatory mechanisms analogous to USFS sanitation regulations or motorized access standards do not exist or are incomplete. The lack of consistent habitat protections

in threatened grizzly bear populations in southern Canada could be a threat to grizzly bears in the lower 48 States in the future if it led to population fragmentation across the international border.

Summary of Factor D. At this time, the existing regulatory mechanisms in the lower 48 States are incomplete. Many of the motorized access management approaches have yet to be formally incorporated into regulatory documents (i.e., National Forest LRMPs or National Park Superintendent's Compendiums). Additionally, some National Forests lack formal food storage orders, which will become increasingly important to grizzly bear conservation as grizzly bear and human populations both expand. At this time, regulatory mechanisms in Canada to limit legal hunting in Canadian population units and develop management plans in areas where grizzlies are most vulnerable are sufficient for grizzly bear recovery in the lower 48 States.

2.3.2.5 Other natural or manmade factors affecting its continued existence.

Genetic Status – The 1975 listing identified the genetic isolation of some grizzly bear populations as a potential threat (40 FR 31734, July 28, 1975). Declines in genetic diversity due are expected in isolated populations, but will occur gradually over decades when populations are large and have long generational times (Frankel and Soule 1981; Ralls et al. 1986; Allendorf et al. 1991; Burgman et al. 1993). Maintaining genetic diversity is important because it provides the raw genetic material with which organisms are able to respond to selective pressures over many generations (i.e., adapt). In general, the more diverse the genetic material, the more likely organisms will be able to adapt to changing environmental conditions successfully. Levels of genetic diversity in grizzly bear populations in the lower 48 States are a potential concern because of small population size in some populations (i.e., SE, CYE, NCASC) and limited genetic exchange with other grizzly bear populations (i.e., SE, NCASC, GYA).

Proctor et al. (in press) used several measures of genetic health to assess the relative connectivity of grizzly bear populations in southern Canada and the northern U.S. Genetic distance values reflect relative levels of population fragmentation in the recent past (Proctor et al. in press). In a well connected, contiguous population, we would expect to see low genetic distances even when bears are geographically distant. Conversely, in populations that are fragmented, we would expect to see high genetic distance values even though bears may be geographically close.

Heterozygosity values are a useful measure of genetic diversity, with higher values (approaching 1.0) indicative of greater genetic variation and evolutionary potential. In grizzly bears (and nearly all vertebrates), any 1 gene will contain a copy of the specific form of that gene (i.e., allele)

inherited from each parent (Mills 2007). If these alleles are different forms of the same gene, they are considered heterozygous. In contrast, if the animal inherits the same form of the gene from both parents, they are considered homozygous. Observed heterozygosity (H_o) is a measure of the proportion of a population that contains different forms of genes (i.e., alleles), averaged across many genes found at different locations on the chromosome (Mills 2007). Heterozygosity values range from 0 to 1.0 with a value of 0 indicating that all individuals in the population contain the same form of genes (alleles) for specific traits whereas a score of 1.0 means that 100% of the population contains different forms of the genes (i.e., alleles) for specific traits.

Equivalent and/or relatively high heterozygosity values are usually indicative of high levels of connectivity among populations or high numbers of breeding animals. While heterozygosity values are useful to compare relative levels of genetic diversity and may be a signal of an isolated population, it is unknown how low heterozygosity values can go before they become biologically detrimental for grizzly bears. We do know that grizzly bears in the lower 48 States have H_o values nearly double those observed in the Kodiak Island grizzly bear population which is not experiencing any known deleterious effects from its lower H_o values. To the contrary, it is a thriving population of grizzly bears considered to be "healthy and productive" (Van Daele 2007, p. iii).

Heterozygosity values for grizzly bear populations in the lower 48 States vary: 0.67-0.68 in the NCDE; 0.64 in the Cabinet Mountains portion of the CYE; 0.63 in the Yaak portion of the CYE; 0.57 in the GYA; and 0.54 in the SE (Proctor et al. in press). There are no data available for the North Cascades grizzly bears. For all the study areas except the SE recovery zone, heterozygosity values were similar to those documented by Paetkau et al. (1998) for grizzly bear populations in the U.S. and Canada and double those observed for the grizzly bear population on Kodiak Island (H_o=0.30), which has been isolated for approximately 10,000 years. Interestingly, Proctor et al. (in press) found an increase in observed heterozygosity in the GYA population (H_o=0.57) from Paetkau et al.'s (1998) estimate (H_o=0.55). This difference is likely attributable to the larger sample size used by Proctor et al. (in press), which has nearly quadrupled since Paetkau et al. (1998) was published (424 vs. 114 samples).

The SE likely had lower values as a result of a bottleneck effect (Van Dyke 2003). When the grizzly bear was listed in 1975, the SE recovery zone in the U.S. was thought to have only a few bears (Layser 1978). Although these numbers gradually increased over the next 33 years to an estimated population of roughly 88 animals in 2008 for the entire SE recovery zone on both the U.S. and Canadian side (Proctor et al. in press),

the effects of such a small initial population size are evidenced by the lower heterozygosity values. Genetic drift and subsequent reductions in heterozygosity values occur more rapidly in small populations (Van Dyke 2003). Meaning, in only a few generations, genetic diversity can be reduced drastically. For comparison, historic genetic samples show the GYA population has been isolated from other grizzly bear populations for at least the last century (Miller and Waits 2003). However, heterozygosity values in the GYA (0.57) are higher than those found in the SE (0.54) because the Yellowstone grizzly bear population was always large enough in size to avoid a bottleneck effect (Miller and Waits 2003; Proctor et al. in press).

Samples from coastal B.C. and the SE recovery zone had the highest genetic distance values (Proctor et al. in press). These data indicate that these two areas have unique genetic material that is dissimilar to other grizzly bear populations in southern Canada and the northern U.S. In the SE, this difference is most likely due to genetic drift acting on a small isolated population over several generations (Proctor et al. in press). The SE is fragmented from other populations because of anthropogenic pressures (Proctor et al. in press). In contrast, the relatively high genetic distance values found in the coastal B.C. sample are primarily explained by the coastal mountains acting as a natural physical barrier to grizzly bear movements (Proctor et al. in press).

It is important to note that these genetic differences in the transborder populations (i.e., NCDE, SE, CYE) are not the result of natural selection in varying environments or indicative of historical conditions. Instead, they are artifacts of human pressures (Proctor et al. in press). In contrast, Miller and Waits (2003) compared heterozygosity values from present bears in the GYA to samples from the early 1900s and concluded that gene flow and, therefore, population connectivity between the GYA grizzly population and populations to the north was very low historically, even prior to the arrival of settlers. The reasons for this historic limitation of gene flow are unclear but there is no doubt increasing levels of human activity and settlement in intervening valleys over the last century further limited grizzly bear movements into and out of the GYA.

Past range contraction and mortality have resulted in genetic fragmentation among grizzly bear populations in the lower 48 States. Each of these fragmented populations may possess genetic material missing from other populations. Maintenance of this genetic material is important to the long-term ability of this region's grizzly bears to respond to environmental changes. Although there are differences in heterozygosity values among study areas and recovery zones, there have been no detectable consequences on grizzly bear morphology, physiology, ecology, or biology related to these differences in genetic diversity as

evidenced by normal litter size, little evidence of disease, an equal sex ratio, and physical characteristics such as body size and weight (Wakkinen and Kasworm 2004; Schwartz et al. 2006a; Kasworm et al. 2010; Mace and Chilton 2009).

Effective population size is a concept used by geneticists to differentiate between total population size and the actual number of individuals available to reproduce at any given time. For example, many individuals in a population may be too young to reproduce and, therefore, are not part of the "effective population size." Short-term fitness (i.e., survival and reproduction rates) can be attained by maintaining an effective population size of at least 50 individuals (Frankel and Soule 1981). This corresponds to an inbreeding rate of 1% per generation, which is considered "tolerable" by animal breeders (Frankel and Soule 1981). For long-term fitness (i.e., the ability to adapt), Franklin (1980) posited that an effective population size of at least 500 is needed to prevent the loss of genetic diversity over time through the natural processes of inbreeding, drift, and mutation. Franklin's hypothesis assumed there were no other management or conservation actions in place and was based on estimates of mutation rates found in *Drosophila* (i.e., fruit flies), maize, and mice (Van Dyke 2003). Shaffer (1981) was the first to question the applicability of the "50/500" rule. He pointed out that the "recommendations were based on very general applications of basic genetic principles and, consequently, are somewhat oversimplified" (Shaffer 1981). Shaffer (1981) recommended that a species specific effective population size based on known measures of genetic variability and the breeding structure of the population in question would provide "what size would be necessary to assure … that none of this variability would be lost due to inbreeding and genetic drift." This type of analysis is exactly what Miller and Waits (2003) conducted for the GYA population to conclude that 1-2 migrants every 10 years would be adequate to maintain current levels of heterozygosity in this population. Since Shaffer's 1981 paper, the increasingly complicated nature of the relationship between genetics and demographics has called into question Franklin's hypothesis and the use of the so-called "50/500 rule … is of little practical value" today (Van Dyke 2003), particularly when there are comprehensive data about a species to determine adequate effective population size as there are for grizzlies.

In grizzlies, effective population size is roughly 25-27% of total population size (Allendorf et al. 1991; Miller and Waits 2003; Groom et al. 2006). Miller and Waits (2003) determined that in the GYA, an effective population size of approximately 100 individuals was adequate in the near-term but that 1-2 migrants every 10 years from other ecosystems would maintain or enhance this level of genetic diversity. Based on the most recent estimates of total population size in the GYA, the effective population size in this ecosystem is 145 (582 x 0.25).

Conservatively, the effective population size in the NCDE is roughly 191 (765 x 0.25); 10 in the CYE; 22 in the SE; and 4 in the NCASC recovery zones. These estimates of effective population size should not be interpreted as absolute population size. Instead, these estimates provide insight into the relative severity and urgency of genetic threats in different recovery zones, as related to total population size. For example, the effective population sizes in the CYE, SE, and NCASC recovery zones suggest that population size and/or connectivity with other populations needs to be increased.

Stochasticity, Connectivity, and Genetic Management. In addition to the challenges posed by small population size, grizzly bear populations in the lower 48 States are relatively isolated from each other and increasingly fragmented from populations in Canada (Proctor et al. in press). This habitat fragmentation informs our discussion and options for recovery. Because grizzly bears live at relatively low population densities and are vulnerable to excessive human-caused mortality, anthropogenic fragmentation of historically contiguous populations into isolated "remnant" populations is a management reality on the current ecological landscape (Forman and Alexander 1996; Proctor et al. in press; Lindenmayer and Fischer 2006). It is a widely accepted tenet in conservation biology that extinction risk is reduced even through minimal levels of connectivity (Soule 1987). At greatest risk of extinction are small isolated populations with less than 100 individuals like the NCASC. Such populations are more susceptible to extinction due to human-caused mortality and environmental processes such as poor food years, climate change, and habitat loss. While the SE and CYE populations also contain less than 100 individuals each, they are not entirely isolated from Canadian populations. Small populations benefit greatly from both demographic rescue (i.e., the immigration of female bears) and to a lesser degree genetic rescue (i.e., immigration of male bears). Although reconnection of these isolated populations is challenging (Forman and Alexander 1996; Lindenmayer and Fischer 2006), metapopulation theory directs that connectivity is the best long-term conservation practice to increase the resiliency, redundancy, representation, and overall probability of persistence of remaining grizzly bear populations in the lower 48 States (Boyce 2000).

Due to their low population size (less than 100 individuals), grizzly bears in the CYE, SE, and NCASC recovery zones are more vulnerable to stochastic (i.e., random) events. We consider the potential effects of 4 types of stochastic events on grizzly bear populations: 1) demographic, 2) genetic, 3) environmental, and 4) catastrophic (Shaffer 1981). Demographic stochasticity, such as chance events associated with births and deaths, only affects viability when populations are very small (e.g., <50) (Young and Clarke 2000; Boyce et al. 2001). Similarly, genetic

stochasticity, such as inbreeding depression and genetic drift, may affect grizzly populations more when effective population sizes are less than 100 (Miller and Waits 2003). Environmental events such as floods, droughts, habitat degradation, or fires may result in direct mortality, indirect mortality through effects on food supplies, or decreased reproduction (Shaffer and Samson 1985; Boyce et al. 2001). Catastrophes are extreme environmental events that have a low probability of occurrence, are unpredictable, and are generally unavoidable (e.g., Mount St. Helens exploding).

Demographic stochasticity refers to random birth and death events, within the realm of normal variability. For example, even though the average litter size for grizzly bears is two, sometimes smaller litters are produced by chance, despite favorable environmental conditions. When these random demographic events occur in small populations, they are more likely to affect overall population trajectory. Demographic stochasticity is partially a function of population size and is best mitigated in grizzly bears by increasing population size, reducing mortality risk factors, and increasing connectivity that would allow demographic rescue by immigration from adjacent populations.

Genetic stochasticity also is influenced by population size with its effects exacerbated at lower population sizes (Frankel and Soule 1981; Van Dyke 2003). Genetic stochasticity refers to two main processes: 1) inbreeding depression and 2) genetic drift. Inbreeding depression occurs when closely related individuals mate, which can lead to decreases in genetic diversity (Van Dyke 2003). Genetic drift refers to the random fluctuations of gene frequencies over time, due to chance alone (Van Dyke 2003; Groom et al. 2006). Unlike demographic stochasticity, genetic concerns can be mitigated through introduction of new genetic material, which may only require one to two individuals being added to a population per generation (Mills and Allendorf 1996; Newman and Tallmon 2001; Miller and Waits 2003). Individuals could be added to a population by natural means such as immigration or artificial means such as transplanting individuals from another population.

Environmental stochasticity is generally thought to be more important than demographic or genetic stochasticity when calculating extinction risk (Lande 1988). This type of stochasticity is best mitigated through habitat protections and providing larger, more connected habitats, thereby spreading the risk and reducing the impacts of environmental variability across the landscape. Catastrophes are a type of environmental stochasticity. The impacts of a catastrophic event can be reduced through the maintenance of several populations which may allow one or more populations to survive a catastrophic event so long as the total area affected by the catastrophic event is smaller than the area occupied by all populations.

Connectivity must be examined in a genetic (requires males only) and demographic (requires females) framework. Experimental and theoretical data suggest that one to two effective migrants per generation is an appropriate level of gene flow to maintain or increase the level of genetic diversity in isolated populations (Mills and Allendorf 1996; Newman and Tallmon 2001; Miller and Waits 2003). While male movements can enhance genetic diversity and reduce genetic fragmentation (Miller and Waits 2003; Proctor et al. in press), female movements are necessary to enhance a small population's growth rate and buffer against demographic stochasticity (Proctor et al. in press). In turn, increasing population size through demographic rescue will decrease the rate at which genetic diversity is lost in small populations. This concept is relevant to grizzly bear recovery in the NCASC, SE, CYE, and BE recovery zones, all of which contain small populations (if any) that are demographically and genetically isolated to varying degrees. Due to the small population size in these recovery zones, movements by females into these areas are critical to recovery of these populations.

In Canada, Canadian Highway 3 is a partial barrier to demographic connectivity with males accounting for 87% (26 / 30) of all known movements between population units in the transborder areas near the CYE, SE, and NCDE recovery zones (FIGURE 3) (Proctor et al. 2005; Proctor et al. in press). Of the four females documented moving between population units in Canada, two moved from areas entirely within Canada to areas that straddled the international border (Proctor et al. in press). These female movements demonstrate the potential for demographic rescue from Canadian populations and highlight the importance of maintaining connectivity between U.S. and Canadian populations. The North Cascades grizzly bear population in Canada appears to be completely isolated from other Canadian populations with no male or female movements into or out of the area (North Cascades GBRT 2004).

In the lower 48 States, we have not documented natural movements by females (i.e., demographic rescue) between any of the recovery ecosystems in the lower 48 States. However, we have documented two male grizzly bears moving between recovery ecosystems, providing genetic rescue effects if these animals successfully reproduced in their new ecosystems. One male grizzly bear moved from the CYE recovery zone into the SE recovery zone across the Kootenai River Valley north of Bonners Ferry, Idaho (FIGURE 3) (Proctor et al. in press). This is the first time we have detected a grizzly bear moving from one recovery zone to another, with the exception of management relocations of nuisance grizzly bears between recovery zones. Proctor et al. (in press) also documented a single male grizzly bear moving from the Cabinet Mountains to the western edge of the NCDE. In addition to these movements documented by Proctor et al. (in press), in 2010 we documented two adult females and

one adult male that were relocated for management purposes from the NCDE into the Cabinet Mountains in 2009 and 2010 moving east back into the NCDE in the vicinity of their original home ranges. While these relocated bears returned from the Cabinet Mountains into the NCDE, their movements were not natural movements because they were made after the animals were relocated to new locations, and were subsequently returning to their previous (source) home range. However, within the CYE recovery zone the Cabinet Mountains' portion of the population appears to be isolated from the Yaak portion and Canadian populations to the north (Kasworm et al. 2010).

These movement data are helpful when considering how to most effectively manage and conserve the remaining grizzly bear populations in the lower 48 States. For example, these data emphasize the importance of maintaining demographic connectivity with Canadian populations and the small populations of the NCASC, SE, and CYE while highlighting the importance of recovering these small populations so that they can provide genetic and demographic rescue for the BE. Of relevance, the NCDE appears to be well connected to Canadian populations genetically and its large population size means female movements from Canada into the NCDE are not absolutely required for demographic health to be maintained, although such female movements are beneficial. Similarly, the GYA has a large enough population size that demographic rescue is not required. Instead, 1-2 male migrants every 10 years (i.e., genetic rescue) are adequate to maintain current levels of genetic diversity in the GYA (Miller and Waits 2003).

Genetic and demographic connectivity can be achieved through translocation or natural connectivity. Movement of just a few individuals between populations may be sufficient to prevent loss of genetic diversity but this level of exchange is not sufficient to create or maintain demographic rescue effects. Recovery may require augmentation in some areas like the Cabinet Mountains and NCASC because these areas do not appear to be connected to larger populations in Canada (Kasworm et al. 2010; Proctor et al. in press). In the GYA, Miller and Waits (2003) recommended that effective population size remain above 100 animals, in order to avoid negative, short-term genetic effects associated with small population size. An effective population size of 100 animals corresponds to a total population size of at least 400 animals. Because habitat in SE and CYE recovery zones cannot support a grizzly bear population of this size, this highlights the importance of maintaining connectivity with Canadian populations in these areas.

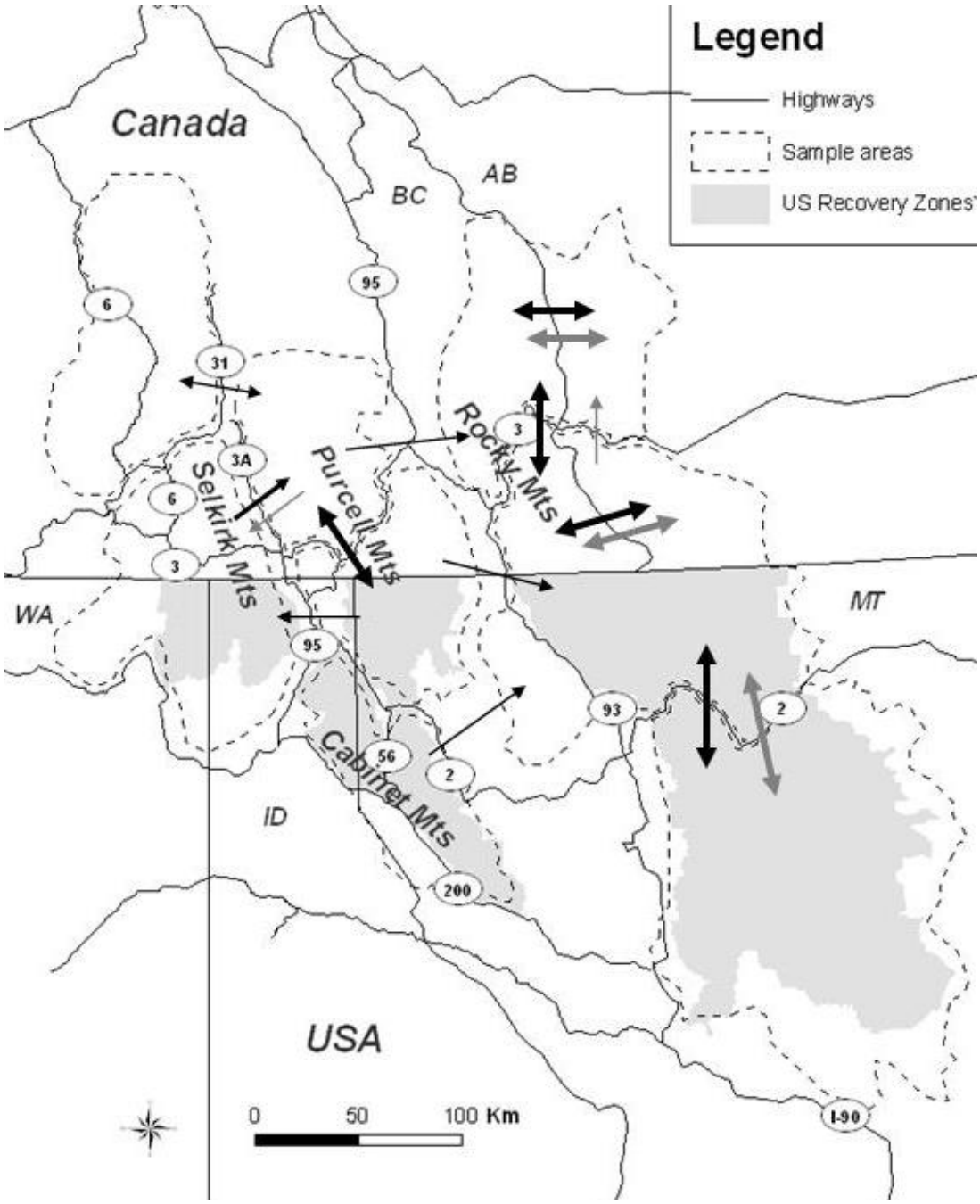


FIGURE 3. Canadian/U.S. Transborder grizzly bear study areas where genetic, movement, conflict, and mortality data were collected and analyzed by Proctor et al. (in press). This map presents a summary of known movements between adjacent areas in the Transborder region. Recovery zones are shaded light grey. Black arrows indicate male movements and grey arrows indicate female movements. Arrows indicate direction and thickness illustrates the number of movements.[5] There were no movements associated with the GYA (not shown) (adapted from Proctor et al. in press).

[5] Arrows are representative of bears and do not indicate the actual routes used by bears. Thicker lines indicate more movements. Each female arrow represents 1 female grizzly bear movement with the exception of multiple female movements across U.S. Highway 2 within the NCDE and across the Continental Divide in Canada.

The primary impediment to both male and female movement between recovery ecosystems in the transborder area is avoidance of and mortality risk associated with anthropogenic influences in the valleys between mountainous areas (Proctor et al. in press). To maintain and re-establish natural connectivity, intervening valleys must be made permeable to grizzly bears. While we recognize the challenges associated with this goal, our experience recovering grizzly bears in the lower 48 States demonstrates it can be done. Mortality risk can be minimized through outreach emphasizing conflict prevention, proper attractant storage, responsive nuisance bear management, hunter and recreationist education to reduce self defense and mistaken identity mortalities, private land planning, and wildlife crossing structures. However, effective implementation of such conservation measures requires social and political support (FWS 1993). Socially, the people that live and recreate in grizzly bear habitat must be willing to modify their behaviors to prevent conflicts. Political support for population connectivity would provide adequate funding and regulatory mechanisms regarding grizzly bear conflicts, attractants, illegal human-caused mortalities, and private land development.

Because it is generally accepted that isolated populations are at greater risk of extinction than contiguous populations over the long term, we will continue efforts to maintain connectivity with Canada and reestablish natural connectivity among the grizzly bear ecosystems in the lower 48 States. To document natural connectivity, we will monitor bear movements near the edges of all recovery zones using a combination of radio-collared bears, non-invasive genetic sampling, and motion-triggered wildlife cameras depending on available resources and opportunities. We also will collect genetic samples from all captured or dead bears to document gene flow between ecosystems. Such movement will be detected by using an "assignment test" which identifies the area from which individuals are most likely to have originated based on their unique genetic signature (Paetkau et al. 1995; Waser and Strobeck 1998; Paetkau et al. 2004; Proctor et al. 2005). This technique also has the ability to identify bears that may be the product of reproduction between GYA and NCDE bears (Dixon et al. 2006). In addition to monitoring for gene flow and movements, we will continue interagency efforts to complete the linkage zone task in the Recovery Plan (FWS 1993) to provide and maintain movement opportunities for grizzly bears, and reestablish natural connectivity and gene flow among all grizzly bear populations in the lower 48 States.

Because current levels of genetic diversity are not translating into any detectable deleterious effects, we do not consider genetic concerns to be a threat to grizzlies in the lower 48 States at this time. Maintaining or increasing current levels of genetic diversity in all grizzly bear populations

in the lower 48 States would help ensure genetic concerns do not become a threat in the future. Genetic connectivity could be established via natural movements or with human assisted movements of a few male bears among ecosystems once every 10 years. While current levels of genetic heterozygosity appear sufficient, small population sizes make grizzly bears in the CYE, SE, and NCASC more vulnerable to genetic, demographic, and environmental stochasticity. To address this increased risk in the CYE, SE, and NCASC, population sizes must be increased and/or connectivity with populations in Canada must be either maintained or established. Natural connectivity among all grizzly bear populations in the lower 48 States would relieve many of the cumulative threats described in this section by providing genetic and demographic rescue, increasing resilience to climate change impacts, and enhancing re-occupancy of currently unoccupied habitats.

Climate Change. Climate change may generate a number of changes in grizzly bear habitat in the foreseeable future. Whether these changes will translate into population level impacts in grizzly bears in the lower 48 States is unknown but most grizzly bear biologists in the U.S. and Canada do not anticipate that habitat changes predicted under climate change scenarios will directly threaten grizzly bears (Servheen and Cross 2010). The most likely ways in which global climate change may affect grizzly bear habitat include: reduction in snowpack levels; shifts in denning times; shifts in the abundance and distribution of some natural food sources; and changes in fire regimes. These ecological changes may ultimately impact grizzly bears by affecting the timing and frequency of grizzly bear/human interactions and conflicts (Servheen and Cross 2010).

While there is much debate about the rates at which temperatures will rise and the effects these increases will have on climate, there is consensus among the world's leading climate scientists that climate change, due to human-caused increases in greenhouse gases, is occurring (Intergovernmental Panel on Climate Change 2001, 2007). The 20th century was the warmest in the last 1,000 years (Inkley et al. 2004) with global mean surface temperature increasing 0.4 to 0.8EC (0.7 to 1.4EF). These increases in temperature were more pronounced over land masses as evidenced by the 1.5 to 1.7EC (2.7 to 3.0EF) increase in North America since the 1940s (Vincent et al. 1999; Cayan et al. 2001) and the increase in frost-free days (Easterling 2002). By 2100, air temperatures are expected to increase 1.1 to 6.4EC (2.0 to 11.5EF) and sea levels are expected to rise 0.18-0.59 m (0.6-1.9 ft) (Intergovernmental Panel on Climate Change 2007). The magnitude of warming in the northern Rocky Mountains has been greater than global averages (Pederson et al. 2010), as indicated by an 8-day advance in the appearance of spring phenological indicators in Edmonton, Alberta, since the 1930s (Cayan et al. 2001;) and a 5- to 6-day advance across North America between 1959 and 1993 (Schwartz and Reiter 2000). However, there is disagreement among climate models as to the spatial pattern of future temperature increases in the western U.S. (Duffy et al. 2006).

Some models predict that increases in air and ocean temperatures will significantly affect water resources in the western U.S. by mid-century (Leung et al. 2004). The hydrologic regime in the northern Rockies has changed with global climate change, and is projected to change further (Bartlein et al. 1997; Cayan et al. 2001; Stewart et al. 2004; Pederson et al. 2011). Under global climate change scenarios, the western U.S. will likely experience milder, wetter winters and warmer, drier summers (Leung et al. 2004). While some climate models do not demonstrate statistically significant changes in precipitation outside of normal interannual variability for the western U.S. (Duffy et al. 2006), changes in precipitation may have ecological effects even without statistical significance. As mean cool season temperatures increase, much of this precipitation will come in the form of rain instead of snow with an increase in "rain on snow" events (Leung et al. 2004; McWethy et al. 2010). The amount of snowpack and the timing of snowmelt also will change, with a reduction in spring snowmelt and an earlier peak, so that a lower proportion of the annual discharge will occur during spring and summer (Cayan et al. 2001; Leung et al. 2004; Stewart et al. 2004). Although there is some disagreement about changes in the water content of snow under varying climate scenarios (Duffy et al. 2006), reduced runoff from decreased snowpack could translate into decreased soil moisture in the summer (Leung et al. 2004). However, Pederson et al. (2011) found that increased spring precipitation in the northern Rocky Mountains is buffering total annual streamflow thus far from these expected declines in hydrological yield due to snowpack declines.

Snowpack levels are predicted to decrease by approximately 20% in the northern Rockies and 60-70% in the Cascades (Leung et al. 2004). Because timing of den entry and emergence is at least partially influenced by food availability and weather (Craighead and Craighead 1972; Van Daele et al. 1990), less snowpack would likely shorten the denning season as foods are available later in the fall and earlier in the spring. Haroldson et al. (2002) reported later den entry times for male grizzlies corresponding with increasing November temperatures from 1975-1999. This increased time outside of the den would consequently add to the threat of conflicts with humans (Servheen and Cross 2010). Spring and fall encounters between grizzly bears and hunters or recreationists would likely increase, escalating the mortality risk to bears during these times. A shortened den season also could affect survival of cubs-of-the-year (Haroldson et al. 2002) by increasing the time they are exposed to predators and other environmental influences. Den entry and exit times are recorded and reported annually for research bears in the CYE (Kasworm et al. 2010) and the GYA. Although these data are not reported annually for the NCDE recovery zone, they are available for radio-collared animals. In the SE recovery zone where there is no active research trapping effort these data do not exist.

Climate change could affect grizzly bears by creating temporal and spatial shifts in available vegetative food sources (Rodriguez et al. 2007). Changes in plant community distributions have already been documented, with species moving further north and higher in elevation (Walther et al. 2002; Walther 2003; Walther et al. 2005). Such changes in vegetative food distributions also may influence other mammal distributions, including potential prey species like ungulates. For a complete discussion of the potential impacts of climate change on GYA grizzlies, please see pp. 14927-14933 of the Yellowstone Final Rule (Appendix A). While the extent and rate to which individual plant species will be impacted is difficult to foresee with any level of confidence (Walther et al. 2002; Fagre et al. 2003), there is general consensus that grizzly bears are flexible enough in their dietary needs that they will not be impacted directly by ecological constraints (Servheen and Cross 2010).

In response to changes in food supplies related to plant phenology and responses to weather (e. g., frost, rainfall, snowmelt, etc.), grizzly bear home ranges may change in size and extent annually (Aune and Kasworm 1989). Grizzly bears are opportunistic feeders and will consume almost any available food including fruits, insects, vegetation, living or dead mammals, fish, and, sometimes, garbage (Knight et al. 1988; Mattson et al. 1991a, 1991b; Kasworm and Manley 1988; Schwartz et al. 2003b). Although the digestive system of bears is essentially that of a carnivore, they are successful omnivores, and in some areas may be almost entirely herbivorous (Jacoby et al. 1999; Schwartz et al. 2003b). In areas where animal matter is less available, grasses, roots, bulbs, tubers, and fungi may be important in meeting protein requirements (LeFranc et al. 1987). High-quality foods such as berries, nuts, insects, and fish are important in some areas (Schwartz et al. 2003b). Diets of grizzly bears vary among individuals, seasons, and years (Mattson et al. 1991a; Felicetti et al. 2003, 2004; Koel et al. 2005), reflecting their flexibility in finding adequate food resources as necessary. Mattson et al. (1991a) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have alternative options in years when preferred foods are scarce.

Grizzly bears eat a variety of foods and are largely herbivorous (Almack 1985; LeFranc et al. 1987; Aune and Kasworm 1989; Kasworm and Manley 1988; Jacoby et al. 1999). In the lower 48 States, grizzlies consume native shrub berries (e.g., *Vaccinium* species) and other vegetative matter heavily. Because grizzly bears are such successful omnivores, these climate-induced vegetative changes may not have detectable, negative effects on grizzly bear populations in the lower 48 States.

Fire regime changes caused either directly or indirectly by global warming (Miller and Urban 1999) also may impact grizzly bears in the future by altering their habitat. Fire frequency and severity may increase with late

summer droughts predicted under climate change scenarios (Nitschke and Innes 2008; McWethy et al. 2010). Fire regimes can impact the abundance and distribution of some vegetative bear foods (e.g., grasses, berry producing shrubs) and may, in the long term, modify resources on a landscape scale. Grizzly bears in the lower 48 States evolved with frequent fires and effective fire suppression policies over most of the 20th century negatively affected grizzly bear foods by reducing early successional stages (LeFranc et al. 1987). Increased fire frequency actually has the potential to improve grizzly bear habitat, but these fires must be low or moderate in severity to be advantageous. High-intensity fires may reduce grizzly bear habitat quality in the short term by decreasing hiding cover and delaying regrowth of vegetation. However, even high-intensity fires may not be bad for grizzly bear habitat in all situations. For example, in wetter habitat types which will require some of the conditions predicted by climate change models to burn in the first place, a fire that reduces the ability of trees to re-establish may benefit huckleberry production for a longer period of time before the trees ultimately grow back and shade out the huckleberry shrubs. Overall, we do not anticipate altered fire regimes will have significant negative impacts on grizzly bear survival and reproduction, despite its effects on vegetation.

***Public Support for Grizzly Bear Recovery*.** The 1975 listing identified human attitudes toward grizzly bears as the cause of "a continual loss of animals through indiscriminate illegal killing" (40 FR 31734, July 28, 1975). Public support is paramount to any successful large carnivore conservation program (Servheen 1998; Alberta GBRT 2008). Historically, human attitudes played a primary role in grizzly bear population declines through excessive human-caused mortality. Through government-endorsed eradication programs and perceived threats to human life and economic livelihood, humans settling the West were able to effectively eliminate most known grizzly populations after only 100 years of westward expansion. Today, human attitudes still play a pivotal role in grizzly bear conservation with mortalities related to malicious killing

Overall, we have seen an improvement in public perceptions and attitudes toward grizzly bears in the last several decades. The same government that once financially supported active extermination of the bear now uses its resources to protect the great symbol of American wildness. This change in government policy and practice is a product of changing public attitudes about the grizzly bear. Although attitudes about grizzlies vary geographically and demographically, there has been a widespread increase in positive attitudes toward the grizzly bear and its conservation, even among traditionally conflict-related communities, like the ranching industry (Kellert et al. 1996). A survey of public attitudes in northwest

Montana in 2007 found that athough 54% of respondents believed that grizzly bears can be dangerous to humans, more than 70% indicated that grizzly bears belong in the CYE and should be preserved as a symbol of our national heritage (Canepa et al. 2008). Similar surveys in the North Cascades in 2002 indicated that 76% of respondents supported grizzly bear recovery (Davis and Morgan 2005).

Grizzly bear/human conflicts often lead to grizzly bear mortalities, either legally in self defense or a management removal or illegally through vandal killing. Effective I&E programs increase public understanding of grizzly bear biology, behavior, and recovery efforts which in turn reduces grizzly bear/human conflicts and grizzly bear mortalities while increasing human safety.

Public outreach presents a unique opportunity to effectively integrate human dimensions of wildlife management into comprehensive programs that can modify societal beliefs about, perceptions of, and behaviors toward grizzly bears. Attitudes toward wildlife are shaped by numerous factors including basic wildlife values, biological and ecological understanding of species, perceptions of individual species, and specific interactions or experiences with species (Kellert 1994; Kellert et al. 1996). The I&E programs teach visitors and residents about grizzly bear biology, ecology, and behavior which enhances appreciation for this large predator by dispelling myths about its temperament and feeding habits. Effective I&E programs have been an essential factor contributing to grizzly bear conservation since its listing in 1975. Being aware of specific values common to certain user groups allows I&E materials and workshops to be tailored to their specific concerns and perceptions. By providing general information to visitors and targeting specific user groups living and working in grizzly country, coexistence between grizzly bears and humans can be accomplished.

Traditionally, people involved in resource extraction industries (i.e., timber harvest, mining, ranching, and hunting) are the largest opponents to land-use restrictions which place the needs of the grizzly bear above human needs (Kellert 1994; Kellert et al. 1996). Surveys of these user groups have shown that they tolerate large predators when they are not seen as direct threats to their economic stability or personal freedoms (Kellert et al. 1996).

Although many human-caused grizzly bear mortalities are unintentional (e.g., vehicle collisions, trap mortality), intentional deaths in response to grizzly bear/human conflicts are responsible for the majority (53%) of known and probable human-caused mortalities. Fortunately, this source of mortality can be reduced significantly if adequate I&E is provided to people who live, work, and recreate in occupied grizzly bear habitat. Current I&E efforts have been major contributors to grizzly bear recovery

over the last 30 years. Both Federal and State management agencies are committed to working with citizens, landowners, and visitors to address the human sources of conflicts.

In the NCDE, CYE, and SE, at least 27% (137 / 497) of human-caused mortalities from 1982-2008 could have been avoided if adequate I&E materials had been presented, understood, and used by involved parties. These 137 human-caused mortalities were either related to improperly stored attractants (102) or mistaken identification by black bear hunters (35). Educating back-country and front-country users about the importance of securing potential attractants can prevent bears from becoming food conditioned and displaying subsequent unnaturally aggressive behavior. Similarly, adhering to hiking recommendations, such as making noise, hiking with other people, and hiking during daylight hours, can further reduce back-country grizzly bear mortalities by decreasing the likelihood that hikers will encounter bears.

Hunter-related mortalities may involve hunters defending their life or property because of carcasses that are left unattended or stored improperly. Grizzly bear mortalities also occur when hunters mistake grizzly bears for black bears. All of these circumstances can be minimized with I&E programs.

State wildlife agencies recognize that the key to preventing grizzly bear/human conflicts is providing I&E to the public and connecting the public with the right resources to prevent conflicts (Dood et al. 2006; Wakkinen et al. 2009). This outreach is the most effective long-term solution to grizzly bear/human conflicts and is paramount to ongoing grizzly bear survival and successful coexistence with humans so that the measures of the ESA are no longer necessary. All four affected States wildlife agencies (MFWP, WGFD, IDFG, and WDFW) and associated partners (e.g., Grizzly Bear Outreach Project) have been actively involved in I&E outreach for over a decade. In addition, the grizzly bear management plans developed by MFWP, WGFD, and IDFG contain chapters detailing efforts to continue current programs and expand them when possible. Since 1993, MFWP has implemented countless public outreach efforts to minimize bear/human conflicts including: presentations to schools, colleges, civic and sportsmen's groups; interviews with newspaper, radio, and TV reporters; Statewide newspaper features; press releases; radio reports; MFWP website devoted to bear identification; Public Information Plan designed by Conservation/Education Division in reaching public; video entitled "Bears and Bees," advising beekeepers about avoiding conflicts with bears; information on electric fencing to keep bears out of orchards, garbage, grain storage and bee yards; meetings with homeowner groups on sanitation, bear-proof containers at Whitefish; bear-proof enclosure fences for garbage containment; day-to-day public contacts by MFWP personnel

during conflict situations with bears; design and production of several brochures ("Living with Grizzlies," "Who's Who? - Know Your Bear," "Bears," "Be Bear Aware – for children"); "Bear Hunters - Know Your Target!" wallet cards; internal education and training; and bumper stickers reading "A Fed Bear is a Dead Bear" (Dood et al. 2006).

The WGFD created a formal human/grizzly bear conflict management program in July 1990 and has coordinated an extensive I&E program since then. Accomplishments include: installation of electric fences around numerous apiaries; distribution of over 250 bear-resistant garbage cans and 30 dumpsters to hundreds of private property owners; installation of food storage boxes and meat poles in many camp sites on public land; establishment of "Living in Bear Country" workshops; production of nearly 40 public service announcements and 28 news releases promoting techniques to co-exist with bears; incorporation of grizzly bear encounter management as a core subject in basic hunter education courses; implementation of annual bear encounter training for outfitters and guides; and mailing information about how to avoid conflicts and behave in encounters to all limited quota big game licenses holders hunting in occupied grizzly bear habitat.

The IDFG also organizes and implements extensive I&E programs and workshops focused on private and public lands within grizzly bear habitat. The goal of the IDFG Grizzly Bear Enforcement and Education Project is to reduce human-caused mortalities of grizzly bears in the SE and CYE areas in Idaho, assisting with the recovery and ultimately the delisting of grizzly bears as a threatened species. Extensive field patrols are conducted throughout the spring, summer, and fall. Field contacts serve to educate all user groups on grizzly bear identification, natural history, and conflict avoidance strategies. Field patrols act as an enforcement deterrent, help prevent and detect road closure violations, and permit the collection of information that might prove useful in solving illegal grizzly bear killings. Field contacts also build a one-on-one relationship with people using grizzly bear habitat, provide information on human activities within the recovery zone, and help to gather information on human-grizzly bear encounters. A comprehensive educational program is conducted during the winter months to teach grizzly bear biology, identification, and methods for coexisting with bears.

The Grizzly Bear Outreach Project began in Okanogan County, Washington in 2002, expanded to serve all counties within the NCASC by 2007, and expanded into the SE by 2010. The Project's mission to promote an accurate understanding of grizzly bears and their recovery in these ecosystems is achieved through community education and involvement. To date, the Project has held more than 800 meetings; given 198 presentations; begun a Bear Smart Program to prevent bear/human conflicts; distributed over 2,000 posters, 3,000 fact sheets, 2,000 bear

identification sheets, and 65,000 informational brochures; been featured in 78 press articles; created and distributed 2 radio public service announcements; and conducted multiple public knowledge and attitude surveys to hone their outreach efforts.

In B.C., there is an active "Bear Aware" I&E program in many communities. These programs aimed at reducing and preventing grizzly bear/human conflicts are active in most cities along Canadian Highway 3, which is a partial barrier to grizzly bear movement (Proctor et al. 2005). Minimizing human-caused mortality risk by preventing conflicts in these cities is critical to maintaining long-term connectivity with Canadian grizzly populations. In March 2010, the B.C. Ministry of Environment (2010) announced it would be initiating and/or further funding Bear Aware programs in several communities relevant to connectivity with U.S. grizzly populations. This commitment to provide $357,000 over 2 years includes a Bear Aware program in 3 cities relevant to connectivity with the NCASC (Kamloops, Squamish, and North Vancouver); 6 cities relevant to connectivity with the SE (Castlegar, Rossland, Kaslo, Nelson, Upper and Lower Slocan Valley, and the North Arrow Lakes area); 2 cities relevant to connectivity with the Yaak portion of the CYE (Kimberley and Cranbrook); and 2 cities relevant to connectivity to the NCDE (Elk Valley and Fernie).

Compensating ranchers for losses caused by grizzly bears is another approach to build support for coexistence between livestock operators and grizzly bears. In cases of grizzly bear livestock depredation that have been verified by USDA Animal and Plant Health Inspection Service-Wildlife Services, IDFG, or MFWP, affected livestock owners are compensated. Since 1997, compensation in Montana and Idaho has been provided primarily by Defenders of Wildlife. The Defenders of Wildlife's Grizzly Bear Compensation Trust has paid $184,681 to livestock operators within the NCDE and CYE for confirmed and probable livestock losses to grizzly bears (Proctor 2009). The MFWP will continue to rely on Defenders of Wildlife to compensate livestock operators for losses due to grizzly bears while MFWP focuses on preventing such conflicts. In Wyoming, compensation has always been paid directly by the State. If grizzlies were delisted in the GYA, both Idaho and Wyoming's grizzly bear management plans provide for State funding of compensation programs (Idaho's Grizzly Bear Delisting Advisory Team 2002; WGFD 2005). Despite these compensation efforts, some ranching interests continue to resent grizzly bears (and predators in general) due to the perception that many of their livestock losses are not compensated because they cannot be quantified or investigated quickly enough to determine a cause of death.

Ultimately, the future of the grizzly bear will be based on the people who live, work, and recreate in grizzly habitat and the willingness and ability of these people to learn to coexist with the grizzly and to accept this animal as a cohabitant of the land. Other management strategies are unlikely to succeed without effective and innovative public I&E programs. The primary goals of public outreach programs are to proactively address grizzly/human conflicts by educating the public about the root causes of these conflicts and providing options to prevent them. By increasing awareness about grizzly bear behavior and biology, we hope to enhance public involvement and appreciation of the grizzly bear.

Summary of Factor E – Because declines in genetic diversity are expected in small and/or isolated populations, we will continue monitoring the genetic status of grizzly bears in the lower 48 States. However, because demonstrable deleterious effects are not occurring at current levels of genetic diversity, we do not consider genetic status to be a threat at this time. Furthermore, we do not anticipate that genetic issues will affect grizzly bears in the foreseeable future because of large population sizes (i.e., GYA, NCDE), connectivity with Canadian populations (i.e., NCDE, CYE, SE), and ongoing efforts to restore natural connectivity and translocate animals, if needed. Changing climate conditions have the potential to affect grizzly bear habitat with subsequent implications for grizzly bear/human conflicts. While we do not consider climate change itself to be a threat to grizzly bears in the lower 48 States at this time, monitoring of radio-collared animals in each ecosystem is necessary to allow us to detect the impacts of climate change and respond with corrective management actions. Finally, although public support for grizzly bear recovery has improved over the decades, preventable human-caused mortalities arising from grizzly bear/human conflicts (i.e., management removals) are the single largest source of mortality for grizzlies. The I&E programs are the most effective way to combat both legal and illegal human-caused mortalities and the continuation and expansion of present programs is necessary for grizzly bear recovery in the lower 48 States.

2.4 Synthesis

CONCLUSION OF FIVE FACTORS ANALYSIS

When grizzly bears in the lower 48 States were listed under the ESA in 1975, the vast reduction in range, increase in trail and road construction, increase in recreation, livestock use of National Forest lands, unsustainable human-caused mortality, lack of data regarding populations, and genetic isolation were identified as factors affecting their conservation status (40 FR 31734, July 28, 1975). To date, all of these threats have been addressed to varying degrees in different areas.

We considered new information regarding grizzly bear biology, current status, and threats. Proctor et al. (in press) compiled and analyzed all known genetic and movement data for grizzly bears in southern Canada and the NCDE, CYE, SE, NCASC, and GYA populations. Genetic data indicate population fragmentation in the recent past (Proctor et al. in press). Movement data demonstrated that males move more frequently (FIGURE 3) and over longer distances than females (Proctor et al. in press). Proctor et al. (in press) documented increasing genetic and demographic fragmentation across Canadian Highway 3, particularly north of the SE and CYE. If allowed to continue, this fragmentation could lead to a loss of connectivity between U.S. and Canadian grizzlies.

Regarding population status, there are approximately 1,500 grizzly bears in the lower 48 States: 765 in the NCDE; 600 in the GYA; 45 in the CYE; 80 in the SE; and 10-20 in the NCASC. The population in the GYA is increasing at 4-7% annually. The population in the NCDE is increasing at 3% annually. The best available data indicate the CYE population is declining due to unsustainable levels of mortality. The SE grizzly bear population is slowly increasing at a rate of 1.9% annually (Wakkinen and Kasworm 2004). Subadult and adult female survival have the largest influence on population trend in all ecosystems (Mace and Waller 1998; Wakkinen and Kasworm 2004). Recent levels of human-caused mortality in the CYE do not appear to be sustainable.

The current range and distribution of grizzly bears in the lower 48 States is fluid as dispersal is occurring and the specific distribution has not been quantified systematically across all ecosystems. Grizzly bear conflicts and mortalities have been documented in areas far outside of recovery zone boundaries. Mortality data reported in sections 2.3.2.2 and 2.3.2.3 include information from beyond the recovery zone boundaries to provide a complete synopsis of all sources of grizzly bear mortality in the lower 48 States.

Factor A. Roughly 32% of all suitable habitat inside the GYA, NCDE, CYE, SE, and NCASC reovery zones is within a designated Wilderness Area (26,980 of 84,703 sq km (10,417 of 32,704 sq mi)). Additionally, of the 22,783 sq km (8,797 sq mi) of suitable habitat in the GYA outside of the recovery zone, 30% (6,799 sq km (2,625 sq mi) is within a designated Wilderness Area (72 FR 14866, March 29, 2007). The average amount of Secure Habitat (areas greater than 500 m (1,640 ft) from an open road) in each recovery zone ranges from 53% in the SE to 70% in the NCDE. In the GYA, the average amount of Secure Habitat (areas at least 4 ha (10 ac) in size and greater than 500 m (1,640 ft) from an open motorized access route) varies from 45.4–100% of each subunit with an average of 85.6% Secure Habitat across all subunits (p. 14914 of the Yellowstone Final Rule, Appendix A). There have been significant improvements in habitat management throughout the range of the species. While not every habitat issue is completely and adequately addressed there are plans and mitigation actions in place to address most known habitat threats.

Factor B. Between 1980 and 2008, 103 grizzly bears from the lower 48 States died for scientific or recreational purposes. Mortalities for recreational purposes are not a threat to grizzly bears in the lower 48 States. Currently, legal grizzly bear hunting seasons within the U.S. and most adjacent areas in Canada have been closed. If the protections of the ESA were removed, the States of Montana, Wyoming, and Idaho would most likely

implement grizzly bear hunting seasons that were within sustainable limits. Mortalities related to scientific research or conservation efforts comprise 3.1% of all mortalities in the lower 48 States outside of the Yellowstone DPS during this time. We do not consider scientific overutilization a threat to grizzly bears in the lower 48 States nor will it be in the foreseeable future.

Factor C. Between 1980 and 2008, grizzly bears in the lower 48 States outside of the GYA incurred an average of 16.4 human-caused grizzly bear mortalities per year in the NCDE; 1.3 in the CYE; 1.6 in the SE; and 12.6 in the GYA. Humans are directly or indirectly responsible for 88% of grizzly bear deaths in the lower 48 States outside of the GYA. Within the GYA, human-caused mortalities accounted for 73% of known mortalities from 1973-2002 (see p. 14920 of Yellowstone Final Rule, Appendix A). Despite these mortalities, GYA and NCDE populations are abundant with evidence of range expansion. Similarly, the SE population appears to be increasing slowly (Wakkinen and Kasworm 2004). In contrast, the CYE population is most likely declining (Wakkinen and Kasworm 2004; Kasworm et al. 2010). Disease and natural predation are not currently a threat to grizzly bears in the lower 48 States although we will continue to monitor mortalities from natural causes as possible with limited funding. Due to small population sizes, inherently low growth rates of grizzly bear populations, and potential fragmentation with Canadian populations, the increase in human-caused mortality over the current decade in both the CYE and SE indicates that human predation is a threat to grizzly bears in both of these ecosystems.

Factor D. At this time, the existing regulatory mechanisms do not appear to warrant reclassification to endangered status for the entire entity (*Ursus arctos horribilis* in the lower 48 States). However, we consider grizzly bears in the lower 48 States to be threatened by the inadequacy of regulatory mechanisms until motorized access management is implemented in all occupied ecosystems. Additionally, the lack of mandatory food storage orders on all public lands in the NCDE, CYE, SE, and NCASC recovery zones may be a threat to grizzly bears in these ecosystems as increased recreational use of public lands and poor sanitation practices on both public and private lands can result in conflicts.

Factor E. Other factors that may affect the long-term conservation of grizzly bears in the lower 48 States include genetic concerns, climate change, and public willingness to accept grizzly bear recovery. Because demonstrable deleterious effects are not occurring at current levels of genetic diversity, we do not consider genetic status to be a threat at this time although we will continue to monitor genetic diversity and increase effective population size and connectivity (whether through natural or artificial means) among ecosystems. Changing climate conditions have the potential to affect grizzly bear habitat. While we do not consider climate change itself to be a threat to grizzly bears in the lower 48 States at this time, we do consider funding inadequacies that prevent us from having radio-collared animals in each ecosystem to be a threat to our ability to monitor and detect the impacts of climate change, thus inhibiting our ability to respond with corrective management actions. Finally, although public support for grizzly bear recovery has improved over the decades, preventable human-caused mortalities arising from grizzly bear/human conflicts (i.e., management removals) are the single largest source of

mortality for grizzlies. The I&E programs are effective at reducing both legal and illegal human-caused mortalities and the continuation and expansion of present programs is necessary for grizzly bear recovery in the lower 48 States.

GREATER YELLOWSTONE AREA. In the GYA, the District Court for the District of Montana determined that our analysis of regulatory mechanisms and the potential impacts from the loss of whitebark pine in that ecosystem were flawed. We are currently working to resolve and clarify these deficiencies in order to reassess the status of grizzlies in the GYA.

NORTHERN CONTINENTAL DIVIDE ECOSYSTEM. Access management has been effectively implemented by Glacier National Park and the USFS. However, adequate regulatory mechanisms are not in place to manage this population and its habitat in the absence of the ESA.

CABINET YAAK ECOSYSTEM. Threats to grizzlies in this recovery zone include incomplete habitat protection measures (motorized access management), unsustainable human-caused mortality, small population size, and population fragmentation that resulted in genetic isolation. The FWS considers this population to be endangered due to continuing high levels of human caused mortality, a decreasing trend (Kasworm and Wakkinen 2004), genetic and demographic isolation, inadequate habitat protections, and increasing fragmentation both within the recovery zone (due to mines and private land development) and in intervening habitat with other grizzly bear populations.

SELKIRK MOUNTAINS ECOSYSTEM. Threats to grizzlies in this recovery zone include incomplete habitat protection measures (motorized access management), inadequate regulatory mechanisms including a lack of food storage orders and institutionalized access management, human-caused mortality, small population size, and population fragmentation that resulted in genetic isolation. Although this population may be slowly increasing (Wakkinen and Kasworm 2004) and reconnecting with adjacent populations, high levels of human-caused mortality and a lack of regulatory mechanisms, in B.C. and the U.S., still threaten this population.

NORTH CASCADES. Threats to grizzlies in this recovery zone include very small population size, incomplete habitat protection measures (motorized access management), population fragmentation resulting in genetic isolation, and a lack of detailed data regarding population size, trend, survival, and reproductive rates. Data indicating the population in B.C. is isolated from other populations limits the chance of natural recovery given the small population size. Population augmentation may be the only way to recover this population.

BITTERROOT ECOSYSTEM. The primary concern in the BE is the absence of a grizzly bear population. Most suitable habitat within the recovery zone is protected by the Wilderness Act but this ecosystem is far from recovery.

Grizzly bears in the lower 48 States are still threatened (i.e., likely to become endangered within the foreseeable future throughout all or a significant portion of their range) due to the lack of regulatory mechanisms and the multitude, severity, and spatial aspects of

threats still faced by grizzly bears in the lower 48 States. Further, grizzly bears in the NCASC, CYE, and SE are still warranted for endangered status because of small population size, isolation, and excessive human-caused mortality.

3. RESULTS

3.1 Recommended Classification

- This review confirms that the lower 48 State listing qualifies as a DPS and recommends the current entity, on the whole, should retain its threatened status.

- Additionally, this review recommends that the CYE, SE, and NCASC remain warranted-but-precluded for endangered status.

- Finally, this review recommends that we correct the lower 48 State listing to remove the grizzly bear from the List of Endangered and Threatened Wildlife in areas of the conterminous States outside of the bear's historical range. These areas were erroneously listed.

3.2 New Recovery Priority Number

The current Recovery Priority Number for grizzly bears in the lower 48 States is 3C. This indicates that the magnitude of threat is high and the threats are imminent. In light of the many improvements made in grizzly bear conservation since their listing regarding motorized access management, livestock allotments on public lands, minimizing human-caused mortality, and positive trends in most populations we no longer consider the magnitude of threat to be high. In response, we recommend the Recovery Priority Number be changed to 9C, corresponding to a moderate magnitude of threat that remains imminent, with the potential for conflict with development projects or other forms of economic activity related to extractive industries (48 FR 43098, September 21, 1983).

3.3 Listing and Reclassification Priority Number[6]

- The uplisting of the CYE, SE, and NCASC has a listing priority number of 3. This priority number indicates the magnitude of threat is high and those threats are imminent. However, proposed rules to reclassify threatened species to endangered are lower priority than listing currently unprotected species (i.e., candidate species; n=251), since species currently listed as threatened are already afforded the protection of the ESA and implementing regulations.

- The recommendation to remove the grizzly bear from the List of Endangered and Threatened Wildlife in areas of the conterminous States outside of the bear's historical range has a reclassification priority number of 6. This priority number indicates deferring this action will cause low to no management burden and that the action is not petitioned.

[6] For more detail on Listing Priority Numbers and Reclassification Priority Numbers, see our Endangered and Threatened Species Listing and Recovery Priority Guidelines (48 FR 43098, September 21, 1983).

4. RECOMMENDATIONS FOR FUTURE ACTIONS

Administrative Actions

- Revise the recovery plan for grizzly bears in the lower 48 States so that it reflects the best scientific and commercial information available. The revised recovery plan should include objective, measurable criteria which, when met, will result in a determination that the species be removed from the Federal List of Endangered and Threatened Wildlife. These criteria should continue to be updated to reflect new science and techniques. Specifically, a team will be created for each recovery plan chapter to evaluate the demographic and habitat criteria, the role of each ecosystem in a metapopulation framework, and any new scientific data available. The recovery plans also should include estimates of the time required and the cost to carry out those measures needed to achieve the goal for recovery and delisting.
- Delist the "error states" to correct the 1975 Listing which listed the grizzly bear throughout the lower 48 States, including areas it was absent from historically.
- Begin the EIS process to select appropriate conservation actions to recover the NCASC grizzly bear population and evaluate the need for grizzly bear augmentation in this ecosystem. Augmentation would allow demographic and genetic reinforcement of this population which is isolated from other populations in Canada.
- When revising demographic recovery criteria for the NCDE, include mortalities in a 10-mile buffer extending into Canada, as is done with our other trans-border populations in the CYE, SE, and NCASC.
- Review the Swan Valley Conservation Agreement to reflect new ownership patterns after the Legacy Project.
- Continue to seek support and resources for a DNA-based population census in the CYE, SE, and NCASC recovery zones.
- Evaluate the scientific basis for each ecosystem's definition of Secure Habitat and consider a standardized definition if appropriate.

Threats Abatements

- Complete the NCDE Conservation Strategy and implement the habitat standards in the strategy via forest plan amendments and park and Tribal management plan amendments.
- Implement standardized sanitation regulations on public and private lands in grizzly habitat as a basic conservation measure for multiple wildlife species across the landscape.
- Enhance conservation action in identified linkage zones between the Purcell Mountains in B.C. southward to the BE and the southward to the GYA. This work should involve identification of key linkage areas using a data-based approach using GPS collars and RSF modeling, sanitation assistance in private land areas in these areas, easements and acquisitions in appropriate private land areas in these areas, outreach and education to local residents, and work with public land managers in the intervening lands to assure habitat security in these areas.

- Encourage an annual requirement for bear identification tests for black bear hunters in all States.

- Continue to fund annual monitoring of population trend and habitat conditions in the NCDE.

- Obtain funding to enhance the research and monitoring program in the SE and NCASC.

- Target the most important linkage areas on private lands for conservation delivery through easements, securing attractants, and possible acquisition with willing landowners.

- Continue to augment the Cabinet Mountains with subadult female grizzly bears in order to increase reproductive output (i.e., demographic rescue).

- Deliver sanitation enhancement assistance to private residents in grizzly habitat particularly on the periphery of grizzly habitat where grizzly conflicts and mortalities are increasing as bears expand their range. Assistance in the form of bear-resistant garbage containers and electric fencing along with more people to work on increased outreach and education will reduce these conflict and mortality levels.

- Deliver effective linkage conservation in the Northern Rockies with private and public partners. To accommodate wildlife linkage across the many human-populated valleys, linkage opportunities must be conserved on public lands, private lands found in intervening valleys, and major transportation routes. For public lands, FWS must work with Federal land management agencies to ensure Forest Planning incorporates linkage considerations regarding projects and motorized access in identified linkage areas. Of particular importance on public lands are food storage regulations to minimize conflicts with all resident wildlife including bears, maintaining visual cover along riparian areas for wildlife travel, no new site developments such as campgrounds adjacent to linkage areas, and no increases in road density on the landscape. For private lands, linkage areas must be permanently conserved with easements and acquisitions, sanitation assistance to landowners, and intensive outreach in order for animals to live within and pass through areas of low human densities. For major transportation routes, effective linkage requires a partnership with the Federal Highway Administration wherein they would build wildlife underpasses and appropriate wildlife fencing at crossing areas to guide animals to these underpasses across all seven paved highways between the Canadian border and the GYA. An estimated 28 such underpasses would provide sufficient movement opportunities that these highways would become permeable to wildlife across the Northern Rockies to provide for dispersal between the large blocks of public lands and potential re-occupancy of unoccupied areas.

- Hire more law enforcement personnel to control current levels of illegal motorized access and prevent grizzly bear poaching on public lands.

- Establish a grizzly bear conservation fund to provide a secure funding source for ongoing and future management and monitoring actions.

- Establish a grizzly bear compensation fund that would continue to compensate livestock operators when grizzlies depredate on their livestock post-delisting.

Research and Monitoring

- Develop a standardized definition of "suitable habitat" which can be applied in both occupied and unoccupied areas. It may be more credible to use radio-collar data in the definition of suitable habitat as more of those data become available.

- In accordance with the 1993 Recovery Plan, other areas throughout the historic range of the grizzly bear in the lower 48 States should be evaluated to determine their habitat suitability for grizzly bear recovery (FWS 1993). Potential areas for recovery would provide the adequate amounts of quality habitat, space, and managed levels of human activities necessary to sustain a viable population of grizzly bears. As budgets allow, conduct evaluations of habitat suitability for currently unoccupied, historic habitat in Colorado, New Mexico, Arizona, Utah, California, Nevada, Oregon, and southern Washington (mountain ranges in the western U.S.). While this is ongoing, continue to focus management efforts on extant populations and the BE before pursuing recovery in currently unoccupied habitat.

- Continue to follow-up on credible sighting data outside existing range and continue surveys using cameras and DNA hair snares in areas where population expansion is likely.

- Develop standardized estimates of current grizzly bear range in each ecosystem using methods of Schwartz et al. 2002 and 2006b, or other scientific methodology.

- With cooperation from the Tribes in the NCDE, update road, habitat security, and livestock data on Tribal lands.

- Assess the impacts of climate change on vegetative food sources, the distribution and extent of important vegetation communities, and the ability of alpine plant communities and insect communities to continue to exist as these areas are important grizzly bear habitat use areas that will be subject to amplified climate change effects.

- Continue genetic monitoring to document range expansion and population exchange by obtaining DNA samples from all management and research captured bears.

- Monitor location and status of radio-collared animals in all ecosystems, using GPS collars when possible.
- To avoid potential conflicts between snowmobiles and denning grizzlies, National Forests should conduct analyses of suitable denning habitat and spring foraging areas that may overlap with snowmobile use then direct snowmobile use accordingly to minimize conflicts.

- Calculate the current number of developed sites on both private and public lands within each recovery ecosystem.

- Obtain habitat data for all public lands outside recovery zones (i.e., road densities, amount of Secure Habitat, number of developed sites, number and type of livestock allotments, etc.).

- Evaluate the effectiveness of MFWP's black bear identification test in reducing the number of mistaken identity grizzly bear mortalities from black bear hunters in Montana.

- Identify areas where movement opportunities still exist in each of the mountain valleys between the Canadian border and the GYA using monitoring data, modeling, and informed decision-making.
- Monitor effectiveness of ongoing Cabinet Mountains augmentation efforts.
- Complete stable isotope and bioimpedance analyses annually to document food habits and nutritional status in relation to management status and geographic location. This research will provide baseline data across the range of the species to document if climate change is resulting in changes in food habits or body condition over time.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Grizzly Bear (*Ursus arctos horribilis*) in the Lower 48 States

Current Classification: Threatened in the lower 48 States. The Cabinet-Yaak, Selkirk, and North Cascades Ecosystems are warranted-but-precluded for endangered status.

Recommendation Resulting From the 5-Year Review & Appropriate Listing / Reclassification Priority Numbers:

- This review confirms that the lower 48 State listing qualifies as a DPS and recommends the current entity, on the whole, should retain its threatened status.
- Additionally, this review recommends that the Cabinet-Yaak, Selkirk, and North Cascades Ecosystems remain warranted-but-precluded for endangered status. This uplisting action has a listing priority number of 3. However, proposed rules to reclassify threatened species to endangered are lower priority than listing currently unprotected species (i.e., candidate species), since species currently listed as threatened are already afforded the protection of the ESA and implementing regulations.
- Finally, this review recommends that we correct the lower 48 State listing to remove the grizzly bear from the List of Endangered and Threatened Wildlife in areas of the conterminous States outside of the bear's historical range. These areas were erroneously listed. This correction has a reclassification priority number of 6.

Review Conducted By: Dr. Christopher Servheen, Grizzly Bear Recovery Coordinator

FIELD OFFICE APPROVAL:
Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 8/10/2011
Grizzly Bear Recovery Coordinator

REGIONAL OFFICE APPROVAL:
Lead Regional Director, Fish and Wildlife Service

Approve _____ Date 08/29/2011
Regional Director, Region 6

Cooperating Regional Director, Fish and Wildlife Service
X Concur ____ Do Not Concur

Signature _____ Date 9/6/2011
for Regional Director, Region 1

Appendix A

Final Rule Designating the Greater Yellowstone Area Population of Grizzly Bears as a Distinct Population Segment and Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife

Federal Register

Thursday,
March 29, 2007

Part II

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Grizzly Bears; Yellowstone Distinct Population; Notice of Petition Finding; Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AT38

Endangered and Threatened Wildlife and Plants; Final Rule Designating the Greater Yellowstone Area Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife; 90-Day Finding on a Petition To List as Endangered the Yellowstone Distinct Population Segment of Grizzly Bears

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule; notice of petition finding.

SUMMARY: The U.S. Fish and Wildlife Service (Service, we or us), hereby establish a distinct population segment (DPS) of the grizzly bear (*Ursus arctos horribilis*) for the Greater Yellowstone Area (GYA) and surrounding area (hereafter referred to as the Yellowstone DPS, Yellowstone grizzly bear DPS, or Yellowstone grizzly bear population) and remove this DPS from the List of Threatened and Endangered Wildlife. The Yellowstone grizzly bear population is no longer an endangered or threatened population pursuant to the Endangered Species Act of 1973, as amended (Endangered Species Act or the Act) (16 U.S.C. 1531 *et seq.*), based on the best scientific and commercial data available. Robust population growth, coupled with State and Federal cooperation to manage mortality and habitat, widespread public support for grizzly bear recovery, and the development of adequate regulatory mechanisms has brought the Yellowstone grizzly bear population to the point where making a change to its status is appropriate.

The delisting of the Yellowstone DPS does not change the threatened status of the remaining grizzly bears in the lower 48 States, which remain protected by the Act. In an upcoming but separate notice, we will initiate a 5-year status review of the grizzly bear as listed under the Act based on additional scientific information that is currently being collected and analyzed. Finally, we announce a 90-day finding on a petition (submitted during the public comment period for the proposed rule) to list the Yellowstone grizzly bear population as endangered on the Federal List of Threatened and Endangered Wildlife under the Act and to designate critical habitat. We find that the petition and additional information in our files did not present substantial scientific information indicating that listing the Yellowstone grizzly bear population as endangered may be warranted. Therefore, we are not initiating a status review in response to this petition.

DATES: This rule becomes effective April 30, 2007.

ADDRESSES: Comments and materials received, as well as supporting documentation used in preparation of this final rule, are available for inspection, by appointment, during normal business hours, at our Missoula office, Grizzly Bear Recovery Coordinator, University Hall, Room #309, University of Montana, Missoula, Montana 59812. Call (406) 243–4903 to make arrangements. In addition, certain documents such as the Strategy and information appended to the recovery plan are available at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm.*

FOR FURTHER INFORMATION CONTACT: Dr. Christopher Servheen, Grizzly Bear Recovery Coordinator, U.S. Fish and Wildlife Service, at our Missoula office (see **ADDRESSES** above) or telephone (406) 243–4903. Individuals who are hearing-impaired or speech-impaired may call the Federal Relay Service at 1–800–877–8337 for TTY assistance.

SUPPLEMENTARY INFORMATION:

Background

Prior to publication of this final rule, we—(1) Finalized the Conservation Strategy (Strategy) that will guide post-delisting monitoring and management of the grizzly bear in the GYA; (2) appended the habitat-based recovery criteria to the 1993 Recovery Plan and the Strategy; and (3) appended an updated and improved methodology for calculating total population size, known to unknown mortality ratios, and sustainable mortality limits for the Yellowstone grizzly bear population to the 1993 Recovery Plan and the Strategy. Additionally, the U.S. Department of Agriculture (USDA) Forest Service finalized the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests and made a decision to incorporate this Amendment into the affected National Forests' Land Management Plans. Yellowstone and Grand Teton National Parks also appended the habitat standards described in the Strategy to their Park Superintendent's Compendiums, thereby assuring that these National Parks will manage habitat in accordance with those habitat standards.

Species Description

Grizzly bears are generally larger and more heavily built than other bears (Craighead and Mitchell 1982, p. 517; Schwartz et al. 2003b, p. 558). Grizzly bears can be distinguished from black bears, which also occur in the lower 48 States, by longer, curved claws, humped shoulders, and a face that appears to be concave (Craighead and Mitchell 1982, p. 517). A wide range of coloration from light brown to nearly black is common (LeFranc et al. 1987, pp. 17–18). Spring shedding, new growth, nutrition, and coat condition all affect coloration. Guard hairs (long, course outer hair forming a protective layer over the soft underfur) are often pale in color at the tips; hence the name ''grizzly'' (Craighead and Mitchell 1982, p. 517). In the lower 48 States, the average weight of grizzly bears is generally 200 to 300 kilograms (kg) (400 to 600 pounds (lb)) for males and 110 to 160 kg (250 to 350 lb) for females (Craighead and Mitchell 1982, pp. 518–520). Grizzly bears are long-lived mammals, generally living to be around 25 years old (LeFranc et al. 1987, pp. 47, 51).

Taxonomy

Grizzly bears (*Ursus arctos horribilis*) are vertebrates that belong to the Class Mammalia, Order Carnivora, and Family Ursidae. The grizzly bear is a member of the brown bear species (*U. arctos*) that occurs in North America, Europe, and Asia; the subspecies *U. a. horribilis* is limited to North America (Rausch 1963, p. 43; Servheen 1999, pp. 50–53). Early taxonomic descriptions of *U. arctos* based primarily on skull measurements described more than 90 subspecies (Merriam 1918, pp. 9–16), but this was later revised to 2 subspecies in North America (*U. a. middendorfi* on the islands of the Kodiak archipelago in Alaska and *U. a. horribilis* in the rest of North America) (Rausch 1963, p. 43). The two North American subspecies approach of Rausch (1963, p. 43) is generally accepted by most taxonomists today, and is the approach we use. Additional discussion of this issue can be found in the proposed rule (70 FR 69854–69855, November 17, 2005). The original 1975 listing (40 FR 31734–31736, July 28, 1975) had been inadvertently modified in the List of Endangered and Threatened Wildlife to *U. arctos* with a historic holarctic range. With this final rule, we have corrected this error to reflect the original listed entity of *U. arctos horribilis* with a historic range of North America.

Behavior

Although adult bears are normally solitary (Nowak and Paradiso 1983, p. 971), home ranges of adult bears frequently overlap (Schwartz *et al.* 2003b, pp. 565–566). Grizzly bears display a behavior called natal philopatry in which dispersing young establish home ranges within or overlapping their mother's (Waser and Jones 1983, p. 361; Schwartz *et al.* 2003b, p. 566). This type of movement makes dispersal across landscapes a slow process. Radio-telemetry and genetics data suggests females establish home ranges an average of 9.8 to 14.3 kilometers (km) (6.1 to 8.9 miles (mi)) away from the center of their mother's home range, whereas males generally stray further, establishing home ranges roughly 29.9 to 42.0 km (18.6 to 26.0 mi) away from their mother's (McLellan and Hovey 2001, p. 842; Proctor *et al.* 2004, p. 1108).

The home range of adult male grizzly bears is typically three to five times the size of an adult female's home range (LeFranc *et al.* 1987, pp. 27–30). The large home ranges of grizzly bears, particularly males, enhance genetic diversity in the population by enabling males to mate with numerous females (Blanchard and Knight 1991, pp. 46–51; Craighead *et al.* 1995, pp. 303–305). Grizzly bear population densities of one bear per 20 square kilometers (sq km) (8 square miles (sq mi)) have been reported in Glacier National Park (Martinka 1976, p. 150), but most populations in the Lower 48 States are much less dense (LeFranc *et al.* 1987, pp. 47, 52–53). For example, estimates of grizzly bear densities in the GYA range from one bear per 50 sq km (20 sq mi) to one bear per 80 sq km (30 sq mi) (Blanchard and Knight 1980, pp. 263–264; Craighead and Mitchell 1982, pp. 537–538).

Grizzly bears have a promiscuous mating system (Hornocker 1962, p. 70; Craighead and Mitchell 1982, p. 522; Schwartz *et al.* 2003b, p. 563) with genetic studies confirming that cubs from the same litter can have different fathers (Craighead *et al.* 1998, p. 325). Mating occurs from May through July with a peak in mid-June (Craighead and Mitchell 1982, p. 522; Nowak and Paradiso 1983, p. 971). Age of first reproduction and litter size may be related to nutritional state (Stringham 1990, p. 433; McLellan 1994, p. 20; Hilderbrand *et al.* 1999, pp. 135–136; Mattson 2000, p. 110). Age of first reproduction varies from 3 to 8 years of age, and litter size varies from one to four cubs (Schwartz *et al.* 2003b, p. 563). For the Yellowstone grizzly bear population, the average age of first reproduction is approximately 6 years old, and the average litter size is 2.04 cubs (Schwartz *et al.* 2006a, p. 19). Cubs are born in a den in late January or early February and remain with the female for 2 to 3 years before the mother will again mate and produce another litter (Schwartz *et al.* 2003b, p. 564). Grizzly bears have one of the slowest reproductive rates among terrestrial mammals, resulting primarily from the late age of first reproduction, small average litter size, and the long interval between litters (Nowak and Paradiso 1983, p. 971; Schwartz *et al.* 2003b, p. 564). Given the above factors and natural mortality, it may take a single female 10 years to replace herself in a population (U.S. Fish and Wildlife Service 1993, p. 4). Grizzly bear females cease breeding successfully some time in their mid-to-late 20s (Schwartz *et al.* 2003a, pp. 109–110).

For 3 to 6 months during winter, grizzly bears across their range enter dens in an adaptive behavior which increases survival during periods of low food availability, deep snow, and low air temperature (Craighead and Craighead 1972, pp. 33–34). Grizzly bears in the lower 48 States spend between 4 and 6 months in dens beginning in October or November (Linnell *et al.* 2000, p. 401). During this period, they do not eat, drink, urinate, or defecate (Folk *et al.* 1976, pp. 376–377; Nelson 1980, p. 2955). Hibernating grizzly bears exhibit a marked decline in heart and respiration rate, but only a slight drop in body temperature (Nowak and Paradiso 1983, p. 971). Due to their relatively constant body temperature in the den, hibernating grizzly bears can be easily aroused and have been known to exit dens when disturbed by seismic or mining activity (Harding and Nagy 1980, p. 278) or by human activity (Swenson *et al.* 1997a, p. 37). Both males and females have a tendency to use the same general area year after year, but the same exact den is rarely used twice by an individual (Schoen *et al.* 1987, p. 300; Linnell *et al.* 2000, p. 403). Females display stronger area fidelity than males and generally stay in their dens longer, depending on reproductive status (Judd *et al.* 1986, pp. 113–114; Schoen *et al.* 1987, p. 300; Linnell *et al.* 2000, p. 403).

In preparation for hibernation, bears increase their food intake dramatically during a stage called hyperphagia (Craighead and Mitchell 1982, p. 544). Hyperphagia is defined simply as overeating (in excess of daily metabolic demands) and occurs throughout the 2 to 4 months prior to den entry. During hyperphagia, excess food is deposited as fat, and grizzly bears may gain as much as 1.65 kg/day (3.64 lb/day) (Craighead and Mitchell 1982, p. 544). Grizzly bears must consume foods rich in protein and carbohydrates in order to build up fat reserves to survive denning and post-denning periods (Rode and Robbins 2000, pp. 1643–1644). These layers of fat are crucial to the hibernating bear as they provide a source of energy and insulate the bear from cold temperatures, and are equally important in providing energy to the bear upon emergence from the den when food is still sparse relative to metabolic requirements (Craighead and Mitchell 1982, p. 544).

Although the digestive system of bears is essentially that of a carnivore, bears are successful omnivores, and in some areas may be almost entirely herbivorous (Jacoby *et al.* 1999, pp. 924–926; Schwartz *et al.* 2003b, pp. 568–569). Grizzly bears are opportunistic feeders and will consume almost any available food including living or dead mammals or fish, and, sometimes, garbage (Knight *et al.* 1988, p. 121; Mattson *et al.* 1991a, pp. 1620–1624; Schwartz *et al.* 2003b, pp. 568–569). In areas where animal matter is less available, grasses, roots, bulbs, tubers, and fungi may be important in meeting protein requirements (LeFranc *et al.* 1987, pp. 111–114). High-quality foods such as berries, nuts, insects, and fish are important in some areas (Schwartz *et al.* 2003b, pp. 568–569).

The search for food has a prime influence on grizzly bear movements (Mattson *et al.* 1991a, pp. 1625–1626). In the GYA, four food sources have been identified as important to grizzly bear survival and reproductive success (Mattson *et al.* 2002, p. 2). Winter-killed ungulates serve as an important food source in early spring before most vegetation is available (Green *et al.* 1997, p. 140; Mattson 1997, p. 165). During early summer, spawning cutthroat trout (*Oncorhynchus clarki*) are a source of nutrition for grizzly bears in the Yellowstone population (Mattson *et al.* 1991a, p. 1623; Mattson and Reinhart 1995, p. 2072; Felicetti *et al.* 2004, pp. 496, 499). Grizzly bears feed on army cutworm moths (*Euxoa auxiliaris*) during late summer and early fall as they try to acquire sufficient fat levels for winter (Mattson *et al.* 1991b, p. 2432; French *et al.* 1994, p. 394). Lastly, in some years, whitebark pine (*Pinus albicaulis*) seeds serve as an important fall food due to their high fat content and abundance as a pre-hibernation food (Mattson and Reinhart 1994, p. 212). The distribution and abundance of these grizzly bear foods vary naturally among seasons and years.

On average, approximately 79 percent of the diet of adult male and 45 percent of the diet of adult female grizzly bears in the GYA is terrestrial meat (Jacoby *et al.* 1999, p. 925). In contrast, in Glacier National Park, over 95 percent of the diets of both adult male and female grizzly bears are vegetation (Jacoby *et al.* 1999, p. 925). Ungulates rank as the second highest source of net digestible energy available to grizzly bears in the GYA (Mealey 1975, pp. 84–86; Pritchard and Robbins 1990, p. 1647; Craighead *et al.* 1995, pp. 250–251). Grizzly bears with home ranges in areas with few plant foods depend extensively on ungulate meat (Harting 1985, pp. 69–70, 85–87). Grizzly bears in the GYA feed on ungulates primarily as winter-killed carrion from March through May although they also depredate elk calves for a short period in early June (Gunther and Renkin 1990, pp. 330–332; Green *et al.* 1997, p. 1040; Mattson 1997, pp. 165–166). Carcass availability fluctuates with winter severity because fewer ungulates die during mild winters (Mattson *et al.* 1991a, pp. 1622–1623).

Due to their high digestibility and protein and lipid content, spawning cutthroat trout are one of the highest sources of digestible energy available to bears during early summer in Yellowstone National Park (Mealey 1975, pp. 84–86; Pritchard and Robbins 1990, p. 1647). Grizzly bears are known to prey on cutthroat trout in at least 36 different streams tributary to Yellowstone Lake (Reinhart and Mattson 1990, pp. 345–346). From 1997 to 1999, Haroldson *et al.* (2000, pp. 32–35) identified 85 different grizzly bears that had likely fished spawning stream tributaries to Yellowstone Lake. While importance varies by season and year, few bears develop a dependence on this food source (Haroldson *et al.* 2005, pp. 173–174). Only 23 individuals visited spawning streams more than 1 year out of the 4 years sampled, suggesting that this resource is used opportunistically (Haroldson *et al.* 2005, pp. 174–175). In contrast to earlier studies which used different assumptions and methods (Reinhart and Mattson 1990, pp. 345–349; Mattson and Reinhart 1995, pp. 2078–2079), Felicetti *et al.* (2004, pp. 496–499) found that male grizzly bears are the primary consumers of cutthroat trout, accounting for 92 percent of all trout consumed by Yellowstone grizzly bears.

Alpine moth aggregations are an important food source for a considerable portion of the Yellowstone grizzly bear population (Mattson *et al.* 1991b, p. 2434). As many as 35 different grizzly bears with cubs-of-the-year have been observed feeding at moth sites in a single season (Ternent and Haroldson 2000, p. 39). Some bears may feed almost exclusively on moths for a period of over a month (French *et al.* 1994, p. 393). Moths have the highest caloric content per gram of any other bear food (French *et al.* 1994, p. 391). Moths are available during late summer and early fall when bears consume large quantities of foods in order to acquire sufficient fat levels for winter (Mattson *et al.* 1991b, p. 2433). A grizzly bear feeding extensively on moths over a 30-day period may consume up to 47 percent of its annual energy budget of 960,000 calories (White *et al.* 1999, pp. 149–150). Moths also are valuable to bears because they are located in remote areas, thereby reducing the potential for grizzly bear/human conflicts during the late-summer tourist months (Gunther *et al.* 2004, p. 15).

Due to their high fat content and potential abundance as a pre-hibernation food, whitebark pine seeds are an important fall food for bears in the GYA (Mattson and Jonkel 1990, p. 223; Mattson *et al.* 1991a, p. 1623). Yellowstone grizzly bears consume whitebark pine seeds extensively when whitebark cones are available. Bears may feed predominantly on whitebark pine seeds when production exceeds 20 cones per tree (Blanchard 1990, p. 362; Mattson *et al.* 1992, pp. 433, 436). During years of low whitebark pine seed availability, grizzly bears often seek alternate foods at lower elevations in association with human activities (Mattson *et al.* 1992, p. 436; Knight and Blanchard 1995, p. 23; Gunther *et al.* 1997, pp. 9–11; Gunther *et al.* 2004, p. 18).

The production and availability of these four major foods can have a positive effect on reproduction and survival rates of Yellowstone grizzly bears (Mattson *et al.* 2002, p. 5). For example, during years when whitebark pine seeds are abundant, there are fewer grizzly bear/human conflicts in the GYA (Mattson *et al.* 1992, p. 436; Gunther *et al.* 2004, pp. 13–15). Grizzly bear/human conflicts are incidents in which bears kill or injure people, damage property, kill or injure livestock, damage beehives, obtain anthropogenic (man-made) foods, or damage or obtain garden and orchard fruits and vegetables (USDA Forest Service1986, pp. 53–54). During poor whitebark pine years, grizzly bear/human conflicts are more frequent, resulting in higher numbers of human-caused grizzly bear mortalities due to defense of life or property and management removals of nuisance bears (Mattson *et al.* 1992, p. 436; Gunther *et al.* 2004, pp. 13–14). A nuisance bear is one that seeks human food in human-use areas, kills lawfully present livestock, or displays unnatural aggressive behavior toward people (USDA Forest Service 1986, pp. 53–54). Introduced organisms (e.g., white pine blister rust and lake trout), habitat loss, and other human activities can negatively impact the quantity and distribution of these four primary foods (Reinhart *et al.* 2001, pp. 285–286). Potential effects to food supply and human/bear conflict are discussed in more detail in the 5-factor analysis.

Recovery

Prior to the arrival of Europeans, the grizzly bear occurred throughout the western half of the contiguous United States, central Mexico, western Canada, and most of Alaska (Roosevelt 1907, pp. 27–28; Wright 1909, pp. vii, 3, 185–186; Merriam 1922, p. 1; Storer and Tevis 1955, p. 18; Rausch 1963, p. 35; Herrero 1972, pp. 224–227; Mattson *et al.* 1995, p. 103; Schwartz *et al.* 2003b, pp. 557–558). Pre-settlement population levels for the western contiguous United States are believed to be in the range of 50,000 animals (Servheen 1999, p. 50). With European settlement of the American West, grizzly bears were shot, poisoned, and trapped wherever they were found, and the resulting range and population declines were dramatic (Roosevelt 1907, pp. 27–28; Wright 1909, p. vii; Storer and Tevis 1955, pp. 26–27; Leopold 1967, p. 30; Koford 1969, p. 95; Craighead and Mitchell 1982, p. 516; Mattson *et al.* 1995, p. 103). The range and numbers of grizzlies were reduced to less than 2 percent of their former range and numbers by the 1930s, approximately 125 years after first contact (U.S. Fish and Wildlife Service 1993, p. 9; Mattson *et al.* 1995, p. 103; Servheen 1999, p. 51). Of 37 grizzly populations present in 1922, 31 were extirpated by 1975 (Servheen 1999, p. 51).

By the 1950s, with little or no conservation effort or management directed at maintaining grizzly bears anywhere in their range, the GYA population had been reduced in numbers and was restricted largely to the confines of Yellowstone National Park and some surrounding areas (Craighead *et al.* 1995, pp. 41–42; Schwartz *et al.* 2003b, pp. 575–579). High grizzly bear mortality in 1970 and 1971, following closure of the open-pit dumps in Yellowstone National Park (Gunther 1994, p. 550; Craighead *et al.* 1995, pp. 34–36), and concern about grizzly population status throughout its remaining range prompted the 1975 listing of the grizzly bear as a threatened species in the lower 48 States under the Act (16 U.S.C. 1531 *et seq.*) (40 FR

31734–31736, July 28, 1975). When the grizzly bear was listed in 1975, the population estimate in the GYA ranged from 136 to 312 individuals (Cowan *et al.* 1974, pp. 32, 36; Craighead *et al.* 1974, p. 16; McCullough 1981, p. 175).

In 1981, we hired a grizzly bear recovery coordinator to direct recovery efforts and to coordinate all agency efforts on research and management of grizzly bears in the lower 48 States. In 1982, the first Grizzly Bear Recovery Plan (Recovery Plan) was completed (U.S. Fish and Wildlife Service 1982, p. ii). The Recovery Plan identified five ecosystems within the conterminous United States thought to support grizzly bears. Today, grizzly bear distribution is primarily within, but not limited to, the areas identified as Recovery Zones (U.S. Fish and Wildlife Service 1993, pp. 10–13, 17–18), including—the GYA in northwest Wyoming, eastern Idaho, and southwest Montana (24,000 sq km (9,200 sq mi)) at more than 500 bears (Interagency Grizzly Bear Study Team 2006, p. 15); the Northern Continental Divide Ecosystem (NCDE) of north central Montana (25,000 sq km (9,600 sq mi)) at more than 500 bears (Kendall 2006); the North Cascades area of north central Washington (25,000 sq km (9,500 sq mi)) at less than 20 bears (Almack *et al.* 1993, p. 4); the Selkirk Mountains area of north Idaho, northeast Washington, and southeast British Columbia (5,700 sq km (2,200 sq mi)) at approximately 40 to 50 bears (64 FR 26730, May 17, 1999; 70 FR 24870, May 11, 2005); and the Cabinet-Yaak area of northwest Montana and northern Idaho (6,700 sq km (2,600 sq mi)) at approximately 30 to 40 bears (Kasworm and Manley 1988, p. 21; Kasworm *et al.* 2004, p. 2). There is an additional Recovery Zone known as the Bitterroot Recovery Zone in the Bitterroot Mountains of east-central Idaho and western Montana (14,500 sq km (5,600 sq mi)), but this area does not contain any grizzly bears at this time (U.S. Fish and Wildlife Service 1996, p. 1; 65 FR 69624, November 17, 2000; U.S. Fish and Wildlife Service 2000, p. ix). The San Juan Mountains of Colorado also were identified as an area of possible grizzly bear occurrence (40 FR 31734–31736, July 28, 1975; U.S. Fish and Wildlife Service 1982, p. 12; U.S. Fish and Wildlife Service 1993, p. 11), but no confirmed sightings of grizzly bears have been found in the San Juan Mountains since a bear was killed there in 1979 (U.S. Fish and Wildlife Service 1993, p. 11).

In the initial Recovery Plan, the Yellowstone Grizzly Bear Ecosystem, later called the Yellowstone Grizzly Bear Recovery Zone, was defined as an area large enough and of sufficient habitat quality to support a recovered grizzly bear population within which the population and habitat would be monitored (U.S. Fish and Wildlife Service 1982, pp. 55–58; U.S. Fish and Wildlife Service 1993, pp. 41). In 1993, we revised the Recovery Plan to include additional tasks and new information that increased the focus and effectiveness of recovery efforts (U.S. Fish and Wildlife Service 1993, pp. 41–58).

However, recovery plans are not regulatory documents and are instead intended to provide guidance to us, 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, we may judge that the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or delist the species. In other cases, recovery opportunities may have been recognized that were not known at the time the Recovery Plan was finalized. These opportunities may be used instead of methods identified in the Recovery Plan. Likewise, information on the species may be learned that was not known at the time the Recovery Plan was finalized. The new information may change the extent that criteria need to be met for recognizing recovery of the species. Recovery of a species is a dynamic process requiring adaptive management (defined as a 6-step feedback loop including assessment, design of management actions and associated monitoring and research, implementation of management according to the design, monitoring, evaluation of outcomes, and adjustment of management based on evaluation of initial management actions) that may, or may not, fully follow the guidance provided in a recovery plan. In the end, any determination of whether a species is no longer in need of the protections of the Act must be based on an assessment of the threats to the species.

Grizzly bear recovery has required cooperation among numerous Federal agencies, State agencies, non-government organizations, local governments, and citizens. In recognition that grizzly bear populations were unsustainably low, the Interagency Grizzly Bear Study Team (hereafter referred to as the Study Team) was created in 1973 to provide detailed scientific information for the management and recovery of the grizzly bear in the GYA. Current members of the Study Team include scientists from the Service, U.S. Geological Survey, USDA Forest Service, academia, and each State game and fish agency involved in grizzly bear recovery. The Study Team has developed protocols to monitor and manage grizzly bear populations and important habitat parameters.

In 1983, the Interagency Grizzly Bear Committee was created to coordinate management efforts and research actions across multiple Federal lands and States within the various Recovery Zones to recover the grizzly bear in the lower 48 States (USDA and U.S. Department of the Interior 1983). Its objective was to change land management practices to more effectively provide security and maintain or improve habitat conditions for the grizzly bear (USDA and U.S. Department of the Interior 1983). The Interagency Grizzly Bear Committee is made up of upper level managers from all affected State and Federal agencies (USDA and U.S. Department of the Interior 1983). Also in 1983, the Yellowstone Ecosystem Subcommittee, a subcommittee of the Interagency Grizzly Bear Committee, was formed to coordinate recovery efforts specific to the GYA (USDA and U.S. Department of the Interior 1983, p. 3). Members of the Yellowstone Ecosystem Subcommittee are mid-level managers and include—the Service; representatives from the six GYA National Forests (the Shoshone, Custer, Beaverhead-Deerlodge, Bridger-Teton, Gallatin, and Targhee); Yellowstone National Park; Grand Teton National Park; the Wyoming Game and Fish Department (WGFD); the Montana Department of Fish, Wildlife, and Parks (MTFWP); the Idaho Department of Fish and Game (IDFG); the Bureau of Land Management (BLM); the Study Team; county governments from each affected State; the Northern Arapahoe Tribe; and the Eastern Shoshone Tribe (USDA and U.S. Department of the Interior 1983).

In 1994, The Fund for Animals, Inc., and 42 other organizations and individuals filed suit over the adequacy of the 1993 Recovery Plan (*Fund for Animals* v. *Babbitt*, 903 F. Supp. 96 (D. D.C. 1995); 967 F. Supp. 6 (D. D.C. 1997). In 1995, the U.S. District Court for the District of Columbia issued an order that remanded for further study and clarification four issues that are relevant to the GYA—(1) The method used to measure the status of bear populations; (2) the impacts of genetic isolation; (3) monitoring of the mortalities related to livestock; and (4)

the monitoring of disease (*Fund for Animals* v. *Babbitt,* 903 F. Supp. 96 (D. D.C. 1995); 967 F. Supp. 6 (D. D.C. 1997)). Following this court decision, all parties filed appeals. In 1997, the parties reached a settlement whereby we agreed to append habitat-based recovery criteria to the Recovery Plan (Settlement dated March 31, 1997, and approved by the court on May 5, 1997, *Fund for Animals* v. *Babbitt,* 967 F. Supp. 6 (D. D.C. 1997)) (hereafter *Fund for Animals* v. *Babbitt*). These four issues and the necessary supplement to the Recovery Plan as required by the court order and subsequent settlement are discussed in detail in this section and in the threats analysis.

Habitat Management and Development of Habitat-based Recovery Criteria—In 1979, the Study Team developed the first comprehensive Guidelines for Management Involving Grizzly Bears in the GYA (hereafter referred to as the Guidelines) (Mealey 1979, pp. 1–4). We determined in a biological opinion that implementation of the Guidelines by Federal land management agencies would promote conservation of the grizzly bear (U.S. Fish and Wildlife Service 1979, p. 1). Beginning in 1979, the six affected National Forests (Beaverhead-Deerlodge, Bridger-Teton, Caribou-Targhee, Custer, Gallatin, and Shoshone), Yellowstone and Grand Teton National Parks, and the BLM in the GYA began managing habitats for grizzly bears under direction specified in the Guidelines.

In 1986, the Interagency Grizzly Bear Committee modified the Guidelines to more effectively manage habitat by mapping and managing according to three different management situations (USDA Forest Service 1986, pp. 35–39). In areas governed by ''Management Situation One,'' grizzly habitat maintenance and improvement and grizzly bear/human conflict minimization received the highest management priority. In areas governed by ''Management Situation Two,'' grizzly bear use was important, but not the primary use of the area. In areas governed by ''Management Situation Three,'' grizzly habitat maintenance and improvement were not management considerations.

Accordingly, the National Forests and National Parks delineated 18 different bear management units within the Recovery Zone to aid in managing habitat and monitoring population trends. Each bear management unit was further subdivided into subunits, resulting in a total of 40 subunits contained within the 18 bear management units (see map at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*). The bear management units are analysis areas that approximate the lifetime size of a female's home range, while subunits are analysis areas that approximate the annual home range size of adult females. Subunits provide the optimal scale for evaluation of seasonal feeding opportunities and landscape patterns of food availability for grizzly bears (Weaver *et al.* 1986, p. 236). The bear management units and subunits were identified to provide enough quality habitat and to ensure that grizzly bears were well distributed across the recovery zone as per the Recovery Plan (U.S. Fish and Wildlife Service 2007, pp. 20, 41, 44–46). Management improvements made as a result of these Guidelines are discussed under Factor A below.

Another tool employed to monitor habitat quality and assist in habitat management is the Yellowstone Grizzly Bear Cumulative Effects Model. The model was designed to assess the inherent productivity of grizzly bear habitat and the cumulative effects of human activities on bear use of that habitat (Weaver *et al.* 1986, p. 234; Dixon 1997, pp. 4–5; Mattson *et al.* 2002, p. 5). The model uses Geographic Information System (GIS) databases and relative value coefficients associated with human activities, vegetation, and key grizzly bear foods to calculate habitat value and habitat effectiveness (Weaver *et al.* 1986, p. 237; Mattson *et al.* 2002, p. 5). Habitat value is a relative measure of the average net digestible energy potentially available to bears in a subunit during each season. Habitat value is primarily a function of vegetation and major foods (Weaver *et al.* 1986, p. 236; Dixon 1997, pp. 62–64). Habitat effectiveness is that part of the energy potentially derived from the area that is available to bears given their response to humans (Weaver *et al.* 1986, pp. 238–239; Dixon 1997, pp. 4–5; Mattson *et al.* 2002, p. 5). More specifically, habitat effectiveness is a function of relative value coefficients of human activities, such as location, duration, and intensity of use for motorized access routes, non-motorized access routes, developed sites, and front- and back-country dispersed uses (Mattson *et al.* 2002, p. 5). The Cumulative Effects Model, which represents the best available scientific information in providing managers with a comparative index of how much habitat values have changed through time, is updated annually to reflect changes in vegetation, major foods, and the number and capacity of human activities.

As per the court settlement (*Fund for Animals* v. *Babbitt*) and as recommended by the 1993 Grizzly Bear Recovery Plan's Task Y423, we have worked to ''establish a threshold of minimal habitat values to be maintained within each Cumulative Effects Analysis Unit in order to ensure that sufficient habitat is available to support a viable population'' (U.S. Fish and Wildlife Service 1993, p. 55). On June 17, 1997, we held a public workshop in Bozeman, Montana, to develop and refine habitat-based recovery criteria for the grizzly bear. A **Federal Register** notice notified the public of this workshop and provided interested parties an opportunity to participate and submit comments (62 FR 19777, April 23, 1997). After considering 1,167 written comments, we developed biologically-based habitat recovery criteria with the overall goal of maintaining or improving habitat conditions at levels that existed in 1998.

There is no published method to deductively calculate minimum habitat values required for a healthy and recovered population. Recognizing that grizzly bears are opportunistic omnivores and that a landscape's ability to support grizzly bears is a function of overall habitat productivity, the distribution and abundance of major food sources, the levels and type of human activities, grizzly bear social systems, bear densities, and stochasticity, we selected 1998 levels as our baseline level. We chose this year because it was known that these habitat values had adequately supported an increasing Yellowstone grizzly bear population throughout the 1990s (Eberhardt *et al.* 1994, p. 362; Knight and Blanchard 1995, pp. 5, 9; Knight *et al.* 1995, p. 247; Boyce *et al.* 2001, pp. 10–11) and that levels of secure habitat (defined as areas more than 500 meters (m) (1650 feet (ft)) from a motorized access route and greater than or equal to 4 hectares (ha) (10 acres (ac)) in size (U.S. Fish and Wildlife Service 2007, pp. 41)) and the number and capacity of developed sites had changed little from 1988 to 1998 (USDA Forest Service 2004, pp. 140–141, 159–162).

The habitat-based recovery criteria lay out detailed management objectives and approaches to manage motorized access, maintain or increase secure habitat, limit increases in site development, and assure no increase in livestock allotments. As each of these management objectives are central to potential present or threatened destruction, modification, or curtailment of habitat or range, each of these criteria are discussed in detail

under Factor A below. These habitat-based recovery criteria have been met.

Additionally, we developed four general habitat-based parameters that will be monitored and related to demographic and population monitoring results—(1) Productivity of the four major foods; (2) habitat effectiveness as measured by the Cumulative Effects Model; (3) grizzly bear mortality numbers, locations, and causes; grizzly bear/human conflicts; nuisance bear management actions; bear/hunter conflicts; and bear/livestock conflicts; and (4) development on private lands (U.S. Fish and Wildlife Service 2007, pp. 25–60). The agencies will monitor, and the Study Team will annually analyze and report on the relationships between grizzly bear population and demographic data, and the availability and distribution of the four most important bear foods, habitat effectiveness, nuisance bear control actions, numbers and distribution of bear/human and bear/livestock conflicts, hunter numbers, and development on private lands. This information will be used to calculate an index of habitat sufficiency and to monitor relationships between decreases in foods or increases in human activity, and increasing bear mortality or changes in bear distribution that might impact the Yellowstone grizzly bear population. These analyses will use the demographic values of a stable to increasing population as a benchmark to be maintained. The current habitat-based recovery criteria have been appended to the Recovery Plan and are included in the Strategy.

Population and Demographic Management—In 2000, we began a process to reevaluate the methods used to measure the status of the bear population, the methods used to estimate population size, and the sustainable level of mortality in the GYA. This process was initiated both in response to the 1995 court order (*Fund for Animals* v. *Babbitt*) and Task Y11 of the 1993 Grizzly Bear Recovery Plan (U.S. Fish and Wildlife Service 1993, p. 44), which suggested that we ''Reevaluate and refine population criteria as new information becomes available.'' The Wildlife Monograph: Temporal, Spatial, and Environmental Influences on the Demographics of Grizzly Bears in the Greater Yellowstone Ecosystem, and the report entitled Reassessing Methods To Estimate Population Size and Sustainable Mortality Limits for the Yellowstone Grizzly Bear (hereafter referred to as the Reassessing Methods Document) (Interagency Grizzly Bear Study Team 2005; Interagency Grizzly Bear Study Team 2006) were produced to respond to the need to reevaluate and refine the population criteria. The Wildlife Monograph is divided into separate chapters (Haroldson *et al.* 2006b, pp. 33–42; Harris *et al.* 2006, pp. 44–55; Schwartz *et al.* 2006a, pp. 18–23; Schwartz *et al.* 2006c, pp. 25–31; Schwartz *et al.* 2006d, pp. 9–16; Schwartz *et al.* 2006e, pp. 57–63), and we reference these chapters individually as applicable. Relevant portions of the authors' analyses are summarized below, as well as relevant findings on the likelihood of population persistence (as defined in a population viability analysis (PVA)) into the foreseeable future for the Yellowstone grizzly bear population.

Harris *et al.* (2006, pp. 44–45) used the survival rates calculated by Haroldson *et al.* (2006b, p. 35) and Schwartz *et al.* (2006c, p. 27), and the reproductive rates calculated by Schwartz *et al.* (2006a, p. 19) to model population trajectory for the Yellowstone grizzly bear population between 1983 and 2002. Because the fates of some radio-collared bears were unknown, Harris *et al.* (2006, p. 48) calculated two separate estimates of population growth rate (see our response to Issue 5 under subheading B in the Responses to Public Comments section for additional detail on this methodology). They found that the Yellowstone grizzly bear population increased at a rate between 4.2 and 7.6 percent per year between 1983 and 2002 (Harris *et al.* 2006, p. 48).

Schwartz *et al.* (2006c, p. 29) concluded that grizzly bears are probably approaching carrying capacity inside Yellowstone National Park. Their conclusion resulted from the analysis of survivorship of cubs and yearlings, and of independent bears, inside Yellowstone National Park, outside the Park but inside the Primary Conservation Area (PCA), and outside the PCA, as well as the analysis of bear distribution in those three zones of residency.

Population viability analyses are often used to describe a population's likelihood of persistence in the future. We consider the findings of Boyce *et al.* (2001, pp. 1–11) in the following paragraphs because they reviewed the existing published PVAs for Yellowstone grizzly bears, and updated these previous analyses using data collected since the original analyses were completed. They also conducted new PVAs using two software packages that had not been available to previous investigators. They found that the Yellowstone grizzly bear population had a 1 percent chance of going extinct within the next 100 years and a 4 percent chance of going extinct in the next 500 years (Boyce *et al.* 2001, pp. 1, 10–11). However, these analyses did not consider changes in habitat that may occur, so Boyce *et al.* (2001, pp. 33–34) did not consider any of the PVAs to be sufficient. Instead, they recommended that a habitat-based PVA be developed that would link a grizzly bear population model with a resource selection function rigorously derived from the existing GIS databases compiled for the Cumulative Effects Model. However, given the uncertainty in parameterizing the habitat databases and the relationships between food availability and grizzly bear vital rates, we do not believe such an exercise, if it is ever possible to complete, is necessary to make informed management decisions and maintain a recovered grizzly bear population in the GYA in the foreseeable future. Such uncertainty could result in a model that is even less indicative or representative of potential responses of bears to habitat variation than what is available now. This rule relies upon the best scientific and commercial information available, which we view as more than adequate to support this action.

Mortality control is a key part of any successful management effort; however, some mortality, including human-caused mortality, is unavoidable in a dynamic system where hundreds of bears inhabit large areas of diverse habitat with several million human visitors and residents. In 1977, Eberhardt documented that adult female survival was the most important vital rate influencing population trajectory (Eberhardt 1977, p. 210). Low adult female survival was the critical factor causing decline in the GYA population prior to the mid-1980s (Knight and Eberhardt 1985, p. 331). In the early 1980s, with the development of the first Recovery Plan (U.S. Fish and Wildlife Service 1982, pp. 21–24), agencies began to control mortality and increase adult female survivorship (USDA Forest Service 1986, pp. 1–2; Knight *et al.* 1999, pp. 56–57). The 1982 and 1993 Revised Recovery Plan (U.S. Fish and Wildlife Service 1982, pp. 33–34, U.S. Fish and Wildlife Service 1993, pp. 20–21) established three demographic (population) goals to objectively measure and monitor recovery of the Yellowstone grizzly bear population:

Demographic Recovery Criterion 1—Maintain a minimum of 15 unduplicated (only counted once) females with cubs-of-the-year over a running 6-year average both inside the Recovery Zone and within a 16-km (10-mi) area immediately surrounding the

Recovery Zone. *Status:* This recovery criterion has been met (Haroldson 2006b, p. 12).

Demographic Recovery Criterion 2—Sixteen of 18 bear management units within the Recovery Zone (see map at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*) must be occupied by females with young, with no 2 adjacent bear management units unoccupied, during a 6-year sum of observations. *Status:* This criterion is important as it ensures that reproductive females occupy the majority of the Recovery Zone and are not concentrated in one portion of the ecosystem. This recovery criterion has been met (Podruzny 2006, p. 17).

1993 Demographic Recovery Criterion 3—The running 6-year average for total known, human-caused mortality should not exceed 4 percent of the minimum population estimate in any 2 consecutive years; and human-caused female grizzly bear mortality should not exceed 1.2 percent of the minimum population estimate in any 2 consecutive years. *Status:* The 4 percent limit on total human-caused mortality has not been exceeded since 1995. Because female mortality averaged 7.5 female bears per year for the time period from 2001 to 2004 (Haroldson and Frey 2006, p. 30), even though there were only 2 female mortalities in 2005 and 3 female mortalities in 2006, the high mortality in the preceding years made the 6-year average exceed the 1.2 percent limit in 2004, 2005, and 2006. This means that this component of 1993 Demographic Recovery Criterion 3 was not met in the last consecutive 2-year period of 2005 to 2006.

2007 Demographic Recovery Criterion 3—For independent females (at least 2 years old), the current annual mortality limit, not to be exceeded in 2 consecutive years and including all sources of mortality, is 9 percent of the total number of independent females. For independent males (at least 2 years old), the current annual mortality limit not to be exceeded in 3 consecutive years and including all sources of mortality, is 15 percent of the total number of independent males. For dependent young (less than 2 years old), the current annual mortality limit, not to be exceeded in 3 consecutive years and including known and probable human-caused mortalities only, is 9 percent of the total number of dependent young (Interagency Grizzly Bear Study Team 2005, pp. 36–38). *Status:* Applying the current methodology to the 1999 to 2006 data, mortality limits have not been exceeded for consecutive years for any bear class and, therefore, this criterion has been met (Schwartz, in press).

We no longer consider *1993 Demographic Recovery Criterion 3* to represent the best scientific and commercial data available, nor the best technique to assess recovery of the Yellowstone grizzly bear population because—(1) There is now a method to calculate the total number of independent females from sightings and resightings of females with cubs (Keating *et al.* 2002, p. 173), and this method allows calculation of total population size (Interagency Grizzly Bear Study Team 2005, pp. 12–26) instead of minimum population size as used in the old method (U.S. Fish and Wildlife Service 1993, pp. 41–44); (2) There is now a method to calculate the unknown and unreported mortalities (Cherry *et al.* 2002, pp. 176–181), and this method allows more conservative mortality management based on annually updated information rather than the estimate of unknown and unreported mortality used in the Recovery Plan (U.S. Fish and Wildlife Service 1993, p. 20, 43); and (3) There are now improved and updated data on reproductive performance of Yellowstone grizzly bears (Schwartz *et al.* 2006a, pp. 19–23), updated data on survival of cub and yearling Yellowstone grizzly bears (Schwartz *et al.* 2006c, pp. 25–28), updated data on survival of independent Yellowstone grizzly bears (Haroldson *et al.* 2006b, pp. 33–35), updated data on the trajectory of the Yellowstone grizzly bear population under alternate survival rates (Harris *et al.* 2006, pp. 44–54), and new data on the impacts of spatial and environmental heterogeneity on Yellowstone grizzly bear demographics (Schwartz *et al.* 2006e, pp. 58–61). These improved data and analyses, since the development of the *1993 Demographic Recovery Criterion 3* (U.S. Fish and Wildlife Service 1993, pp. 41–44), allow improved mortality management based on more accurate calculations of total population size, and the establishment of sustainable mortality for independent females, independent males, and dependent young.

As stated above, the update to *1993 Demographic Recovery Criterion 3* began in 2000, as per Task Y11 of the 1993 Recovery Plan (U.S. Fish and Wildlife Service 1993, p. 44) and the court remand to the Service for further study and clarification (*Fund for Animals* v. *Babbitt*). When this review began in 2000, the *1993 Demographic Recovery Criterion 3* had been achieved since 1998 (Haroldson and Frey 2006, p. 35). It was only since 2004, 4 years after the reassessment work began, that the 1993 criterion was not met (Haroldson and Frey 2006, p. 35).

Although the 1993 Recovery Plan suggested calculating sustainable mortality as a percentage of the minimum population estimate (as outlined in Demographic Recovery Criterion 3), this method no longer represents the best scientific and commercial data available (Interagency Grizzly Bear Study Team 2005, pp. 8–9). The Study Team conducted a critical review of both current and alternative methods for calculating population size, estimating the known to unknown mortality ratio, and establishing sustainable mortality levels for the Yellowstone grizzly population (Interagency Grizzly Bear Study Team 2005, pp. 13–41). The product of this work is the aforementioned Reassessing Methods Document, which evaluates current methods, reviews recent scientific literature, examines alternative methods, and recommends the most scientifically valid techniques based on these reviews (Interagency Grizzly Bear Study Team 2005, pp. 41–45). This Reassessing Methods Document was sent out to three peer reviewers, and the comments of the reviewers were incorporated into the final document that was released to the public in November of 2005 (70 FR 70632, November 22, 2005). These peer reviews are available in the administrative record for this final rule. We requested public comment on the Reassessing Methods Document (70 FR 70632–70633, Nov. 22, 2005). In response to the comments received, the Study Team prepared a Supplement to the Reassessing Methods Document, which addresses many of the concerns raised during the public comment period (Interagency Grizzly Bear Study Team 2006). This Supplement also underwent peer review. Both the Reassessing Methods Document and its Supplement are accessible at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm.*

The end result of this critical review and analysis are revised methods for calculating population size, estimating the known to unknown mortality ratio, and establishing sustainable mortality levels for the Yellowstone grizzly population based on the best available science. These methods and the *2007 Demographic Recovery Criterion 3* were appended to the Recovery Plan as a supplement and included in the Strategy (72 FR 11376; 72 FR 11376–11377).

The current method is a much more comprehensive mortality management approach. Between 1980 and 2002,

approximately 21 percent of all known grizzly bear deaths were from undetermined causes (Servheen *et al.* 2004, p. 15). These deaths could not be counted against the 4 percent human-caused mortality limit using the previous method because the cause of death could not be confirmed. The previous method also assumed a 2-to-1 ''known-to-unknown'' mortality ratio. Many researchers hypothesize that unknown mortality is much higher than that suggested by a ratio of ''known-to-unknown'' of 2-to-1 (Knight and Eberhardt 1985, pp. 332–333; McLellan *et al.* 1999, p. 916). After careful consideration and using the best available science, the Study Team adopted a new more conservative ''known-to-unknown'' mortality ratio of approximately 1-to-2 that is recalculated each year based on the number of known, reported deaths (Cherry *et al.* 2002, p. 179; Interagency Grizzly Bear Study Team 2005, pp. 39–41).

Annual allowable mortality limits for each bear class (independent female, independent male, and dependent young) are calculated annually based on total population estimates of each bear class for the current year (Interagency Grizzly Bear Study Team 2005, pp. 5–9). The Study Team calculates both the total population size and the mortality limits within an area designated by the Strategy (see The Conservation Strategy section of the rule below) that overlaps and extends beyond suitable habitat (see Figure 1 below). For independent females, a 9 percent limit was considered sustainable because simulations have shown that this level of adult female mortality rate allows a stable to increasing population 95 percent of the time (Harris *et al.* 2006, p. 50). For independent males, a 15 percent limit was considered sustainable because it approximates the level of male mortality in the GYA from 1983 to 2001 (Haroldson *et al.* 2006b, p. 38), a period when the mean growth rate of the population was estimated at 4 to 7 percent per year (Harris *et al.* 2006, p. 48). Independent males can endure a higher rate of mortality compared to females without affecting the overall stability or trajectory of the population because they contribute little to overall population growth (Mace and Waller 1998, pp. 1009–1013; Interagency Grizzly Bear Study Team 2005, p. 39). Similarly, the 9 percent limit on human-caused mortality for dependent young was chosen because this level of mortality is less than the 15 percent human-caused mortality documented for each sex of this age group from 1983 to 2001, a period of population growth and expansion (Interagency Grizzly Bear Study Team 2005, pp. 9, 36–38). Although it is known that dependent bears experience far higher natural mortality rates than independent bears (Schwartz *et al.* 2006c, p. 30), there is no known way to sample these mortalities directly in the field. Instead, these rates are calculated from consecutive years of observing radio-collared females with cubs-of-the-year.

These mortality limits can be reduced by individual management agencies of the multi-agency Yellowstone Grizzly Coordinating Committee (hereafter referred to as the Coordinating Committee and further described in Factor D below) within their jurisdictions, as part of the Coordinating Committee management process to meet the Strategy and the State plans' management objectives. These mortality limits, as described above in the Conservation Strategy Management Area (Figure 1), cannot be increased above the limits of 9 percent for independent females, 15 percent for independent males, and 9 percent for dependent young, unless such an increase is justified or supported by new scientific findings using the best available science, and the basis for this increase is documented by the Study Team in a report to the Coordinating Committee. Any such recommendation to increase mortality limits would be considered an amendment to the Strategy open for public comment, and requiring a majority vote by the Coordinating Committee before finalization (U.S. Fish and Wildlife Service 2007, p. 63).

The Study Team will reevaluate mortality limits every 8 to 10 years, or as new scientific information becomes available (Interagency Grizzly Bear Study Team 2005, p. 45), or at the request of the Coordinating Committee. Allocation of mortality limits within the Conservation Strategy Management Area (see Figure 1 below) among management jurisdictions is the responsibility of the Coordinating Committee, but total mortality for independent females, independent males, and dependent young within the Conservation Strategy Management Area (see Figure 1 below) must remain at or below the sustainable mortality limits established by the Study Team. This allocation process may be used to adjust mortality numbers among jurisdictions to achieve management objectives while staying within the overall mortality limits.

The Conservation Strategy—In order to provide adequate regulatory mechanisms after delisting and ensure the long-term maintenance of a recovered population, the Recovery Plan calls for the development of ''a conservation strategy to outline habitat and population monitoring that will continue in force after recovery'' (Recovery Plan Task Y426) (U.S. Fish and Wildlife Service 1993, p. 55). To accomplish this goal, in 1993, we created the Interagency Conservation Strategy Team. This team included biologists from the Service, the National Park Service, the USDA Forest Service, the IDFG, the WGFD, and the MTFWP.

In March 2000, a draft Conservation Strategy for the GYA was released for public review and comment (65 FR 11340, March 2, 2000). Also in 2000, a Governors' Roundtable was organized to provide recommendations from the perspectives of the three States that would be involved with grizzly bear management after delisting. In 2003, the draft Final Conservation Strategy for the Grizzly Bear in the GYA was released, along with drafts of State grizzly bear management plans (all accessible at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*). We have responded to all public comments received on the Strategy and finalized the Strategy (72 FR 11376). The Strategy will become effective once this final rule takes effect.

The purpose of the Strategy and associated State and Federal implementation plans is to—(1) Describe, summarize, and implement the coordinated efforts to manage the grizzly bear population and its habitat to ensure continued conservation of the Yellowstone grizzly bear population; (2) specify and implement the population, habitat, and nuisance bear standards to maintain a recovered grizzly bear population for the foreseeable future; (3) document the regulatory mechanisms and legal authorities, policies, management, and monitoring programs that exist to maintain the recovered grizzly bear population; and (4) document the actions which the participating agencies have agreed to implement (U.S. Fish and Wildlife Service 2007, pp. 5–6).

The Strategy identifies and provides a framework for managing two areas, the PCA and adjacent areas of suitable habitat where occupancy by grizzly bears is anticipated as per the State plans. The PCA boundaries (containing 23,853 sq km (9,210 sq mi)) correspond to those of the Yellowstone Recovery Zone (U.S. Fish and Wildlife Service 1993, p. 41) and will replace the Recovery Zone boundary (see Figure 1 below). The PCA contains adequate seasonal habitat components needed to support the recovered Yellowstone grizzly bear population for the foreseeable future and to allow bears to continue to expand outside the PCA.

The PCA includes approximately 51 percent of the suitable habitat within the DPS and approximately 84 to 90 percent of the population of female grizzly bears with cubs (Schwartz *et al.* 2006b, pp. 64–66).

The Strategy will be implemented and funded by both Federal and State agencies within the Yellowstone DPS. The USDA Forest Service, National Park Service, and BLM will cooperate with the State wildlife agencies (MTFWP, IDFG, and WGFD) to implement the Strategy and its protective habitat and population standards. The USDA Forest Service and National Park Service (which collectively own and manage approximately 98 percent of the PCA) are responsible for maintaining or improving habitat standards inside the PCA and monitoring population criteria. Specifically, Yellowstone National Park, Grand Teton National Park, and the Shoshone, Beaverhead-Deerlodge, Bridger-Teton, Caribou-Targhee, Custer, and Gallatin National Forests are the primary areas with Federal responsibility for implementing the Strategy. Affected National Forests and National Parks have incorporated the habitat standards and criteria into their Forest Plans and National Park management plans via appropriate amendment processes so that they are legally applied to these public lands within the Yellowstone DPS boundaries (Grand Teton National Park 2006, p. 1; USDA Forest Service 2006b, p. 4; Yellowstone National Park 2006, p. 12).

Outside of the PCA, grizzly bears will be allowed to expand into suitable habitat as per direction in the State management plans. Here, the objective is to maintain existing resource management and recreational uses, and to allow agencies to respond to demonstrated problems with appropriate management actions. The key to successful management of grizzly bears outside of the PCA lies in their successfully utilizing lands not managed solely for bears, but in which their needs are considered along with other uses. Currently, approximately 10 to 16 percent of female grizzly bears with cubs occupy habitat outside of the PCA (Schwartz *et al.* 2006b, pp. 64–66). The area of suitable habitat outside of the PCA is roughly 83 percent Federally owned; 6.0 percent Tribally owned; 1.6 percent State-owned; and 9.5 percent privately owned. State grizzly bear management plans (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002; MTFWP 2002; WGFD 2005), the Forest Plan Amendment (USDA Forest Service 2006a), and other appropriate planning documents provide specific management direction for areas outside of the PCA.

This differential management standard (one standard inside the PCA and another standard for suitable habitat outside the PCA) has been successful in the past (USDA Forest Service 2004, p. 19). Lands within the PCA/Recovery Zone are currently managed primarily to maintain grizzly bear habitat, whereas lands outside of the PCA/Recovery Zone boundaries are managed with more consideration for human uses (U.S. Fish and Wildlife Service 1993, pp. 17–18). Such flexible management promotes communication and tolerance for grizzly bear recovery.

As the grizzly bear population within the Recovery Zone has rebounded in response to recovery efforts, there has been a gradual natural recolonization of suitable habitat outside of the PCA/Recovery Zone (Pyare et al. 2004, p. 6). Today, most suitable habitat within the DPS boundaries is occupied by grizzly bears (68 percent) but approximately 14,500 sq km (5,600 sq mi) are still available for recolonization (see suitable habitat analysis in Factor A of this final rule below).

The Strategy is an adaptive, dynamic document that establishes a framework to incorporate new and better scientific information as it becomes available or as necessary in response to environmental changes. Ongoing review and evaluation of the effectiveness of the Strategy is the responsibility of the State and Federal managers and will be updated by the management agencies every 5 years, or more frequently as necessary. Public comments will be sought on all updates to the Strategy (U.S. Fish and Wildlife Service 2007, p. 14).

Previous Federal Actions

On July 28, 1975, the grizzly bear was designated as threatened in the conterminous (lower 48) United States (40 FR 31734–31736). On November 17, 2005, we proposed to designate the GYA population of grizzly bears as a DPS and to remove this DPS from the Federal List of Endangered and Threatened Wildlife. This notice was followed by a 120-day comment period (70 FR 69854, November 17, 2005; 71 FR 8251, February 16, 2006), during which we held two public hearings and four open houses (70 FR 69854, November 17, 2005; 71 FR 4097–4098, January 25, 2006). Included in the public comments was a petition to uplist the Yellowstone DPS to endangered status. All assertions of this petition are addressed either in the Summary of Public Comments section below, in the 5-factor analysis that follows, or in the Reassessing Methods Document's issues and responses summary. A 90-day finding on whether the petition presented substantial information indicating whether the petitioned action may be warranted is included below. Similarly, this final rule addresses the 2004 Administrative Procedure Act petition from the Wyoming Farm Bureau Federation to designate the grizzly bear in the GYA as a DPS (Hamilton et al. 2004). Finally, between 1991 and 1999, we issued warranted-but-precluded findings to reclassify grizzly bears in the North Cascades (56 FR 33892–33894, July 24, 1991; 63 FR 30453–30454, June 4, 1998), the Cabinet-Yaak (58 FR 8250–8251, February 12, 1993; 64 FR 26725–26733, May 17, 1999), and the Selkirk Ecosystems (64 FR 26725–26733, May 17, 1999) from threatened to endangered. These uplisting actions remain precluded by higher priority actions. We hope to further evaluate each of these ecosystems during our upcoming 5-year review. Please refer to the proposed rule for more detailed information on previous Federal actions (70 FR 69861, November 17, 2005).

Distinct Vertebrate Population Segment Policy Overview

Pursuant to the Act, we shall consider for listing or delisting any species, subspecies, or, for vertebrates, any DPS of these taxa if there is sufficient information to indicate that such action may be warranted. To interpret and implement the DPS provision of the Act and congressional guidance, the Service and the National Marine Fisheries Service published, on December 21, 1994, a draft Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Act (DPS Policy) and invited public comments on it (59 FR 65884–65885). After review of comments and further consideration, the Services adopted the interagency policy as issued in draft form, and published it in the **Federal Register** on February 7, 1996 (61 FR 4722–4725). This policy addresses the establishment of DPSs for potential listing and delisting actions.

Under our DPS policy, three factors are considered when determining whether or not a population can be considered a DPS. These are applied similarly for additions to the list of endangered and threatened species, reclassification, and removal from the list. They are—(1) discreteness of the population segment in relation to the remainder of the taxon (i.e., *Ursus arctos horribilis*); (2) the significance of the population segment to the taxon to which it belongs (i.e., *Ursus arctos horribilis*); and (3) the population segment's conservation status in relation

to the Act's standards for listing (i.e., is the population segment endangered or threatened).

Application of the Distinct Population Segment Policy

Although the DPS Policy does not allow State or other intra-national governmental boundaries to be used as the basis for determining the discreteness of a potential DPS, an artificial or manmade boundary may be used to clearly identify the geographic area included within a DPS designation. Easily identifiable manmade projects, such as the center line of interstate highways, Federal highways, and State highways are useful for delimiting DPS boundaries. Thus, the Yellowstone DPS consists of—that portion of Idaho that is east of Interstate Highway 15 and north of U.S. Highway 30; that portion of Montana that is east of Interstate Highway 15 and south of Interstate Highway 90; and that portion of Wyoming south of Interstate Highway 90, west of Interstate Highway 25, Wyoming State Highway 220, and U.S. Highway 287 south of Three Forks (at the 220 and 287 intersection), and north of Interstate Highway 80 and U.S. Highway 30 (see Figure 1 below). Due to the use of highways as easily described boundaries, large areas of unsuitable habitat were included in the DPS.

The core of the Yellowstone DPS is the Yellowstone Recovery Zone (24,000 sq km (9,200 sq mi)) (U.S. Fish and Wildlife Service 1993, p. 39). The Yellowstone Recovery Zone includes Yellowstone National Park; a portion of Grand Teton National Park; John D. Rockefeller Memorial Parkway; sizable contiguous portions of the Shoshone, Bridger-Teton, Targhee, Gallatin, Beaverhead-Deerlodge, and Custer National Forests; BLM lands; and surrounding State and private lands (U.S. Fish and Wildlife Service 1993, p. 39). As grizzly bear populations have rebounded and densities have increased, bears have expanded their range beyond the Recovery Zone, into other suitable habitat. Grizzly bears in this area now occupy about 36,940 sq km (14,260 sq mi) in and around the Yellowstone Recovery Zone (Schwartz *et al.* 2002, p. 207; Schwartz *et al.* 2006b, pp. 64–66). No grizzly bears originating from the Yellowstone Recovery Zone have been suspected or confirmed beyond the borders of the Yellowstone DPS.

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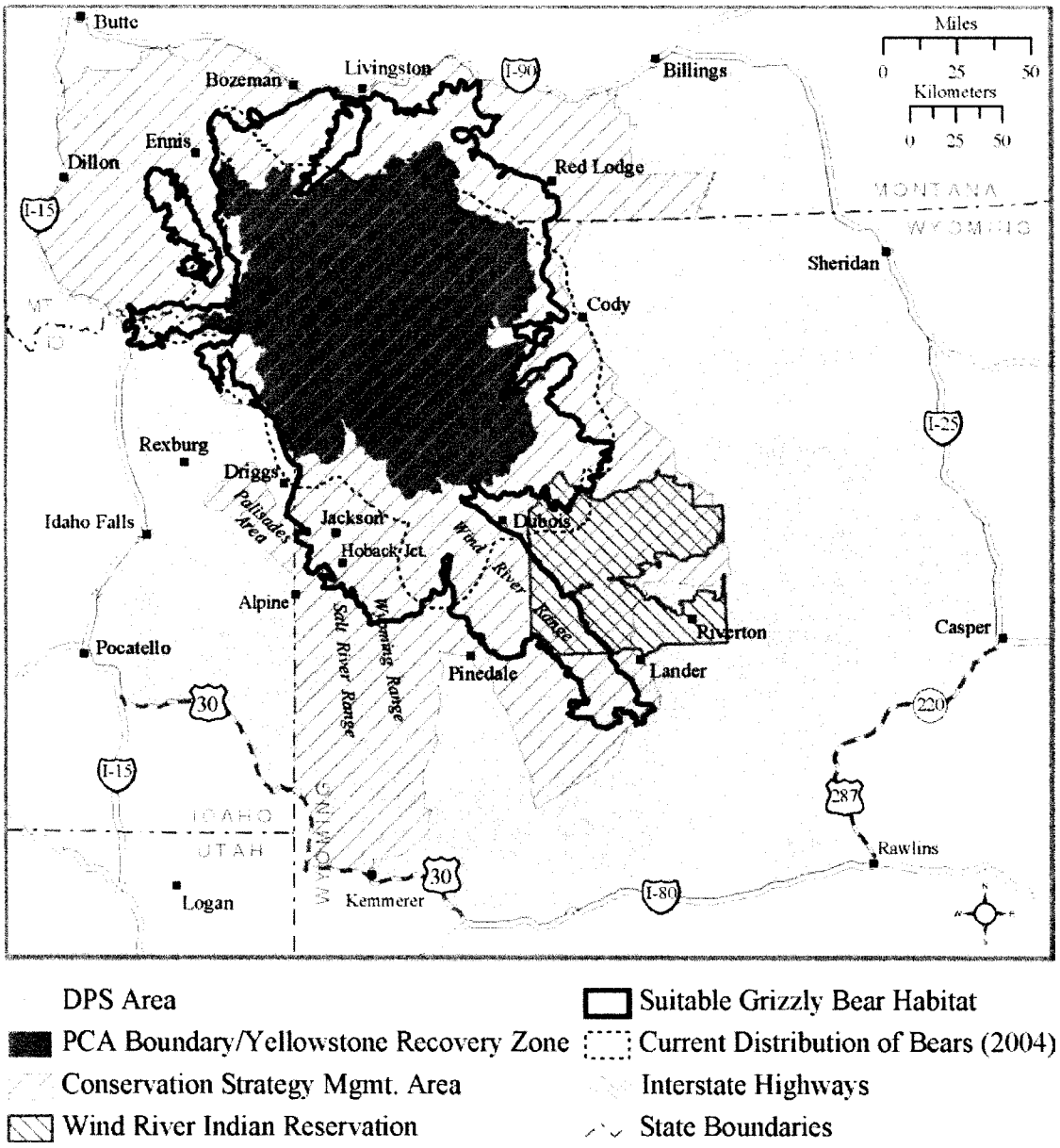

Figure 1. This figure illustrates boundaries for — (1) the Yellowstone grizzly bear Distinct Population Segment (DPS) area; and (2) the Primary Conservation Area (PCA) within which the habitat standards in the Conservation Strategy apply (the boundaries of the PCA also correspond to those of the Yellowstone Recovery Zone); (3) the Conservation Strategy Management Area in which all population and mortality standards will be monitored and calculated; (4) the current distribution of grizzly bears (Schwartz et al. 2006b, pp. 64-66); and (5) Suitable Habitat (as defined in Factor A below).

Analysis for Discreteness

Under our DPS Policy, a population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions—(1) It is markedly separated from other populations of the same taxon (i.e., *Ursus arctos horribilis*) as a consequence of physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence of this separation); or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) (''the inadequacy of existing regulatory mechanisms'') of the Act. Our DPS policy does not require complete reproductive isolation among populations in order to determine that a population is markedly separated from other populations, and allows for some limited interchange among population segments considered to be discrete (61 FR 4722).

The Yellowstone grizzly bear population is the southernmost population remaining in the conterminous States and has been physically separated from other areas where grizzly bears occur for at least 100 years (Merriam 1922, pp. 1–2; Miller and Waits 2003, p. 4334). The nearest population of grizzly bears is found in the NCDE. These populations are separated by land ownership, vegetation, and topographic patterns unsuitable for grizzly bears. The end result is a functional barrier to grizzly bear movement across the landscape and connectivity between the GYA and the NCDE. Grizzly bears from the GYA have not migrated north of the current location of Interstate 90 (the northern boundary of the DPS), probably for at least the last century (Miller and Waits 2003, p. 4334). Meanwhile, during the last decade, there have been periodic reports of grizzly bears from the NCDE as far south as Highway 12 near Helena, Montana. In the last 25 years, two male grizzly bears have been killed near Anaconda, Montana, and the Flint Creek mountains southwest of the NCDE. Both of these reports are approximately 120 km (75 mi) northwest of the most northerly Yellowstone grizzly bears. This distance is too far for normal grizzly bear dispersal distances of roughly 10 to 40 km (6 to 25 mi) (McLellan and Hovey 2001, pp. 841–842; Proctor *et al.* 2004, p. 1108) to effectively connect the NCDE population or other neighboring populations with the Yellowstone DPS. There is currently no connectivity, nor are there any known resident grizzly bears in this area between these two grizzly bear populations.

Because the Yellowstone Ecosystem represents the most southerly population of grizzly bears, connectivity further south is not an issue. Connectivity to the east also is irrelevant to this action as grizzly bears in the lower 48 States no longer exist east of the GYA, and most of the habitat is unsuitable for grizzly bears. Finally, connectivity west into the Bitterroot Mountains is irrelevant to this action because no bears have been documented in this ecosystem in the past 25 years (U.S. Fish and Wildlife Service 1993, p. 12; 65 FR 69624, November 17, 2000; U.S. Fish and Wildlife Service 2000, p. viii).

Genetic data also support the conclusion that grizzly bears from the GYA are demographically markedly separated from other grizzly bears. Genetic studies involving heterozygosity (which provides a measure of genetic variation in either a population or individual) estimates at 8 microsatellite loci show 55 percent heterozygosity in the GYA grizzly bears compared to 69 percent in the NCDE bears (Paetkau *et al.* 1998, pp. 421–424). Heterozygosity is a useful measure of genetic diversity, with higher values indicative of greater genetic variation and evolutionary potential. High levels of genetic variation are indicative of high levels of connectivity among populations or high numbers of breeding animals. By comparing heterozygosity of extant bears to samples from Yellowstone grizzlies of the early 1900s, Miller and Waits (2003, p. 4338) concluded that gene flow and, therefore, population connectivity between the GYA grizzly population and populations to the north was very low historically, even prior to the arrival of settlers. The reasons for this historic limitation of gene flow are unclear. Increasing levels of human activity and settlement in this intervening area over the last century further limited grizzly bear movements into and out of the GYA, resulting in the current lack of connectivity.

Based on our analysis of the best available scientific data, we find that the GYA grizzly population and other remaining grizzly bear populations are markedly separated from each other. This contention is supported by evidence of physical separation between populations (both current and historical) and evidence of genetic discontinuity. Therefore, the Yellowstone DPS meets the criterion of discreteness under our DPS Policy.

Analysis for Significance

If we determine a population segment is discrete, its biological and ecological significance will then be considered in light of congressional guidance that the authority to list DPS's be used sparingly while encouraging the conservation of genetic diversity. In carrying out this examination, we consider available scientific evidence of the population's importance to the taxon (i.e., *Ursus arctos horribilis*) to which it belongs. Our DPS policy states that this consideration may include, but is not limited to, the following—(1) Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) Evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon; (3) Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; and/or (4) Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. Below we address Factors 1, 2, and 4. Factor 3 does not apply to the Yellowstone grizzly bear population.

Unusual or Unique Ecological Setting—Grizzly bears in the GYA exist in an unusual and unique ecosystem that has greater access to large-bodied ungulates such as bison (*Bison bison*), elk (*Cervus elaphus*), and moose (*Alces alces*), and less access to fall berries than any other interior North American, European, or Asian grizzly bear populations (Stroganov 1969, p. 128; Mattson *et al.* 1991a, p. 1623; Jacoby *et al.* 1999, p. 925; Schwartz *et al.* 2003b, pp. 568–569). The GYA ecosystem contains extensive populations of ungulates with an estimated 100,000 elk, 29,500 mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*), 5,800 moose, 4,000 bison and, relative to other ungulate populations in the area, a small population of pronghorn antelope (*Antilocapra americana*) (U.S. Fish and Wildlife Service 1994, p. ix; Toman *et al.* 1997, p. 56; Smith *et al.* 2003, pp. 337–338). Although grizzly bears are successful omnivores, grizzlies in the rest of the conterminous States (Jacoby *et al.* 1999, p. 925), most of Europe (Berducou *et al.* 1983, pp. 154–155; Clevenger *et al.* 1992, pp. 416–417; Dahle *et al.* 1998, pp. 152–153), and Siberia (Stroganov 1969, p. 128) rely on plant and insect materials for the majority of their diet. In contrast, grizzlies in the GYA rely on terrestrial mammals as their primary source of nutrition, as indicated by bear scat (Mattson 1997, p. 162), feed site analysis (Mattson 1997, p. 167), and bear hair isotope analysis (Jacoby *et al.* 1999, p. 925). Concentration of isotopic nitrogen (^{15}N) in grizzly bear hair from Yellowstone grizzly bears suggests that meat constitutes 45 percent and 79 percent of the annual diet for females and males, respectively (Jacoby *et al.* 1999, p. 925). These high percentages of meat in Yellowstone grizzly bears' diet are in contrast to the 0 to 33 percent of meat in the diet of bears in the NCDE and 0 to 17 percent of meat in the diet of bears from the Cabinet-Yaak Ecosystem (Jacoby *et al.* 1999, p. 925). Furthermore, the source of this animal meat is primarily large-bodied ungulates, not fish, as in other populations of brown bears in Alaska and Siberia (Stroganov 1969, p. 128; Hilderbrand *et al.* 1996, pp. 2086–2087). Of particular relevance is the Yellowstone grizzly bears' use of wild bison, a species endemic to North America, but eradicated in most of the lower 48 States except the GYA by the

end of the 19th century (Steelquist 1998, pp. 16, 30). Although bison numbers have increased since this time, the vast majority of today's bison are found in managed or ranched herds (Steelquist 1998, pp. 33–37). Their habitat, bunchgrass prairie (tallgrass, mixed-grass, and shortgrass prairie), has been almost entirely converted to agricultural lands (Steelquist 1998, p. 11), leaving little opportunity for existence in areas outside of the isolated refuges and ranches where they are commonly found today. Mattson (1997, p. 167) found that wild bison comprised the second largest source of ungulate meat (24 percent) consumed by Yellowstone grizzly bears, second only to elk (53 percent).

The Yellowstone grizzly population also exists in a unique ecological setting because it is able to use whitebark pine seeds as a major food source. Whitebark pine, a tree species found only in North America (Schmidt 1994, p. 1), exhibits annual variation in seed crops, with high seed production in some years and very low seed production in other years (Weaver and Forcella 1986, p. 70; Morgan and Bunting 1992, p. 71). During these years of high seed production, Yellowstone grizzly bears derive as much as 51 percent of their protein from pine nuts (Felicetti *et al.* 2003, p. 767). In fact, grizzly bear consumption of ungulates decreases during years of high whitebark pine seed production (Mattson 1997, p. 169). In most areas of North America where whitebark pine distribution overlaps with grizzly bear populations, bears do not consistently use this potential food source (Mattson and Reinhart 1994, pp. 212–214). This may be due to different climatic regimes that sustain berry-producing shrubs or simply the scarcity of whitebark pines in some areas of the bear's range (Mattson and Reinhart 1994, p. 214). Dependence of Yellowstone grizzly bears on whitebark pine is unique because in most areas of its range, whitebark pine has been significantly reduced in numbers and distribution due to the introduced pathogen white pine blister rust (*Cronartium ribicola*) (Kendall and Keane 2001, pp. 228–232). While there is evidence of blister rust in whitebark pines in the GYA, the pathogen has been present for more than 50 years (McDonald and Hoff 2001, p. 210) and relatively few trees have been severely impacted (see Factor E below). Also, although several berry-producing shrubs occur in the area, these are relatively limited by climatic factors and most grizzly bears in the GYA do not rely on berries as a significant portion of their diets.

Significant Gap in the Range of the Taxon—Loss of the Yellowstone DPS would represent a significant gap in the range of the taxon. As noted above, grizzly bears once lived throughout the North American Rockies from Alaska and Canada, and south into central Mexico. Grizzly bears have been extirpated from most of the southern portions of their historic range. Today, the Yellowstone DPS represents the southernmost reach of the grizzly bear. The loss of this population would be significant because it would substantially curtail the range of the grizzly bear by moving the range approximately 4 degrees of latitude to the north. Thus, the loss of this population would result in a significant gap in the current range of the taxon.

Given the grizzly bear's historic occupancy of the conterminous States and the portion of the historic range the conterminous States represent, recovery in the lower 48 States where the grizzly bear existed in 1975 when it was listed has long been viewed as important to the taxon (40 FR 31734–31736, July 28, 1975). The Yellowstone DPS is significant in achieving this objective, as it is 1 of only 5 known occupied areas and constitutes approximately half of the remaining grizzly bears in the conterminous 48 States. Finally, the Yellowstone DPS represents the only grizzly bear population not connected to bears in Canada.

Marked Genetic Differences—Several genetics studies have confirmed the uniqueness of grizzly bears in the GYA. The GYA population has been isolated from other grizzly bear populations for approximately 100 years or more (Miller and Waits 2003, p. 4334). Yellowstone grizzly bears have the lowest relative heterozygosity of any continental grizzly population yet investigated (Paetkau *et al.* 1998, pp. 421–424; Waits *et al.* 1998a, p. 310). Only Kodiak Island grizzly bears, a different subspecies (*Ursus arctos middendorfi*), have lower heterozygosity scores (26.5 percent), reflecting as much as 12,000 years of separation from mainland populations (Paetkau *et al.* 1998, p. 421; Waits *et al.* 1998b, pp. 412–413). Miller and Waits (2003, p. 4338) conclude that gene flow between the GYA and the closest remaining population was limited prior to the arrival of European settlers but could only speculate as to the reasons behind this historical separation. The apparent long-term difference in heterozygosity between Yellowstone and other Montana populations indicates a unique set of circumstances in which limited movement between these areas has resulted in a markedly different genetic situation for the Yellowstone population.

We conclude that the Yellowstone grizzly population is significant because it exists in an unusual and unique ecological setting; the loss of this population would result in a significant gap in the range of the taxon; and this population's genetic characteristics differ markedly from other grizzly bear populations.

Conclusion of Distinct Population Segment Review

Based on the best scientific and commercial data available, as described above, we find that the Yellowstone grizzly bear population is discrete from other grizzly populations and significant to the remainder of the taxon (i.e., *Ursus arctos horribilis*). Because the Yellowstone grizzly bear population is discrete and significant, it warrants recognition as a DPS under the Act.

It is important to note that the DPS Policy does not require complete separation of one DPS from other populations, but instead requires ''marked separation.'' Thus, if occasional individual grizzly bears disperse among populations, the Yellowstone grizzly bear DPS would still display the required level of discreteness per the DPS Policy. And, as stated in the 1993 Recovery Plan, we recognize that natural connectivity is important to long-term grizzly bear conservation and we will continue efforts to work toward this goal independent of the delisting of the Yellowstone DPS (U.S. Fish and Wildlife Service 1993, p. 53). This issue is discussed further under Factor E below. In addition, the conclusion regarding the conservation status (step 3 of the DPS analysis) of the Yellowstone DPS follows the 5-factor analysis discussion below.

Summary of Public Comments

In our proposed rule, we requested that all interested parties submit information, data, and comments concerning the status of grizzly bears in the GYA, their habitat, and their management (70 FR 69882, November 17, 2005). The comment period was open from November 17, 2005, through March 20, 2006 (70 FR 69854, November 17, 2005; 71 FR 8251, February 16, 2006). During this time, we held two formal public hearings and four informational meetings (70 FR 69854, November 17, 2005; 71 FR 4097–4098, January 25, 2006). In addition, there were numerous press releases, a press conference with the Secretary of the Interior, and a conference call with

numerous environmental groups and non-government organizations discussing the proposed rule. Comments could be hand delivered to us or submitted to us via e-mail, mail, or public hearing testimony.

During the 120-day comment period, we received comments from 164,486 individuals, organizations, and government agencies. Those comments arrived in 193,578 letters, form letters, public hearing testimonies, and email messages. Numerous respondents submitted multiple comments, so the total number of comments received (193,578) is greater than the total number of people/groups responding (164,486). Twelve of these letters were signed as ''petitions'' with 974 signatures. Finally, one of the above comment letters also formally petitioned the Service to list the Yellowstone grizzly bear DPS as endangered under the Act and designate critical habitat. All assertions of this petition are addressed either in this section, in the 5-factor analysis that follows, or the Reassessing Methods Document's issues and responses summary.

We have read and considered all comments received. A content analysis of these comments is available upon request (see **ADDRESSES** section above) or online at: *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm.* We updated the proposed rule where it was appropriate, and we respond to all substantive issues received, below. We have grouped similar comments together in ''Issues,'' each of which is followed by our ''Response.''

A. General Comments

Issue 1—Numerous comments suggesting corrections to facts and data in the proposed rule such as correcting typographical errors, including omitted cooperators, and modifying the presentation of statistical results. One commenter noted our reference to the DPS as both a ''population'' and an ''area.'' This commenter also noted inconsistencies in our use of the words ''population'' and ''populations'' in the proposed rule and asked if there is one population or multiple populations within the DPS boundaries.

Response—There is one population within the DPS boundaries and the appropriate changes have been made in the text of the final rule to clarify this, as well as the other matters raised in Issue 1.

Issue 2—A few commenters disputed the Service's claim that the nearest grizzly bear population to the Yellowstone DPS is 130 km (80 mi) away. According to these commenters, grizzly bears originating from the NCDE have been documented near Anaconda, Montana, and one grizzly bear originating from the Yellowstone DPS was sighted north of Bozeman, Montana, in the Bridger Mountains. Furthermore, one commenter noted that the Tobacco Root Vegetation Management Plan Final Environmental Impact Statement (USDA Forest Service 2001, p. 44) describes the Tobacco Roots as habitat occupied by grizzlies on both a resident and transient basis. This puts the two populations only 72 km (45 mi) apart.

Response—We know of two records of grizzly bears near Anaconda, Montana. In one case, the carcass of a subadult male grizzly bear was discovered by a hunter in 1980. The other report notes a 2005 incident in which a hunter mistakenly shot a grizzly bear 11 km (7 mi) west of Anaconda that was determined to be from the NCDE with DNA analysis. There are no other verified reports of grizzly bears within 76 km (45 mi) of Anaconda. The Study Team has no record of any grizzly bears in the Bridger Mountains or in the Tobacco Root Mountains. Despite what the Final Environmental Impact Statement for the Tobacco Root Vegetation Management Plan may identify as occupied habitat, a study conducted in the Tobacco Roots in 1999 and 2000 failed to document grizzly bear presence (Lukins *et al.* 2004, p. 171). In the final rule, we corrected the distance between the Yellowstone grizzly bear population and the nearest bears to account for these two records near Anaconda, Montana. This resulted in the closest possible distance between the Yellowstone population and the nearest record of a grizzly bear as 120 km (75 mi) instead of 130 km (80 mi) as reported in the proposed rule.

Issue 3—One commenter disputed our claim that 30 percent of suitable habitat outside the PCA within the DPS is protected by official Wilderness Area designation, instead suggesting only 15 percent of occupied habitat outside the PCA within the DPS is protected as Wilderness.

Response—This numeric disparity centers around a difference in our frame of reference. Our calculation is the percentage of ''suitable habitat'' outside the PCA within the DPS (6,799 sq km (2,625 sq mi)) that is protected by Wilderness Area designation (22,783 sq km (8,797 sq mi)). In contrast, this comment is referring to ''occupied habitat'' outside the PCA within the DPS protected by Wilderness Area designation. We considered suitable habitat because we expect grizzly bears to naturally recolonize much of the remaining unoccupied suitable habitat in the next few decades.

Issue 4—Several commenters noted that our definition of suitable habitat does not consider Wyoming's habitat criteria of ''socially acceptable.'' They request that this inconsistency in definitions be remedied.

Response—Our definition of suitable habitat is based on biological criteria. Some considerations of social acceptance entered into the considerations of suitable habitat in the Wyoming plan. The Wyoming plan does not restrict grizzly bears from areas outside their definition of suitable habitat. Instead, it establishes management objectives in these areas to minimize conflicts between bears and human activities. Because most grizzly bears do not come into conflict with humans, the impact of this difference in designation of suitable habitat between the Service and Wyoming will have little functional impact on grizzly bear occupancy or mortality.

B. Population Concerns

Issue 1—Several commenters noted their concern about the occurrence of high levels of female mortality since 2000 and requested that the impact of this trend be analyzed. It was noted that the allowable adult female mortality was exceeded in 2004 and 2005; therefore, the recovery goal that adult female mortality cannot be exceeded in 2 consecutive years has not been met. These commenters asked that we explain why delisting is being proposed when one of the recovery goals has not been met.

Response—Recovery plans are intended to provide guidance and are subject to revision as new data are reported. They are not regulatory documents. Recovery of species requires adaptive management that may, or may not, fully follow the guidance provided in a recovery plan. That said, we no longer consider 1993 Demographic Recovery Criterion 3 to represent the best scientific and commercial data available nor the best technique to assess recovery of the Yellowstone grizzly bear population. Therefore, the 1993 mortality management system for the Yellowstone grizzly bear population has been reevaluated and revised using a recent and more accurate model (Harris *et al.* 2006, pp. 51–55). This approach was consistent with a 1995 court order to reevaluate this issue (*Fund for Animals* v. *Babbitt*) and Recovery Plan Task Y11, which suggested we work to ''determine population conditions at which the species is viable and self sustaining,'' and to ''reevaluate and refine

population criteria as new information becomes available'' (U.S. Fish and Wildlife Service 1993, p. 44). Under the revised methods for calculating sustainable mortality, female mortality was not exceeded in either 2004 or 2005. These changes have been appended to the Recovery Plan and the Strategy.

Issue 2—Some commenters felt that delisting was premature without a PVA based on future habitat conditions and that PVAs based simply on past population trends are inadequate. A habitat-based PVA could determine how future habitat conditions such as the availability of major food sources, climate change, increasing human populations, and resource extraction may affect the long-term persistence of the Yellowstone DPS. One commenter referred to a similar PVA conducted by ''Boyce *et al.* (2005)'' on grizzly bears in Alberta, Canada, and suggested that Boyce be contracted to do this analysis for the Yellowstone DPS.

Response—When we contacted the commenter who suggested we consider employing a technique similar to ''Boyce *et al.* (2005)'', we were told that the correct citation for that article was Nielsen *et al.* 2006. Nielsen *et al.* (2006, pp. 219–221) predicted adult female grizzly bear occupancy and mortality across the landscape. Their exercise did not make any attempt to predict the long-term viability of the grizzly bear population in Alberta and, in this sense, was not a habitat-based PVA. Instead, Nielson *et al.* (2006, pp. 226–227) attempted to provide a useful tool to managers that linked not only occupancy, but also survival, to habitat conditions.

In our view, a PVA based on possible future habitat conditions relies upon too many speculative variables to be relied upon to determine long-term persistence. Given the compound uncertainties associated with projections of possible future habitat changes, and the grizzly bear's corresponding responses to those changes, it is unlikely that a habitat-based PVA would provide an accurate representation of future population viability for Yellowstone grizzly bears. The management system outlined in the Strategy depends on monitoring of multiple indices including production and availability of all major foods; and monitoring of grizzly bear vital rates including survival, age at first reproduction, reproductive rate, mortality cause and location, dispersal, and human/bear conflicts. These data will be used in an adaptive management system to monitor the real-time status of the population and its relationship with major foods and environmental variables, allowing managers to implement actions that respond to changes in ecological conditions and/or vital rates. The continued monitoring of these multiple indices will allow rapid feedback on the success of management actions in maintaining a viable population. In addition, please see our response to Issue 12 under subheading F in the Summary of Peer Review Comments section below for more information on the models the Study Team is pursuing.

Issue 3—One commenter stated that the Yellowstone DPS range has not expanded as much as we claim according to the 1980 Study Team report of verified sightings near Ketchum, Idaho, and Cody, Wyoming.

Response—Because the cited 1980 Study Team report provides no information regarding the verification of the reported sighting near Ketchum, Idaho, it is impossible to make any conclusions on the sighting's credibility. There is no reason to connect this supposed sighting to the Yellowstone ecosystem or to indicate that a bear sighted there might have come from Yellowstone. We did not rely solely on sightings of grizzly bears to make the statement that the population's range had expanded. Instead, we used peer-reviewed literature that documented this range expansion through multiple data sources, including initial observations of unduplicated females with young, locations of radio-collared bears, and locations of grizzly bear/human conflicts (Schwartz *et al.* 2002, p. 204; Schwartz *et al.* 2006b, p. 63). We are confident that the Yellowstone grizzly bear population's range has expanded significantly since 1980 and the sightings from this time do not contradict the conclusions established by Schwartz *et al.* (2002, p. 207) and Schwartz *et al.* (2006b, p. 66).

Issue 4—One commenter noted that because ''persistence time depends strongly on the magnitude of the variance in population growth rate'' and the Yellowstone population size estimates are extremely variable, we should consider this and other sources of stochasticity in our decision.

Response—These variations have been considered in detail. The considerations of the variation of results is thoroughly evaluated and discussed in Harris *et al.* (2006, p. 46), Schwartz *et al.* (2006d, p. 14), Schwartz *et al.* (2006e, pp. 62–63), the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2005, pp. 25, 35–36), and its Supplement (Interagency Grizzly Bear Study Team 2006, pp. 2–10). Throughout the rulemaking process we also carefully considered the matter of uncertainty and its implications to management decisions. For additional discussion about sources of stochasticity and their effects on population persistence, see our response to Issue 5 under subheading R below.

Issue 5—One commenter noted that the Service presents the estimated annual population growth rate as between 4 and 7 percent per year. This presentation deceptively makes it seem that these are the upper and lower bounds of a confidence interval, not merely two point estimates based on different assumptions; and, the Service claims that the total population size in 2004 was 588 individuals but does not disclose the confidence intervals around this estimate.

Response—The 4 to 7 percent annual population growth rate is based on analyses conducted by Harris *et al.* (2006, p. 48) using survival estimates of grizzly bears determined by Haroldson *et al.* (2006b, p. 36). Haroldson *et al.* (2006b, p. 34–35) used a data set of 323 independent (greater than 2 years old) radio-collared bears, but analyzed the data two different ways to address the bears with unknown fates. Specifically, they estimated the survival rate for each of those data sets, assuming bears whose fates were unknown either all lived or all died, to establish the most conservative and most optimistic survival rates. The true estimate must be bracketed by those two bounds. The resulting annual survival rates of independent female bears were either 92.2 percent or 95.0 percent depending on which interpretation of unknown fate is used.

Harris *et al.* (2006, p. 48) then used the two survival estimates produced by Haroldson *et al.* (2006b, p. 35) to estimate the growth rate of the GYA grizzly population from 1983 to 2002. For the estimate of population growth rate based on the assumption that all females with unknown fates died at last contact, the mean value of lambda is 1.042, with an approximate 95 percent confidence interval of 0.969–1.093. For the estimate of population growth rate when adult survival was estimated assuming females with unknown fates survived, the mean value is 1.076, with an approximate 95 percent confidence interval of 1.003–1.113.

These population growth rates mean that the Yellowstone grizzly bear population was increasing at a rate of 4.2 percent or 7.6 percent per year between 1983 and 2002 (Harris *et al.* 2006, p. 48). Those estimates are often reported as ''a growth rate between 4 percent and 7 percent.'' That does not refer to a 95 percent confidence interval.

Instead, it refers to an estimate based on the assumption that all bears whose fates were unknown died at the time their radio transmissions stopped (4.2 percent), and an estimate based on the assumption that all bears whose fates were unknown were alive at the time their radio transmissions stopped (7.6 percent). Those assumptions result in conservative bounds, because some bears assumed to have died in the 4 percent growth rate data set were probably still alive, and because some bears assumed to be alive in the 7 percent growth rate data set were probably dead. The true population growth rate from 1983 to 2002 was probably between 4 and 7 percent.

Regarding the confidence interval around the total population estimate, the index of total population size is produced using the total number, an estimate of the total number of females with cubs-of-the-year (Interagency Grizzly Bear Study Team 2005, pp. 24–26), and the proportions of females in the population applied to the proportions of sex and age classes in the population. The Chao2 estimator, a statistical tool used to correct sighting variability, was chosen by the Study Team to estimate the number of females with cubs-of-the-year (Keating *et al.* 2002, p. 170; Interagency Grizzly Bear Study Team 2005, pp. 25–26) because it consistently returns results that are correct or biased low (Interagency Grizzly Bear Study Team 2005, p. 20). Confidence intervals for the total population index from years 1983 to 2005 are reported in the Supplement to the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2006, p. 15). For 2005, the total population index is 546 bears with a 95 percent confidence interval between 491 and 602 (Interagency Grizzly Bear Study Team 2006, p. 15).

Issue 6—Several commenters questioned why we were not using deoxyribonucleic acid (DNA) based methods, like the survey conducted in the NCDE during the summer of 2004, to get an accurate estimate of total population size. They considered DNA to be the best available method and wondered why this method was not employed before proposing to delist this population.

Response—The methods developed for producing a population index in the Yellowstone ecosystem are based on the best available science and built on intensive sampling of this population for almost 26 years. These methods produce annually updated population size indices and continuously updated population trend estimates. Although the use of DNA to estimate population size has become more common in recent years (Mowat and Strobeck 2000, p. 183; Bellemain *et al.* 2005, p. 150; Solberg *et al.* 2006, p. 158), the method used to make a one-time total population estimate for the NCDE would be less useful in the GYA than current methods. DNA was chosen as the population estimate system in the NCDE because this ecosystem did not have the long-term consistent sampling data that exists in Yellowstone. The final point estimate for population size in the NCDE will be available in early 2007 and will be a one-time estimate for 2004—the year the sampling was done. Once completed, this DNA-based system will have taken 4 years and cost $4.5 million, to produce a 2004 population estimate. Given that the long-term intensive data were available in Yellowstone, population size estimates based upon peer-reviewed, published methods existed, and because the methods used in Yellowstone allow continuously updated population indices rather than a one-time estimate, the application of a DNA-based system was unnecessary for the Yellowstone ecosystem.

Issue 7—One commenter noted that we violated the Administrative Procedure Act and the Endangered Species Act by not disclosing the apparent ''population crash'' that occurred in 2005 using the revised methods described in the Reassessing Methods Document (2004 = 588, 2005 = 350) and discussing its implications for the population.

Response—No population crash occurred in 2005. In 2004, a large number of females had cubs. Because female grizzly bears usually produce litters once every 3 years, high cub production years are typically followed by years with fewer cubs because less of the adult female population is available for breeding. The index of total population size described in the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2005, pp. 5–9) is not equivalent to an exact number of animals in the population due to this natural biological variation associated with cub production in grizzly bear populations (Interagency Grizzly Bear Study Team 2006, pp. 1–2). Fluctuations in the estimate of population size are expected and addressed through the use of a modeling average technique to estimate the total number of females with cubs-of-the-year (Interagency Grizzly Bear Study Team 2006, pp. 2–7).

Issue 8—One commenter stated that we claim that the Act only mandates that a species be ''viable,'' rather than ''recovered.'' They believed that this perceived interpretation has led us to focus on reducing mortality within occupied habitat rather than restoring formerly wide-ranging species to historically occupied habitat. This commenter noted that the courts have repeatedly rejected this interpretation and that true recovery requires connectivity or linkage, protection and enhancement of existing populations, meaningful habitat protections, adequate regulatory mechanisms, and recolonization of historic suitable habitat such that ecological effectiveness (Trombulak 2006) is restored.

Response—We disagree with the assertion that we have focused on viability instead of recovery. The principal goal of the Act is to return listed species to a point at which protection under the Act is no longer required (50 CFR 424.11(d)(2)). A species may be delisted on the basis of recovery only if the best scientific and commercial data available indicate that it is no longer endangered or threatened within all or a significant portion of its range (50 CFR 424.11(d)). As described later in this rule, we believe the Yellowstone DPS meets neither of these definitions for listing, thereby justifying delisting due to recovery.

We also disagree with the claim that we have over-emphasized mortality control at the expense of other recovery goals. To date, recovery efforts have focused on sufficient mortality control, habitat monitoring, population levels, distribution, management of habitat effectiveness and habitat security, monitoring of all grizzly bear/human conflicts, genetic analyses, and linkage zone maintenance. This comprehensive approach to recovery has led to reduced mortality, increasing population numbers, and significant increases in range, allowing grizzly bears to reoccupy habitat they have been absent from for decades, as well as demographic and habitat security into the foreseeable future. Grizzly bears now occupy 68 percent of suitable habitat within the DPS and will likely occupy the remainder within the foreseeable future. However, the Service does not believe that restoration of grizzly bears to all historic habitats (particularly those no longer capable of supporting grizzly bear populations) within the DPS boundaries is necessary or possible.

While some have suggested recolonization of historically suitable habitat to achieve ''ecological effectiveness'' (Trombulak 2006), the Act neither requires us to consider ecological effectiveness, nor do we have any objective way of measuring this

type of success currently. We do not believe the restoration of the grizzly bear as a top predator and scavenger throughout all historically occupied habitat is feasible or required. Instead, we have restored grizzly bears to most of their suitable habitat within the DPS and anticipate the State management plans will lead to re-occupancy of the remaining suitable habitat in the near future. Other issues such as linkage are only relevant to this rulemaking to the extent that they impact the Yellowstone DPS. For example, connectivity or a lack thereof, has the potential to impact this population's genetic fitness. As such, this issue is discussed and addressed in our five factor analysis (see Factor E below) and in the Strategy.

C. Public Involvement

Issue 1—Several commenters believe that the Service did not provide meaningful ways for the public in areas other than Bozeman, Montana, Cody and Jackson, Wyoming, and Idaho Falls, Idaho, to participate in a dialogue about this national issue, except via Web sites and mail. Numerous commenters at public hearings, in letters, and in emails encouraged the Service to give greater consideration to opinions of people that live in grizzly bear country than opinions of those that do not have to deal with grizzlies in their daily lives. Conversely, many argued that the grizzly bear is a national and international treasure and that all Americans should have an equal voice in how they are to be managed.

Response—The public comment process considers all comments equally and gives no preference based on where commenters live or what format commenters use to comment. We believe that providing multiple formats for commenting on the proposed rule, including hand delivery, e-mail, and U.S. mail lessened the need for formal hearings throughout the country. Because all comments are considered equally, it does not matter whether comments were submitted via hand delivery, e-mail, mail, or public hearing. In fact, commenting via e-mail, hand delivery, or letter allowed unlimited space to express comments, as opposed to the public hearing format, which limited comments to three minutes in order to provide an opportunity for all attending to speak.

Issue 2—Several commenters stated that asking the public to comment on the proposed rule when none of the supporting documents (Reassessing Methods Document, Habitat-Based Recovery Criteria, the Strategy, and the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests) have been finalized does not allow the public to know what they are commenting on; furthermore, the Act requires an analysis of existing regulatory mechanisms, not those that will be added in the future.

Response—The Strategy and the Habitat-Based Recovery Criteria supplement to the Recovery Plan have been finalized (72 FR 11376; 72 FR 11376–11377). There have been no significant changes from the drafts of Habitat-Based Recovery Criteria, the Strategy, and the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests. All the supporting documents have been available for full public review, in accordance with the Administrative Procedure Act (62 FR 47677, September 10, 1997; 64 FR 38464, July 16, 1999; 64 FR 38465, July 16, 1999; 70 FR 70632, November 22, 2005). The proposed rule also noted that these draft documents were available online at—*http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*. As envisioned by the Administrative Procedure Act, changes to the Reassessing Methods Document were made in response to public comments. These changes did not affect our final determination from that described in the draft rule. We responded to comments in the final documents. The Strategy and the Forest Plan Amendment are existing regulatory mechanisms that are currently in existence and take effect upon implementation of this final rule. Therefore, we considered these mechanisms when determining if the regulatory mechanisms were sufficient to protect the Yellowstone DPS' recovered status.

Issue 3—Some commenters stated that the Service violated the Endangered Species Act and Administrative Procedure Act by not providing the raw data upon which it relied, thereby hindering the public's ability to comment on the proposed rule; ''[T]he Administrative Procedure Act requires the agency to make available to the public, in a form that allows for meaningful comment, the data the agency used to develop the proposed rule.''

Response—We have a responsibility to rely upon the best scientific and commercial data available. In this case, we relied upon numerous peer reviewed and published documents that we made available upon request. Much of this information was publicly available when we published our proposed rule and during our public comment period. For example, mortality information, including date of death, sex, age, certainty of death, if the bear was marked or not, and location are published annually in the Study Team's annual reports, available at: *http://www.nrmsc.usgs.gov/research/igbst-home.htm*. However, requests received for exact locations of grizzly bears obtained via radio-telemetry and GPS radio-collars (i.e., ''raw data'') could not be honored because this information was not in our possession. Additionally, without the permission of the Secretary of the Interior, the Omnibus Parks and Public Lands Act of 1998 (16 U.S.C. 5937) prohibits the release of specific locations of threatened species that spend any part of their lives within National Parks.

D. Compliance With Court Settlements

Issue 1—Some commenters claimed that the Service violated the Fund for Animals court settlement (*Fund for Animals* v. *Babbitt*), by publishing the proposed rule to delist before finalizing the Habitat Based Recovery Criteria. They noted that the Fund for Animals settlement stated that ''Prior to publishing any proposed rule to delist any grizzly bear population, the Service will establish habitat-based recovery criteria for that population's ecosystem * * * . In any such rulemaking to delist a grizzly bear population, the Service will utilize the Habitat Based Recovery Criteria, as well as all other pertinent recovery criteria that have been established, when addressing the 5 factors set forth in section 4(a)(1) of the Act.''

Response—In 1994, The Fund for Animals, Inc., and 42 other organizations and individuals filed suit over the adequacy of the 1993 Recovery Plan (*Fund for Animals* v. *Babbitt*). The court remanded the Recovery Plan to us for further study, and in 1996 the parties reached a settlement agreement. As part of the settlement we agreed to hold a workshop on the habitat-based recovery criteria and to append habitat-based recovery criteria to the Recovery Plan. On June 17, 1997, we held a public workshop in Bozeman, Montana, to develop and refine habitat-based recovery criteria for the grizzly bear. A **Federal Register** notice notified the public of this workshop and provided interested parties an opportunity to participate and submit comments (62 FR 19777, April 23, 1997).

After considering 1,167 written comments, we developed biologically-based habitat criteria with the goal of maintaining or improving habitat conditions at 1998 levels. These draft criteria were published in the **Federal Register** on July 16, 1999 (64 FR 38464–38465), and a copy of the habitat-based

criteria also is available at—*http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*. These revised habitat-based recovery criteria were relied upon in the proposed rule and have since been appended to the Recovery Plan and incorporated into the Strategy (U.S. Fish and Wildlife Service 2007, p. 39–43). Importantly, these habitat-based recovery criteria have not changed significantly since being drafted and being made available for public comment in 1999. The Strategy ensures they will continue to be met in the foreseeable future. Our proposed rule and this final rule utilized the habitat-based recovery criteria, as well as all other pertinent recovery criteria, when addressing the 5 factors set forth in section 4(a)(1) of the Act.

Issue 2—Some commenters noted that we cannot claim that the demographic recovery goals have been met because the goals cited have been found inadequate by the courts.

Response—The demographic recovery goals have not been found inadequate by the courts. The court opinion (*Fund for Animals* v. *Babbitt*, p. 30) stated, ''Based on the record the court does not find that the defendant's designation of population targets is arbitrary and capricious.'' The court directed us to ''reconsider the available evidence and its decision to adopt the population monitoring methodology that it has incorporated into the Grizzly Bear Recovery Plan.'' We did so in a formal response to public comments regarding the supplemental information (accessible at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*) and found these methods were the best available methods when the Recovery Plan was written in 1993. In order to apply the best available methods at the time of proposing delisting, we worked with the U.S. Geological Survey and the Study Team to begin the process detailed in the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2005, pp. 12–41) to consider and apply newer science to the issues of population monitoring and the establishment of sustainable mortality. This effort has resulted in the improved methods appended to the Recovery Plan and incorporated into the Strategy.

E. Significant Portion of Range

Issue 1—Many commenters expressed dissenting views and interpretations of the Act's phrase ''significant portion of its range'' as it is used to define a threatened species, or in this case, a recovered species. Some stated that range does or should mean historical range, thereby obligating us to recover species across a significant portion of their historical range to be considered recovered. Some commenters disagreed with our definition of range and said that it was the same as the court-invalidated wolf rule (68 FR 15804, April 1, 2003), which stated that range, when defined as ''the area within the DPS boundaries where viable populations of the species now exist,'' was circular because if we define range as where grizzlies currently are and then conclude that they are therefore recovered within a significant portion of that range, this would have meant they were recovered in 1975. Several commenters noted that we must explain why the Yellowstone grizzly bear is no longer threatened by the loss of its historical range.

Response—A species may be delisted according to 50 CFR 424.11(d) if the best scientific and commercial data available demonstrate that the threats to that species, as described in section 4(a)(1), have been removed such that it is neither endangered nor threatened. The Act defines an ''endangered species'' as one that ''is in danger of extinction throughout all or a significant portion of its range.'' A ''threatened species'' is one that ''is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.'' One consideration in deciding whether a species meets either of these definitions is the interpretation of ''significant portion of its range.''

For a detailed discussion of ''range'' under the Act, see the Summary of Factors Affecting the Species portion of this rule below. That said, historical range is only relevant to the discussion of ''significant portion of the range'' to the extent that it may offer evidence whether a species in its current range is likely to become endangered in the foreseeable future. In such situations, historical range is considered in the listing factor section 4(a)(1) analysis.

Our 5-factor analysis was conducted over the entire current and foreseeable range of the grizzly bear including all ''suitable habitat'' within the DPS (defined and discussed under Factor A below). While grizzly bears once occurred throughout the area of the Yellowstone DPS (Stebler 1972, pp. 297–299), records indicate that even in the early 19th century, grizzly bears were less common in these eastern prairie habitats than in mountainous areas to the west and south (Rollins 1935, p. 191; Wade 1947, p. 444). Today, these habitats are no longer biologically suitable for grizzly bears as they lack adequate food resources (i.e., bison). These unsuitable areas are not relevant to the current or foreseeable status of the Yellowstone DPS. The current range of the DPS supports a population of adequate quantity and distribution to ensure a recovered population into the foreseeable future. And, additional unoccupied suitable habitat will provide opportunities for continued population growth. Finally, as discussed below, a lack of occupancy of all historic habitat within the DPS will not impact whether this population is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Issue 2—One commenter noted that because grizzly bears experience negative growth rates outside the PCA, they are in danger in this portion of their range. The commenter believes that the area outside the PCA constitutes a significant portion of their range because we include all grizzly bears and the lands they currently occupy to make the statement that they are recovered within a significant portion of their range.

Response—We agree that the suitable habitat outside the PCA represents a significant portion of the range, albeit less significant than suitable habitat within the PCA. See the Significant Portion of Range discussion under Factor A below for a more detailed discussion of this issue. That said, grizzly bears are not in ''danger'' in areas outside the PCA. The Yellowstone grizzly population is a single population with mortalities counted in all areas inside the Conservation Strategy Management Area (Figure 1) and sustainable mortality limits established for the entire population. The overall population growth rate will be managed for a stable to increasing population as per the methods and direction in the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2005, pp. 5–11). Although the population may experience negative growth rates in some areas, this is not biologically significant. It would be inappropriate to suggest one ''segment'' is declining, while another ''segment'' is increasing because the population is contiguous and is considered as a whole entity per our DPS analysis above. The overall trajectory of the population will remain stable to increasing.

F. DPS Policy

Issue 1—Some commenters believe that the DPS policy is to be used only in listing decisions and that using it in a delisting decision violates Congressional intent and the legislative and statutory structure of the Act.

Response—We disagree with this interpretation of the DPS policy. The

Act, its implementing regulations, and our DPS policy provide no support for this interpretation. Section 4(a)(1) of the Act directs the Secretary of the Interior to determine whether ''any species'' is endangered or threatened. Numerous sections of the Act refer to adding and removing ''species'' from the list of threatened or endangered plants and animals. Section 3(15) defines ''species'' to include any subspecies ''and any distinct population segment of any species of vertebrate fish or wildlife * * * .'' The Act directs us to list, reclassify, and delist species, subspecies, and DPSs of vertebrate species. It contains no provisions requiring, or even allowing, DPSs to be treated in a different manner than species or subspecies when carrying out the listing, recovery, and delisting functions mandated by section 4. Furthermore, our DPS Policy states that the policy is intended for ''the purposes of listing, delisting, and reclassifying species under the Act'' (61 FR 4722, February 7, 1996), and that it ''guides the evaluation of distinct vertebrate population segments for the purposes of listing, delisting, and reclassifying under the Act'' (61 FR 4725, February 7, 1996).

The comment also overlooks the untenable situation that would arise if DPSs could be listed but could never be delisted after they have been successfully recovered. Clearly Congress did not envision such an outcome when amending the definition of species to include vertebrate DPSs.

Issue 2—A commenter noted that the DPS analysis in the proposed rule created a remnant population, contrary to a court decision. They stated that the Act allows us to ''consider listing only an *entire* species, subspecies, or DPS'' (*Alsea Valley Alliance* v. *Evans*, 161 F. Supp. 2d 1154, 1162 (D. Or. 2001)); therefore, we cannot declare part of a listed subspecies a DPS without also designating the remaining listed subspecies as DPS(s). This commenter suggests that we reconsider the status of all other lower 48 grizzly bear populations simultaneously and should not delist the GYA population until we uplist all other populations in the Lower 48 States.

Response—While in some situations it may be appropriate to designate multiple DPSs simultaneously, the lack of such a requirement provides useful flexibility, allowing the Service to subsequently list or delist additional DPSs when additional information becomes available or as the conservation status of the taxon changes. Importantly, courts have upheld this flexibility. In *National Wildlife Federation* v. *Norton* (1:03–CV–340, D. VT. 2005, p. 20), the court found that ''Nowhere in the Act is the Secretary prevented from creating a 'non-DPS remnant' designation, especially when the remnant area was already listed'' * * *. Our current designation of a Yellowstone DPS, while retaining the remaining lower 48 State grizzly bear listing intact as threatened, is consistent with this aspect of the District Court's ruling.

Furthermore, just as the Yellowstone DPS is discrete from the remaining populations in the lower 48 States, the remaining populations are discrete from the Yellowstone DPS. The amended lower 48 State listing is discrete from Canadian populations of *Ursus arctos horribilis* as delineated by the United States/Canadian international boundary with significant differences in control of exploitation, management of habitat, conservation status, and regulatory mechanisms. The amended lower 48 State listing is significant in that the loss of the lower 48 State population would result in a significant gap in the range of the taxon (*U. a. horribilis*). Therefore, the amended lower 48 State listing is discrete and significant.

Additional analysis is required to determine if the amended lower 48 State listing warrants further splitting into additional DPSs. For now, the warranted-but-precluded findings for uplisting (from threatened to endangered) the Selkirk, the North Cascades, and the Cabinet-Yaak populations remain precluded by higher priority actions (71 FR 53755, 53835, September 12, 2006). While these warranted-but-precluded findings are reviewed annually, we intend to review the status of the entire amended lower 48 State listing that results from this final rule in an upcoming 5-year review, as per section 4(c)(2)(A) of the Act.

Issue 3—One commenter recommended that the Service use evolutionary divergence (Hall's subspecies) to designate DPSs across their historical range and that these should replace or supplement the current recovery zones.

Response—The subspecies approach identified by Hall (1984, pp. 2–11) suggested seven different North American grizzly bear subspecies and is not in accordance with accepted scientific taxonomic literature and approaches. We accept the holarctic species concept and North American subspecies designations established by the works of Couterier (1954, p. 5), Rausch (1953, pp. 95–107; 1963, p. 43), and Kurten (1968, p. 127–128). This literature establishes one single holarctic species (*Ursus arctos*) and two North American subspecies, *U. a. horribilis* and *U. a. middendorfi*. *U. a. horribilis* is the subspecies that occurs in North America outside of Kodiak Island, Alaska. Therefore, the current recovery zones consider recovery in light of this taxonomy.

Issue 4—Some commenters noted that we violated the DPS policy because we failed to consider the effect of delisting the Yellowstone DPS on rangewide recovery of the species, especially in the Bitterroot Ecosystem, which is currently unoccupied by grizzly bears but considered vital to the metapopulation dynamics of grizzlies in the Lower 48 States.

Response—The DPS policy was carefully followed in designating the Yellowstone DPS. The delisting of the Yellowstone DPS will not have detrimental impacts on grizzly bear recovery actions in other recovery zones, as the grizzly bears in these areas remain threatened under the Act. As such, coordinated recovery efforts will continue in these areas.

Issue 5—Several commenters disagreed with the delineation of the boundaries for the Yellowstone DPS. Some believe that because the boundaries were mainly highways, they were arbitrary and not based on sound biological principles. Others believe that the DPS should be expanded to the north to allow for more dispersal because, currently, suitable habitat on the northern edge extends nearly to the DPS boundary. Others believe that the DPS boundaries should include the entire State of Wyoming to lessen confusion and allow for management by the State of Wyoming if bears disperse south of Interstate 80.

Response—As noted in the proposed rule, an artificial or manmade boundary (such as Interstate, Federal, and State highways) may be used as a boundary of convenience in order to clearly identify the geographic area included within a DPS designation. The Yellowstone DPS boundaries were defined along easily identifiable boundaries and included the entire recovery zone, the primary conservation area, the conservation strategy management area, all suitable habitat within the GYA based on biological information, and all occupied habitat. We believe this represents the most appropriate DPS for this population. Expansion of the DPS boundaries is not necessary to maintain a recovered grizzly bear population and is not justified biologically, given the limited dispersal capabilities of grizzly bears.

Issue 6—Some commenters pointed out that it would be confusing for State and Federal managers to have a grizzly bear roam outside of the boundaries, for

instance west of Interstate 15, and then be considered a threatened species. To address this confusion, some commenters believe that any grizzly bear originating from the Yellowstone DPS should be considered part of that DPS, regardless of where they are geographically.

Response—A DPS is a geographic designation determining the listed status for all individuals of said species in that area. Bears outside the DPS area, no matter their origin, are listed as threatened under the Act. The State and Federal agencies are aware of and understand the management implications of the DPS boundaries. We used easily identifiable boundaries such as the center line of major highways to minimize management confusion. If a grizzly bear goes beyond the Yellowstone DPS boundaries, it would become a threatened grizzly bear. Similarly, if a grizzly bear from another population enters the Yellowstone DPS boundaries, it would be managed according to the Strategy and State management plans.

Issue 7—One commenter stated that the DPS designation would preclude augmentation because it would destroy the genetic uniqueness of the DPS.

Response—Designation of the DPS would not preclude future augmentation, if we determine augmentation to be necessary to maintain genetic fitness. The DPS Policy does not require complete separation of one DPS from other populations, but instead requires ''marked separation.'' As stated in the 1993 Grizzly Bear Recovery Plan, natural connectivity is important to long-term grizzly bear conservation, and we will continue efforts to work toward this goal (whether accomplished naturally or through augmentation) independent of the delisting of the Yellowstone DPS (U.S. Fish and Wildlife Service 1993, p. 53). Thus, if occasional individual grizzly bears disperse among populations or are moved intentionally, the Yellowstone grizzly bear DPS would still display the required level of discreteness, per the DPS Policy. Gene flow through either linkage or augmentation is discussed further under Factor E below.

Issue 8—One commenter stated that he could not find the ''genetic monitoring information'' to be appended to the Recovery Plan.

Response—This document was made available for public review and comment in 1997 (62 FR 47677, September 10, 1997) and noticed again in 1999 (64 FR 38465, July 16, 1999). As noted in the proposed rule, the document also was posted on our website for the Yellowstone grizzly bear population (*http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*). This document does not describe recovery criteria, as current levels of genetic diversity are consistent with known historic levels and do not threaten the long-term viability of the species, and instead proposes a post-delisting monitoring strategy to ensure that necessary levels of gene flow occur so that this population retains its recovered status for the foreseeable future. This 1999 information was never formally appended to the 1993 Recovery Plan. Due to the continuous and rapid evolution of the genetics field, this information no longer reflects the most up-to-date and scientifically sound approach. Therefore, we have determined that it is no longer appropriate to append the 1999 genetic monitoring methods and management responses to the Recovery Plan. Instead, a new genetic monitoring approach which reflects the most recent, best available science will be applied to the future management of the Yellowstone grizzly bear DPS as described in the Strategy's updating process (U.S. Fish and Wildlife Service 2007, p. 63). The Coordinating Committee will commence this genetic monitoring information updating process, which will include a public comment process, within 6 months of this final rule becoming effective.

G. Definition of Suitable Habitat

Issue 1—Several commenters requested that we explain why lands excluded from our definition of suitable habitat or the State's definitions do not constitute a significant portion of the grizzly bears' range.

Response—None of these unsuitable areas, either individually or collectively, are capable of contributing, in a meaningful way, to the overall status of the Yellowstone DPS. Therefore, these unsuitable areas do not represent a significant portion of the Yellowstone DPS range because their exclusion will not influence population trajectory or population health. Suitable habitat inside the PCA, which contains 84 to 90 percent of the population of females with cubs (Schwartz *et al.* 2006b, p. 64), the most important age and sex group to population trajectory, will be protected by the habitat standards in the Strategy. Grizzly bears also will be allowed to expand into currently unoccupied suitable habitat as per the State plans. Outside the PCA, 60 percent of suitable habitat is protected by its status as Designated Wilderness, Wilderness Study Area, or Inventoried Roadless Area. Areas outside of suitable habitat will not affect the trajectory or health of the Yellowstone population now or in the future. A lack of occupancy of historic habitat will not impact whether this population is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Issue 2—Several commenters believe that the decision to exclude sheep allotments as suitable habitat was based upon social considerations rather than biology. Instead, they stated that ''* * * mortality rates in these areas are not a function of the habitat itself, but of land-use decisions'' and that the habitat could be made suitable by regulatory mechanisms. One commenter suggested that the Service be upfront and clear that the definition of suitable habitat ''* * * is not based solely on an evaluation of the grizzly bear's resource needs.'' Another commenter requested that we prepare an analysis of what proportions of their lives individual grizzlies spend in ''suitable'' versus ''unsuitable'' habitat.

Response—Our determination that sheep allotments were not suitable for grizzly bears was based on mortality rates, which is a biological issue. In areas of high conflict potential such as campgrounds, management actions are taken to limit grizzly bear presence or use. The sheep allotments outside suitable habitat are not necessary to ensure that this population avoids becoming threatened within all or a significant portion of its range in the foreseeable future. Because of the habitat protections inside the PCA and the large percentage of suitable habitat outside the PCA (60 percent) that is currently a Designated Wilderness Area (6,799 sq km/4,225 sq mi), Wilderness Study Area (708 sq km/440 sq mi), or Inventoried Roadless Area (6,179 sq km/3,839 sq mi), the long-term persistence of the Yellowstone grizzly bear population is assured without the sheep allotments.

Our definition of suitable habitat reflects the best available science and is adequate to ensure that the Yellowstone grizzly bear population is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The three criteria we used to define suitable habitat in the proposed rule are—(1) being of adequate habitat quality and quantity to support grizzly bear reproduction and survival (i.e., within the Middle Rockies ecoregion—please see discussion below in Suitable Habitat section under Factor A); (2) contiguous with the current distribution of Yellowstone grizzly bears such that

natural re-colonization is possible; and (3) having low mortality risk as indicated through reasonable and manageable levels of grizzly bear mortality. Upon the request of one peer reviewer and in response to this issue, we undertook additional analyses to examine how much suitable habitat would exist in the GYA under different definitions of suitable habitat.

If grizzly bears were given priority over all other land uses, we found that an additional 13,837 sq km (5,342 sq mi) of habitat exists that meets the first two criteria for our definition of suitable habitat (found within the Middle Rockies ecoregion and contiguous with the current population distribution). Of that ''potentially'' suitable habitat, nearly 16 percent (2,184 sq km (843 sq mi)) is privately owned. The remaining habitat is 70 percent National Forest (9,637 sq km (3,720 sq mi)), 8.5 percent BLM (1,171 sq km (452 sq mi)), 4 percent State-owned (545 sq km (211 sq mi)), and less than 2 percent in other Federal ownerships (200 sq km/77 sq mi).

Although management direction could change on these Federal and State-owned lands to favor grizzly bears by eliminating all other uses (e.g., livestock grazing allotments, oil and gas development), this action is not biologically necessary to maintain the recovered status of the Yellowstone grizzly bear. These areas do not constitute a significant portion of the range. If this habitat became biologically necessary in the future due to decreases in habitat quality or excessive mortality, the adaptive management approach described in the Strategy would allow managers to modify the management within what is currently ''potentially'' suitable habitat on public lands.

When we examine all areas found within the DPS boundaries that are within the Middle Rockies ecoregion and do not consider whether these areas are contiguous with the current grizzly bear population, an additional 7,178 sq km (2,771 sq mi) of habitat meets this sole criterion. Of this ''potentially suitable'' habitat that is not contiguous with the current distribution of grizzly bears, 6,341 sq km (2,448 sq mi) is contained within the Bighorn Mountains and 837 sq km (323 sq mi) within the Pryor Mountains on the Wyoming and Montana border. Distances between these mountain ranges, the current distribution of grizzly bears, and land uses in the intervening habitat will preclude dispersal of most males and most, if not all, females. Without constant emigrants from suitable habitat, it is highly unlikely that the Bighorns or the Pryor Mountains can support a self-sustaining grizzly bear population. Again, this ''potentially suitable'' habitat is not biologically necessary to maintain the recovered status of the Yellowstone grizzly bear DPS.

We have determined that an analysis examining the proportion of time grizzly bears spend in suitable and unsuitable habitats is unnecessary. Although this information may be useful when modeling source-sink dynamics, the sustainable mortality limits that have been established for the entire population ensure that mortality will not exceed recruitment. The Study Team will continue to monitor habitat use by radio-collared grizzly bears post-delisting and attempt to quantify why and where grizzly bears experience different mortality rates.

Issue 3—Some commenters noted that we considered more than strictly biological criteria in the recovery process when we introduced the term ''socially acceptable'' in the Strategy.

Response—The presence of grizzly bears in places with high levels of human activity and human occupancy results in biological impacts to grizzly bears in terms of increased mortality risk and displacement. The level of this impact is directly related to the location and numbers of humans, their activities, and their attitudes and beliefs about grizzly bears. The consideration of human activities is fundamental to the management of grizzly bears and their habitat.

Issue 4—Many commenters questioned whether the 1998 baseline applied exclusively inside the PCA was adequate to ensure the continued viability of the Yellowstone DPS. They noted that in 1998, the population was already occupying a large area outside of the recovery zone and, therefore, to conclude that habitat conditions inside the PCA are what contributed to the observed 4 to 7 percent population growth is to portray an incomplete picture of what occurred. Many commenters believed all currently occupied habitat should be protected since it has contributed to the growth of the population. Many commenters suggested that protections must be extended to all suitable habitat to ensure long-term viability of the Yellowstone DPS. One commenter recommended that we employ a reserve design approach with the PCA designated as the protected core of the GYA Reserve (with no hunting) and the rest of the GYA managed as a buffer zone (with all protections currently provided in the PCA being extended to the entire GYA). One commenter also noted that we must have data on habitat conditions outside of the PCA to draw a conclusion about future risks and habitat changes there.

Response—The Service has applied a reserve design approach by designating the PCA. The PCA, which is a subset of the suitable habitat, contains between 84 to 90 percent of the females with cubs (the population's most important age and sex group) (Schwartz *et al.* 2006b, p. 64). The population has been growing at 4 to 7 percent per year since the 1990s (Harris *et al.* 2006, p. 48), with most of the growth occurring inside the PCA (Schwartz *et al.* 2006b, p. 64). The best available information demonstrates that the PCA contains the habitat necessary for a healthy and viable grizzly bear population in the long-term. Strict habitat protection within the PCA is guaranteed to assure the future of the population. Sixty percent of suitable habitat outside the PCA is Designated Wilderness, Wilderness Study Area, or Inventoried Roadless Area. This amount of protected habitat combined with the GYA National Forests' commitment to manage habitat for a viable grizzly bear population, forest-wide food storage orders, and designation of the grizzly bear as a species-of-concern on GYA National Forests, gives the Service reasonable assurance that grizzly bears outside of the PCA will continue to be protected adequately. In addition, allowable hunting mortalities will be determined and limited by the total sustainable mortality limit.

H. Habitat Protections

Issue 1—Some commenters questioned the adequacy of the habitat protections that we developed for the PCA and advocated more meaningful habitat protections including baseline values for major foods, restrictions on private land development, and limits on both motorized and non-motorized recreation.

Response—Our habitat protection criteria are adequate and biologically sound. There is no biological way to define ''baseline'' levels for various foods because the natural foods for grizzly bears naturally fluctuate, annually and spatially, across the ecosystem. Instead of establishing artificial baseline values for major grizzly bear foods, the protocol in place for the monitoring of major foods will provide annual indices of the variation of these foods, and will compare changes in these foods to grizzly bear vital rates such as mortality causes and locations, cub production and survival, adult female survival, and numbers and distribution of bear/human conflicts. The results will guide adaptive management responses to changes in foods such as enhanced Information and

Education (I & E) efforts, limiting grizzly bear mortality, planting whitebark pine, controlling exotic species, and/or prescribed burning.

Private lands comprise 2.1 percent of the PCA. Limits on developing private lands to reduce conflicts with resident wildlife are the responsibility of the counties and the States. County representatives are members of the Coordinating Committee and will insure that efforts to limit conflicts on private lands will continue. Their cooperation with the State wildlife agencies to promote outreach, education and management of land development activities in grizzly habitat to reduce bear/human conflicts will continue upon delisting. These efforts to limit conflicts on private lands will continue under the Coordinating Committee's management.

Limiting motorized recreation is a fundamental component of the Strategy, hence the requirement for no net decrease in secure habitat inside the PCA. This measure directly limits the total area impacted by motorized recreation, so that grizzly bears have adequate secure habitat regardless of the number of people using motorized trails. Limitation of non-motorized recreation throughout the GYA is not currently necessary, as evidenced by the increasing grizzly bear population since the 1980's (Harris *et al.* 2006, p. 48). The adaptive management approach in the Strategy will allow managers to respond to detrimental levels of non-motorized recreation on a case-by-case basis and also provide managers with the data necessary to determine if ecosystem-wide limitations may be necessary in the future.

Issue 2—Numerous comments stated that grizzly bears must be allowed access to habitat in the Southern Wind Rivers, Palisades, and Wyoming Range so that they can find food in light of declining food sources. These areas are currently deemed as socially unacceptable habitat by the Idaho and Wyoming State management plans. Many commenters thought that the States should throw out their concept of ''socially acceptable'' areas and should, instead, encourage colonization of all biologically suitable habitat while improving efforts to manage conflicts in those areas.

Response—The Idaho Plan does not limit or restrict bears in the Palisades. The Idaho Plan acknowledges this area as one of many outside the PCA where grizzly bear occupancy is anticipated in the next 5 to 10 years (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 8–9). The Wyoming Plan calls for management emphasis to limit conflicts in the southern Wind River and the Wyoming Ranges by discouraging grizzly bear dispersal and occupancy of these areas. The Wyoming Grizzly Bear Management Plan (WGFD 2005, pp. 12–16) does not exclude grizzlies from the southern Wind Rivers; rather, it recognizes a higher potential for grizzly bear/human conflicts if they move into areas such as the southern Wind River or Wyoming Mountain ranges. The presence of grizzly bears in places where there are high levels of human activity and occupancy results in biological impacts to grizzly bears in terms of increased mortality risk and displacement. Consideration of these potential biological impacts was a critical element in the determination of suitable habitat. As the grizzly population increases in area and density, an emphasis will be placed on education, conflict prevention, relocation, or removal of bears to limit conflicts. Because there have been few if any bears in these areas for many decades and the population has continued to grow during this time, these areas are presently not necessary to include in the PCA.

Issue 3—Commenters requested that we consider potential changes in management of Inventoried Roadless Areas resulting from the 2005 Roadless Areas Rule (70 FR 25654) under which management decisions will be made based on State Governor's petitions and individual Forest Plans. Some thought we should undertake a more detailed analysis of ''* * * roadless areas that are specifically threatened [and] identify which formerly-protected areas are especially important to present and future grizzly bear conservation.''

Response—The State Petitions for Inventoried Roadless Area Management Rule (70 FR 25654, May 13, 2005) that replaced the Roadless Area Conservation Rule (''Roadless Rule'') (66 FR 3244, January 12, 2001) was overturned September 19, 2006 (*People of the State of California ex rel. Bill Lockyer, et al.* v. *U.S. Department of Agriculture; Mike Johanns, Secretary of the Department of Agriculture, et al.*, C05–03508 EDL). The State Petitions for Inventoried Roadless Area Management Rule was set aside and the 2001 Roadless Rule was reinstated. The USDA Forest Service was enjoined from taking any further action contrary to the 2001 Roadless Rule without undertaking environmental analysis consistent with the court opinion. Because this court decision voided the State Petitions for Inventoried Roadless Area Management Rule, the 2005 Roadless Areas Rule has no impacts. Even if the State Petitions for Inventoried Roadless Area Management Rule is sustained in a possible appeal of the September 19, 2006, court decision, the majority of roadless areas are likely to remain undeveloped. The six GYA National Forests are committed to managing for a viable grizzly bear population. If any roads are proposed to be built in roadless areas, the USDA Forest Service must first complete a formal National Environmental Policy Act of 1969 (NEPA) process and specifically consider the project's impacts on species of concern, which the Yellowstone grizzly bear population will be classified as post-delisting (USDA Forest Service 2006b, p. 26). State Petitions for Inventoried Roadless Area Management only allow the Governors to comment on the Forest Service process of considering management of Inventoried Roadless Areas and do not provide the Governors any authority to make decisions on road building. Any comments from the Governors would be considered during the EIS process.

Issue 4—Several commenters suggested that we provide habitat protections for identified linkage zones between the GYA and other occupied and unoccupied grizzly bear habitat to the north and west.

Response—A process to identify, maintain, and improve wildlife movement areas between the large blocks of public land in the Northern Rocky Mountains is ongoing (Servheen *et al.* 2003, p. 3). This interagency effort involves 13 State and Federal agencies working on linkage facilitation across private lands, public lands, and highways (Interagency Grizzly Bear Committee 2001, pp. 1–2). To date, this effort has included: (1) Development of a written protocol and guidance document on how to implement linkage zone management on public lands (Public Land Linkage Taskforce 2004, pp. 3–5); (2) production of several private land linkage management documents, including ''Making Connections from the Perspective of Local People'' (Parker and Parker 2002, p. 2), and the Swan Conservation Agreement (U.S. Fish and Wildlife Service 1997), which is a collaborative linkage zone management document; (3) analyses of linkage zone management in relation to highways, including identification of multiple linkage areas in southeast Idaho from Idaho Falls to Lost Trail Pass (Geodata Services Inc. 2005, p. 2) and the effects of highways on wildlife (Waller and Servheen 2005, p. 998); and (4) a workshop in the spring of 2006 on implementing management actions for wildlife linkage, the proceedings of which are available

online at: *www.cfc.umt.edu/linkage.* The objective of this work is to maintain and enhance movement opportunities for all wildlife species across the northern Rockies. This linkage work is not directly associated with the Yellowstone grizzly population and will continue to address ways to improve cooperation and affect management on public lands, private lands, and highways in linkage areas across the northern Rockies regardless of the listed status of the Yellowstone grizzly bear DPS.

Issue 5—Numerous commenters believed that resource extraction industries would dominate the landscape if delisting occurred. Some stated that the overall trend for habitat quality has been declining, at least in part, due to high-density oil and gas development. Some commenters believe that we did not fully evaluate or acknowledge the potential impacts from oil and gas development or increased logging in the GYA on the grizzly bear population. One commenter noted that, although there are large areas of land in the GYA that are not open to surface occupancy, such stipulations are routinely waived upon request and do not adequately address concerns of ''full field development'' that may occur in grizzly bear habitat.

Response—Service-defined suitable habitat inside or outside the PCA (see Figure 1 above) does not contain active oil or gas wells. Timber is the primary resource extracted in grizzly bear habitat. Habitat quality (as a function of road density and timber harvest) has improved as a result of declining timber harvest and road construction and increasing road decommissioning since the mid-1990s (USDA Forest Service 2006a, pp. 156, 200).

Inside the PCA, the potential for increased oil and gas development in the future is guided by the Strategy and its limitations on road density and development (U.S. Fish and Wildlife Service 2007, p. 41). We do not anticipate a dramatic increase in oil and gas development outside of the PCA due to moderate to low potentials for both occurrence and development throughout most of the six GYA National Forests, with the exception of the Bridger-Teton National Forest (USDA Forest Service 2006a, pp. 210–213). Even with the high potential for occurrence and development in the Bridger-Teton, only 14 active oil and gas wells are currently inside that National Forest and none are within Service-defined suitable grizzly habitat.

Issue 6—Many commenters were concerned about the rapid human population growth in the GYA and the resulting increases in houses, recreationists, and grizzly bear/human conflicts. Some commenters suggested that overall habitat quality in the GYA had already declined, and would continue to do so, primarily due to houses and off-highway-vehicle (OHV) use. Commenters believe that we must ensure future human population growth does not affect the grizzly bear population and recommended that we quantify current levels of use in the GYA for consideration in a risk assessment. They also recommended we develop a comprehensive monitoring, management, and enforcement plan for OHV and snowmobile use in the GYA before considering delisting.

Response—Human populations in the GYA, and the rest of the United States, are expected to increase (USDA Forest Service 2006a, p. 229). In the six Wyoming counties where grizzly bears are, or are expected to be, in the next few decades, the human population is projected to increase by roughly 15,000 residents between 2000 and 2020 (from 105,215 in 2000 to 120,771 by 2020) (Wyoming Department of Administration and Information Economic Analysis Division 2005). In the Montana counties of Gallatin, Madison, Beaverhead, Park, Sweet Grass, Stillwater, and Carbon, total populations are expected to increase by roughly 35,000 people during this same time (from 120,934 in 2000 to 154,800 by 2020) (NPA Data Services 2002). We anticipate similar levels of population growth in the Idaho counties of the GYA given that the West, as a region, is projected to increase at rates faster than any other region (U.S. Census Bureau Population Division 2005). Increasing human populations do not necessarily lead to declining predator populations, when adequate management programs are in place with policies that promote the conservation of the species (Linnell *et al.* 2001, p. 348) such as mortality control, research and monitoring, and outreach and education about living with wildlife.

Recent reports (Gosnell *et al.* 2006, pp. 749–750) demonstrate that the majority of land sales over 162 ha (400 ac) in size in the greater Yellowstone ecosystem from 1990 to 2001 were to amenity buyers (39 percent) (those who purchase for ambiance or recreation and who have little interest in the economic viability of the property), or to traditional ranchers (26 percent). Less than 6 percent of 605,814 ha (1.497 million ac) sold from 1990 to 2001 were to land developers, and 12 percent were to investors whose ultimate intention was unknown. This report suggests that ongoing changes in land ownership may result in reduced conflicts between livestock and predators, and a lowered level of land development sales than previously projected. While there may be conservation benefits in this overall land ownership change, there are uncertainties as to the eventual land uses on these properties.

The Service has no authority to limit or manage future human population growth. Current levels of human use of public lands are quantified (USDA Forest Service 2006a, pp. 180–185) and managed to limit resource impacts in the management plans of the National Forests and the National Parks in the Yellowstone ecosystem. A modeling exercise to further predict the impacts of future population growth on the Yellowstone grizzly bear DPS would be of minimal use due to multiple uncertainties regarding assumptions about human behavior and how humans will react to grizzly bears. As human populations and recreational activity have increased in the GYA National Forests, additional regulations have been implemented to limit bear/human conflicts such as the food storage orders in all suitable habitat on National Forest lands and comprehensive State and Federal I & E programs that explain how to coexist with bears. These efforts will continue upon delisting so that the potential negative impacts of increasing human populations on the Yellowstone grizzly bear DPS are adequately mitigated.

Under the Strategy, designated motorized access routes will not be increased inside the PCA, and OHV use is restricted to designated motorized access routes. The USDA Forest Service Final EIS on the Forest Plan Amendment for Grizzly Bear Habitat Conservation for The Greater Yellowstone Area National Forests (USDA Forest Service 2006a, p. 192) states that, ''It is likely that revised plans will revise, and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages.'' Quantification and management of OHV use and snowmachine use on public lands are presented in the management plans of the National Forests and the National Parks in the GYA. Any detrimental impacts on grizzly bear habitat use and/or mortality will be monitored as part of the comprehensive monitoring systems in the Strategy.

Issue 7—Many commenters were concerned that declines in all four of the major foods that Yellowstone grizzlies rely upon will decrease the carrying capacity of the GYA, with resulting negative effects on long-term grizzly bear population viability. The

commenters stated that the proposed rule was too optimistic regarding grizzly bear response to decreases in major foods and noted that the alternative foods for grizzly bears in the GYA are not of the same quality and quantity found as the four major foods grizzlies currently use.

Response—The amounts of major foods for grizzly bears will likely fluctuate due to possible changes in average temperature, precipitation, forest fires, introduced species, and resident insects. Changes in environmental conditions and resulting changes in foods for grizzly bears have been recognized by management agencies throughout the recovery process. That such changes will occur is neither exceptional nor unexpected. The key issue is determining how management agencies will quantify and respond to such changes. Presently, a system has been implemented to monitor changes in the production and distribution of foods in relation to grizzly bear vital rates (U.S. Fish and Wildlife Service 2007, pp. 25–60). The Study Team will report the monitoring results on food production, extent and impact of insect and disease on food production, bear mortality, reproductive success, and age-specific survival annually to the Coordinating Committee. The relationships between these factors will detect any impacts of changes in foods on bear viability in the ecosystem and will be the basis for an adaptive management response by the Coordinating Committee.

Issue 8—Some private landowners in the GYA were concerned about the direction given in the Strategy that encourages citizens to become involved in private land issues and questioned what authority we have to make such a recommendation.

Response—We have no direct authority over private lands nor can we require private citizen actions. Instead, the Strategy put forward voluntary recommendations. The consideration of private land activities on grizzly/human conflicts is fundamental to the proper management of grizzly bears and to human safety because a disproportionate number of grizzly bear/human conflicts occur at site developments on private lands (Servheen *et al.* 2004, p. 15).

Issue 9—Some commenters were concerned about the amount of denning habitat both inside and outside of the PCA that will be open to snowmachine use.

Response—The Forest Plan Amendment includes guidance that inside the PCA, localized area restrictions are to be used to mitigate conflicts, where conflicts occur during denning or after bear emergence in the spring. Much of the grizzly bear denning habitat identified in the Forest Plan Amendment Final EIS as being open to snowmobiling is not actually used by snowmachines (USDA Forest Service 2006a, p. 92). Bears tend to den in remote areas with characteristics that are not conducive to snowmachining (i.e., steep, forested habitats). Eighty-eight percent of the known dens in the Yellowstone ecosystem are located in areas where snowmachine use does not occur (USDA Forest Service 2006a, p. 92).

Suitable denning habitat is well distributed on the forests. Five of the six GYA National Forests consulted with us in 2001 regarding the effect of snowmachines on denning grizzly bears. Our best information suggests that current levels of snowmachine use are not appreciably reducing the survival or recovery of grizzly bears. While the potential for disturbance exists, USDA Forest Service and Study Team monitoring over the last three years has not documented any disturbance (Gallatin National Forest 2006, p. D–68). Monitoring will continue to support adaptive management decisions to limit snowmachine use in areas where disturbance is documented or likely to occur.

I. 1998 Baseline for Secure Habitat, Developed Sites, and Livestock Allotments

Issue 1—Many comments questioned the logic and supporting evidence for using 1998 as the baseline year. Some commenters said that the 1998 baseline was chosen arbitrarily and that the Service did not analyze the implications of selecting any other particular year within the time of 4 to 7 percent population increase (1983–2001).

Response—The year 1998 was chosen because secure habitat and site developments had been roughly the same during the previous ten years (USDA Forest Service 2004, p. 27) and the population was increasing during these years (Eberhardt and Knight 1996, p. 419; Harris *et al.* 2006, p. 48). The selection of any other year between 1988 and 1998 would have resulted in approximately the same baseline values for roads and developed sites. We did not select baseline habitat values from years before 1988 because habitat improvements that occurred after the implementation of the Interagency Grizzly Bear Committee Guidelines (USDA Forest Service 1986, pp. 6–21) would not have been reflected.

Issue 2—Several commenters said that the 1998 baseline did not adequately consider alternative hypotheses and processes that may have lead to positive growth rates for the grizzly population from 1983–2001 (e.g., good whitebark pine years in the early 1990s), and that it is overly simplistic to assume that levels of secure habitat, developed sites, and livestock allotments are adequate to explain the observed population growth.

Response—Numerous studies have confirmed that secure habitat, developed sites, and livestock allotments affect grizzly bear survival on a landscape scale (Mattson *et al.* 1987, p. 271; Mace *et al.* 1996, pp. 1402–1403; Servheen *et al.* 2004, p. 20). We used these variables as surrogates for habitat effectiveness because the annual variability in the abundance and distribution of major foods precludes the Service from establishing baseline values for them.

We believe that high whitebark pine cone production in the early 1990s does not adequately explain the observed population growth during this time (Haroldson *et al.* 2006b, p. 41). The Annual Study Team reports document that the early 1990s were not particularly good whitebark pine production years as evidenced by average counts of less than 20 cones per tree from 1990 through 1995. In fact, the only 2 years during the 1990s with cone counts above 20 cones per tree were 1996 and 1999 (Haroldson and Podruzny 2006, p. 45). We also note that the Yellowstone grizzly bear population was declining in the 1960s and 1970s, regardless of whitebark pine production. Declines continued until management intervention occurred with the implementation of the Guidelines (USDA Forest Service 1986, pp. 6–21) by the affected National Parks and Forests. These Guidelines (USDA Forest Service 1986, pp. 6–21) focused on improving habitat quality and limiting human-caused mortality resulting from grizzly bear/human conflicts. Because of the subsequent success of the Yellowstone grizzly bear population in the decades following implementation of the Guidelines, it is reasonable to infer that the Guidelines played a significant role and that the continuation of such management actions will ensure the Yellowstone grizzly bear DPS remains recovered.

Issue 3—Some commenters suggested that subunits on the Gallatin National Forest need to improve levels of secure habitat before delisting occurs even if this means closing additional USDA Forest Service roads to compensate for adjacent, highly roaded, private lands.

Response—The Yellowstone grizzly bear DPS increased 4 to 7 percent per year between 1983 and 2002 (Harris *et*

al. 2006, p. 48) with the current level of road density on the Gallatin National Forest. There is no biological reason to conclude that additional road density reductions on the Gallatin National Forest are necessary before delisting can move forward.

Issue 4—Several commenters believe that the 1998 baseline is unrealistic because habitat changes are already occurring due to oil and gas extraction, human population growth, pine beetles, and other threats to food sources. One commenter said that the 1998 baseline contained inaccuracies in its road data thus making its use as a baseline value ineffective.

Response—Habitat conditions relating to the habitat standards described in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 38–56) have either remained stable or improved since 1998 for road densities, levels of secure habitat, site developments, and livestock allotments. The 1998 baseline was not developed to address specific projects such as oil and gas development or timber harvest. Using the adaptive management approach described in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 5–11), management agencies will respond with adequate restrictions and enforcement if recreation on public lands due to increased human populations in the GYA becomes detrimental to the Yellowstone grizzly bear population. The 1998 baseline does not contain threshold values for any of the major foods due to the natural variability in their abundance and distribution that occurs annually. The 1998 baseline attempted to establish realistic habitat standards that ensure adequate habitat security and minimum livestock conflicts within the PCA. We consider the establishment of habitat thresholds for human population growth, food sources, and specific projects to be unrealistic and that the 1998 baseline will address these issues adequately through access management and limitations on site development. Regarding the accuracy of road data, the 1998 baseline for roads is calculated using the best available road layers compiled by each GYA National Forest.

Issue 5—Some commenters suspected that the 1998 baseline would not be enforced and noted that we have already allowed three projects that violate the terms of the Strategy—(1) the Togwotee Pass road expansion, (2) Grand Teton National Park's plan to build miles of paved pathways, and (3) Yellowstone National Park's installation of large trailer-home developments at Lake and Canyon for employees and contractors.

Response—The 1998 baseline values are being maintained and enforced. With their signatures on the Strategy, the agencies have committed to implement the habitat standards by adhering to the 1998 baseline (U.S. Fish and Wildlife Service 2007, pp. 13, 63–67), amending the forest plans on the six GYA National Forests, and implementing changes to the Superintendent's Compendiums regulating habitat management within Yellowstone and Grand Teton National Parks. One phase of the Togwotee Pass road expansion that would have violated the secure habitat terms of the Strategy (U.S. Fish and Wildlife Service 2007, pp. 39–44) has been reevaluated and abandoned because it violated the agreed-upon habitat standards (U.S. Fish and Wildlife Service 2007, pp. 38–56). The paved pathways in Grand Teton National Park's plan are for exclusive use by bicyclists and pedestrians and, therefore, do not violate the established limits on motorized access routes. The addition of trailer homes at Lake and Canyon in Yellowstone National Park does not violate the developed site standard because administrative site expansions for improvement of management on public lands, for temporary construction camps, or for temporary housing for major maintenance projects are exempt.

Issue 6—Many commenters objected to the exceptions that we allow to the 1998 baseline regarding the 1 percent rule for temporary changes and the application rules for permanent changes in secure habitat and developed sites. They believe that these allowances are unacceptable and not based on biology. Some commenters asked why replacement habitat used to mitigate permanent changes in secure habitat would only be maintained for 10 years and suggested that this would lead to a net loss of secure habitat over time. Other commenters noted that exceptions allowed in the USDA Forest Service's Draft EIS (USDA Forest Service 2004, p. 141) could result in an increase in developed sites above 1998 levels. Some groups believe that the 1 percent rule was too restrictive and questioned why the Service would implement more strict standards than those in use while the grizzly population was increasing (i.e., the Guidelines).

Response—Regarding developed sites, the habitat standard in the Strategy states that there will be no net increase in the capacity or number of developed sites from the 1998 baseline (U.S. Fish and Wildlife Service 2007, p. 42). Any proposed expansion of an existing developed site or any new developed sites will be analyzed, with the potential detrimental and positive impacts on grizzly bears documented, through a biological evaluation or assessment. This evaluation/assessment would determine the mitigation necessary for any proposed increases in number or capacity of developed sites. The final EIS states that any project that changes the number or capacity of developed sites must follow specific application rules requiring that any new sites be mitigated by removing an existing site within that subunit to offset any increases in human capacity, habitat loss, or human access to surrounding habitats (USDA Forest Service 2006a, p. 36). The application rules allow for an expansion of developed campgrounds if an equivalent capacity of dispersed campsites is eliminated. Administrative site expansions are exempt from human capacity mitigation expansion only if they are necessary for enhancement of management of public lands and other viable alternatives are not available.

The requirement to maintain secure habitat for 10 years is considered a minimum, and cannot be eliminated after the 10 years unless mitigated by an equal quantity and quality of secure habitat that then must be retained for at least 10 years. There will be no net loss of secure habitat in any subunit. Temporary changes in secure habitat may reduce secure habitat for a period no longer than 3 years and can be no larger than 1 percent of the largest subunit size within that Bear Management Unit. All secure habitat would be restored upon completion of a temporary project. There are no biological data that demonstrate that the temporary 1 percent level of secure habitat disturbance in any subunit has had any detrimental impact on the grizzly bear population.

J. Whitebark Pine

Issue 1—Numerous commenters noted the importance of whitebark pine to grizzly bear survival and reproductive success. They believe that we were overly optimistic about the severity of the decline of whitebark pine in the GYA and the potential impacts to the Yellowstone grizzly bear DPS. These commenters suggested that we complete a more thorough analysis of impacts of potential decreases in whitebark pine cone production. Several commenters were concerned that the monitoring systems described by the Strategy will not detect changes in the grizzly bear population related to decreases in whitebark pine cone production soon enough, and that there is no clear management response if this occurs.

Response—We have added additional information to the final rule concerning potential threats to whitebark pine and possible impacts to grizzly bears. The

extent to which whitebark pine nut production will be affected across the landscape is unknown and difficult to calculate with any degree of certainty. Instead, managers will use an adaptive management approach that addresses poor food years with responsive management actions.

The Strategy commits the agencies to intensive monitoring of all grizzly bear vital rates, and the relationship of these rates to changes in major foods and levels and types of human activities. Vital rates that are more sensitive to habitat changes such as litter size and cub survival also will be monitored. Due to the reproductive biology of grizzly bears in which fertilized eggs are not implanted into the uterus if the nutritional status of the female is inadequate, poor whitebark pine production resulting from a landscape scale decrease in overall carrying capacity would be detected by a decreased number of females with cubs-of-the-year.

In the short-term, management responses to poor whitebark pine cone production years will include immediate limitation on all discretionary mortalities; enhanced outreach and education to minimize bear/human conflicts and the availability of attractants in bear habitat that might promote such conflicts; notice to residents and users of bear habitat about the possible increased foraging of bears in peripheral habitats; detailed monitoring of food habit shifts and possible changes in home range size and locations, particularly for adult females; limitation of human activities in new or expanded feeding areas should there be changes in range or feeding area; and requests for a status review and/or immediate emergency relisting. The long-term response to decreases in whitebark pine will be continued efforts to replant whitebark pine, habitat management that encourages whitebark pine recruitment and growth, and enhancing secure habitat availability in specific areas outside the PCA where healthy whitebark pine may be available.

Issue 2—Some commenters critiqued the current monitoring protocol for whitebark pine. Specifically, one commenter suggested that the Service update the monitoring protocol for whitebark pine to count dead trees as cone production equal to zero, so that whitebark pine mortality due to pine beetle and blister rust is reflected in total cone production estimates. Other commenters recommended that any delisting proposal be intimately tied with whitebark pine restoration and protection from mountain pine beetle attack via verbenone (a hormone that decreases mountain pine beetle success).

Response—We believe that the current whitebark monitoring system provides a representative, ecosystem-wide index of cone production, numbers of dead trees and the sources of death, and changes in pine nut production over time. This comprehensive monitoring system is made possible by the synergistic work of the Study Team, the Greater Yellowstone Whitebark Pine Monitoring Working Group, and the Whitebark Pine Subcommittee.

Currently, the Study Team monitors 19 whitebark pine cone production transects within the PCA, 9 of which have been monitored on an annual basis since 1980 (Knight *et al.* 1997, p. 14). The purpose of monitoring these transects is to assess whitebark pine production, because Blanchard (1990, p. 362) demonstrated that grizzly bears in the GYA use whitebark pine seeds almost exclusively when pine cone production averages more than 20 cones per tree. As such, counting dead trees which have no cone production produces an unreliable estimate of cone production of live trees.

We agree that it is important to monitor mortality of whitebark pine trees due to blister rust infection and mountain pine beetle infestation. One of the three stated objectives of the Greater Yellowstone Whitebark Pine Monitoring Working Group is to ''* * * estimate survival of individual whitebark pine trees greater than 1.4 m high'' (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005, p. 96). To assess whitebark pine mortality, the Greater Yellowstone Whitebark Pine Monitoring Working Group has established more than 70 transects outside the PCA and works closely with statisticians to ensure a representative sample and a high power of inference (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006, p. 76) for more accurate results.

The Whitebark Pine Subcommittee, formed in 1998, is an interagency group comprised of members from the USDA Forest Service, the National Park Service, the Study Team, and the Whitebark Pine Ecosystem Foundation (USDA Forest Service 2006a, p. 148). The Whitebark Pine Subcommittee coordinates the implementation of restoration techniques, management responses, and gathering whitebark pine status information. Current work on whitebark pine includes planting in several areas, cone collection from healthy trees, silvicultural treatments to improve growth and establishment, prescribed burning to encourage natural whitebark pine seedling establishment, and surveys for healthy trees that may possess blister rust resistant genes.

Verbenone is an anti-aggregation pheromone of the mountain pine beetle (Kegley and Gibson 2004, p. 1). It has usefulness in protecting individual trees or small areas 0.4 ha (1 ac) from pine beetle attack (Kegley *et al.* 2003, pp. 4–5, Kegley and Gibson 2004, p. 1), but its use is limited to individual high-value trees or very small areas. Its use is impractical over thousands of square kilometers throughout an ecosystem.

Under the Strategy, the Study Team will continue to work with the Greater Yellowstone Whitebark Pine Monitoring Working Group and the Whitebark Pine Subcommittee to monitor whitebark pine cone production, the prevalence of white pine blister rust, whitebark pine mortality, and to actively restore whitebark pine in the GYA.

Issue 3—One commenter stated that the Service failed to consider the threat of dwarf mistletoe to whitebark pine.

Response—While dwarf mistletoe can infect and kill whitebark pine trees, it has only ever been detected on one whitebark pine tree in the GYA of the thousands surveyed each year (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005, p. 111). There is no evidence to suggest that dwarf mistletoe represents a serious threat to whitebark pine as a food source for grizzly bears, but the Greater Yellowstone Whitebark Pine Monitoring Working Group will continue to monitor for its presence on the transects it has distributed throughout the GYA.

K. Cutthroat Trout

Issue 1—Some commenters suggest delisting be delayed until the Yellowstone cutthroat trout status review is complete and the findings can be considered in our decision.

Response—The Yellowstone cutthroat trout was found to be not warranted for listing under the Act on February 21, 2006 (71 FR 8818).

Issue 2—Some commenters noted that we did not assess the threat to cutthroat trout from direct competition for food between non-native, invasive New Zealand mud snails and cutthroat trout fry.

Response—The New Zealand mud snail (*Potamopyrgus antipodarum*) is a recently arrived invasive species that was first observed in the GYA in 1994 (Hall *et al.* 2006, p. 1122). They are most abundant in the mid-elevation geothermal streams in Yellowstone National Park. New Zealand mud snails can occur in such great abundance that they out-compete and displace native

aquatic invertebrates that are the preferred foods of cutthroat trout. However, the Service's 12-month finding on a petition to list Yellowstone cutthroat trout stated that ''While it is likely this organism (New Zealand mud snail) is increasingly becoming more widespread and will continue to spread, to date there is no evidence that implicates the New Zealand mud snail in the collapse of any conservation populations of Yellowstone cutthroat trout'' (71 FR 8829, February 21, 2006). Because cutthroat trout are not as important to reproductive female grizzly bears as previously thought (Felicetti *et al.* 2004, p. 496, Reinhart and Mattson 1990, p. 349; Mattson and Reinhart 1995, pp. 2076–2079), we do not foresee New Zealand mud snails as a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range in the foreseeable future.

Issue 3—A few commenters noted that the Yellowstone National Park lake trout removal program has not succeeded in reversing the decline in the number of cutthroat trout spawning in the tributaries to Yellowstone Lake.

Response—Over 100,000 lake trout were removed from Yellowstone Lake between 1994 and 2004. The average length of captured lake trout and the catch per unit effort have declined during this time, suggesting that lake trout control efforts are impacting the population. Fewer and smaller lake trout will have a reduced impact on cutthroat trout. The lake trout removal program will continue. Overall, we do not foresee a decline in Yellowstone cutthroat trout as a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range in the foreseeable future (see Factor E below).

Issue 4—One commenter stated that the decline in availability of spawning cutthroat trout may be forcing more grizzlies out of Yellowstone National Park where they are at greater risk of human-caused mortality.

Response—Only a small proportion of the Yellowstone grizzly bear DPS eat cutthroat trout and the nutritional contribution of cutthroat trout to the overall diet of those few bears is minimal (Felicetti *et al.* 2004, p. 496). Movement data from radio-collared grizzly bears who consume trout do not indicate these bears move outside Yellowstone National Park any more than bears eating foods other than trout. The Strategy and the Study Team have established biologically sustainable mortality limits for the entire GYA and if bears experience unsustainable mortality levels as a result of leaving Yellowstone National Park in search of alternative foods to cutthroat trout, this trend will be detected and addressed.

L. Army Cutworm Moths

Issue 1—Most comments we received about army cutworm moths addressed the proposed rule's lack of a discussion about the impacts of global climate change and pesticide use on the moths. Some commenters believe that we should analyze the impacts of human recreation on grizzly bear use of army cutworm moth sites and that identified sites should be protected from heavy recreation and development.

Response—The final rule contains a discussion of the potential effects of global climate change and pesticides on army cutworm moths. The Study Team is sponsoring research on the geospatial prediction of army cutworm moth sites that will help managers identify sites that are potentially exposed to human recreational use. It is highly unlikely that any of the high-elevation sites used by the moths, all of which are on public lands, will be exposed to development.

M. Availability of Ungulates

Issue 1—Some commenters noted that we failed to consider the multiple factors that may affect the availability of ungulate carcasses to grizzly bears in the future. These include brucellosis control and management plan impacts on the availability of elk and bison, the potential for chronic wasting disease to afflict elk populations, competition with wolves at carcasses, displacement of female grizzlies with cubs, loss of winter habitat and migration routes due to human housing trends, and fewer carcasses available to grizzlies in the spring due to milder winters.

Response—The final rule contains a discussion of all of these issues.

Issue 2 —One commenter noted that we failed to consider the large declines of the northern Yellowstone elk population and how or if this may affect the grizzly bear population.

Response—The northern elk herd declined from about 17,000 elk in 1995 to about 8,000 elk in 2005. The decline has been attributed to a variety of factors including severe winters, drought, hunter harvest, and increased predation on elk calves by grizzly bears, black bears, and wolves (Vucetich *et al.* 2005, pp. 266–268; Barber *et al.* 2005, pp. 42–43). The grizzly bear population has continued to increase at 4 to 7 percent per year during this time period, meaning there is no detectable cause and effect relationship between the elk population decline and the health of the grizzly population.

N. Hunting

Issue 1—Many commenters were concerned that the Yellowstone population cannot sustain additional human-caused mortality and that this will lead to a decline in the population and eventually to their extinction.

Response—Because the revised sustainable mortality limits for independent males and females include mortalities from all sources (Interagency Grizzly Bear Study Team 2005, pp. 6–7), including hunting, and are applied ecosystem-wide within the Conservation Strategy Management Area (Figure 1), hunting should never threaten the Yellowstone grizzly bear population. Hunting is a discretionary mortality source and will occur only if the mortality limits from all causes have not been exceeded (U.S. Fish and Wildlife Service 2007, p. 31).

Issue 2—Some commenters requested that we discuss the potentially negative impacts on grizzly bear population dynamics that can be caused by hunting, particularly when large males are targeted.

Response—When large males are removed from the population, new male bears may move into an area and kill resident females' cubs (Swenson *et al.* 1997b, p. 450). This process of sexually-selected infanticide has been documented in Scandinavia (Swenson *et al.* 1997b, p. 450). However, the only study of sexually-selected infanticide conducted in North America concluded that a limited hunting season under a sustainable mortality regime does not decrease cub survival (McLellan 2005, p. 146). This issue is still being debated in the scientific community. For more discussion about this issue, please see Issue 2 under subheading A in the Summary of Peer Review Comments section below. Because hunting in the Yellowstone ecosystem will be limited, it is unlikely to have an impact on the population dynamics of the Yellowstone ecosystem population.

Issue 3—Many commenters are opposed to sport hunting of any kind and believe such practices to be barbaric, unnecessary, and unethical.

Response—While we respect the values and opinions of all commenters, we are required by law to make decisions based on the best available science. As such, the various values that people hold about sport hunting are outside the scope of our decision-making authority. The Study Team has established sustainable mortality limits for the Yellowstone grizzly bear population that ensure that hunting will not threaten the overall status of the

population (Interagency Grizzly Bear Study Team 2005, pp. 5–9).

Issue 4—One commenter noted that hunting mortality would not be compensatory, because it would take place mostly in Wilderness Areas rather than developed areas, where most human-caused mortalities occur.

Response—Hunting will always be a source of compensatory mortality for the Yellowstone grizzly bear DPS because all hunting mortalities will fall within the sustainable mortality limits established by the Study Team and the Strategy. Hunting permits will not be issued by the States if mortality limits are exceeded.

Response—One commenter suggested that we research the effects of hunting on grizzly bear/human conflicts.

Response—We agree that it would be useful to compare grizzly bear/human conflicts before and after the implementation of a hunting season to demonstrate its effects on the frequency of grizzly bear/human conflicts. The Study Team and State agencies collect data on grizzly bear/human conflicts, and will continue to do so after delisting. These data are reported and displayed spatially in the Study Team's Annual Report. If the effects of any change in the frequency, location, or nature of grizzly bear/human conflicts are detectable, the data will indicate these changes.

O. Disease

Issue 1—Most comments we received that mentioned disease did so in the context of increased susceptibility to diseases as a result of genetic isolation and are discussed below in the genetic concerns section. Some commenters referenced the 2005 outbreak of parvovirus in the Yellowstone wolf population and suggested that, because this outbreak was not anticipated, we should have a plan to manage a potential epidemic disease in bears.

Response—Approximately 10 percent of the Yellowstone grizzly population is currently tracked using radio collars. The Study Team examines all bears captured for research or management purposes, and performs post mortem examinations on the carcasses of dead bears. If a disease outbreak were to occur, it would be identified promptly. Due to the lack of evidence that diseases and parasites play any significant role in grizzly bear population dynamics in the GYA (see Factor C below), we do not view developing a management plan to respond to a potential outbreak as necessary.

P. Human-caused Mortality, Poaching, Grizzly Bear/Human Conflicts, and Information and Education Programs

Issue 1—Several commenters were concerned that poaching would increase without the deterrent of prosecution under the Act. Many more questioned how much enforcement would occur after delisting and whether the States had the infrastructure or the desire to pursue poaching investigations. Some commenters noted that the number of State enforcement officers is lower than Federal enforcement officers, and that enforcement would be reduced under State management.

Response—The States are committed to prosecuting illegal grizzly bear kills, as per the State plans (U.S. Fish and Wildlife Service 2007, p. 15), and they have the legal authorities to do so under State law (U.S. Fish and Wildlife Service 2007, pp. 72–76). There are no data to suggest that the jurisdiction under which poaching is prosecuted affects the willingness of poachers to commit the crime.

State and Federal conservation officers are usually cross-commissioned, so that Federal conservation officers cite State law violators when they encounter them, and vice versa. National Park Service rangers would have little occasion to encounter State conservation law violators, but State conservation officers, our special wildlife agents, Tribal conservation officers, and USDA Forest Service enforcement officers will continue to cooperate in the investigation of poaching incidents.

Issue 2—We received numerous comments suggesting how and why we should focus on reducing grizzly bear/hunter conflicts. Many thought we should expand efforts to reduce grizzly bear/hunter conflicts with black bear and elk hunters either through I & E or stricter regulations. Some commenters recommended that all hunters be required to carry bear spray and hang their meat immediately when hunting in grizzly bear territory. Several commenters believed that the practice of black bear baiting, (currently permitted in Idaho and Wyoming) should be illegal in all suitable grizzly bear habitat or outlawed entirely.

Response—The Strategy prioritizes outreach and education to minimize grizzly bear/human conflicts (U.S. Fish and Wildlife Service 2007, pp. 57–62). The State plans also contain direction on ways to minimize grizzly bear/hunter conflicts (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, p. 15; MTFWP 2002, pp. 24, 62; WGFD 2005, pp. 31–35). Although the States do not currently require hunters to carry pepper spray, it is strongly encouraged in hunter education courses and other educational materials. Elk hunters in Grand Teton National Park are required to carry bear spray, and this may prove to be a research opportunity to quantify how much, if any, this requirement reduces grizzly bear conflicts with elk hunters.

Montana does not allow black bear baiting in any areas and black bear baiting inside the PCA is not allowed in Idaho or Wyoming (Servheen *et al.* 2004, p. 11). In areas outside the PCA in Idaho and Wyoming, State wildlife agencies will monitor grizzly bear mortality associated with black bear hunting to respond to problems if they occur. The Yellowstone grizzly bear population has increased while black bear baiting has been allowed in Idaho and Wyoming outside the PCA, so it cannot be identified as a significant factor that will threaten the recovered status of the Yellowstone DPS.

Issue 3—One commenter noted that we must consider the impacts of increased poaching in habitat surrounding areas of high-density oil and gas production.

Response—Poaching violations may increase in the vicinity of resource extraction boom towns, and the magnitude of increase relative to population growth is greater at industrial sites than at agricultural or recreational sites (Berger and Daneke 1988, pp. 285–287). State agencies are aware of this potential and will manage accordingly through increased Information and Education efforts and enforcement near boom towns.

Issue 4—To prevent grizzly bear/human conflicts before they occur, many commenters recommended that proper sanitation and garbage storage be implemented in all occupied habitat and, preferably, in all suitable habitat. These preventative measures should be in place before delisting occurs and are especially important in light of projected increases in human population and private land development over the next several decades.

Response—The USDA Forest Service currently has food storage orders in most Service-defined suitable habitat, and food storage orders will be implemented in all suitable habitat found within National Forests by 2008. For a complete map of when and where food storage orders will take effect on National Forest lands in the GYA, please see *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*. Extensive collaborative efforts involving State

wildlife agencies, NGOs, waste management companies, and private landowners to improve garbage storage and to avoid future grizzly bear/human conflicts on private lands will continue (Servheen *et al.* 2004, pp. 6–7). Over two-thirds of the suggested budgets created by the States and Federal agencies responsible for managing the grizzly bear post-delisting are for managing grizzly bear/human conflicts and Information and Education efforts (U.S. Fish and Wildlife Service 2007, p. 154). This level of commitment by responsible agencies demonstrates their understanding that I & E efforts and conflict management and prevention are crucial elements of maintaining a healthy Yellowstone grizzly bear population.

Issue 5—Some commenters believe that aversive conditioning, not management removals, should be emphasized when conflicts with livestock occur or when conflicts are the result of human attractants.

Response—The Federal and State management agencies emphasize preventative measures and aversive conditioning whenever possible (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 15–16; MTFWP 2002, pp. 46–49; U.S. Fish and Wildlife Service 2007, pp. 59–60; WGFD 2005, pp. 28, 31). Management removal is only used as a last resort.

Issue 6—Some commenters thought that grizzly bear conflicts with livestock grazing on public lands should always be settled in favor of the grizzly bear.

Response—Inside the PCA, numerous sheep allotments have been retired or relocated to other, less-conflict-prone areas to accommodate grizzly bears (USDA Forest Service 2006a, p. 170). As of 2006, there are only two remaining active sheep allotments inside the PCA (USDA Forest Service 2006a, p. 168). In areas inside the PCA, grizzly bears involved in any livestock conflict will be given a second chance and relocated at least once before removal is used (U.S. Fish and Wildlife Service 2007, p. 59). Management of grizzly bear conflicts with livestock grazing on public lands outside of the PCA will be guided by the respective State wildlife agency's grizzly bear management plan and will remain within the sustainable mortality limits established for the Conservation Strategy Management Area. As such, this source of mortality will not threaten the Yellowstone grizzly bear population.

Q. Adequacy of Regulatory Mechanisms

Issue 1—Several commenters noted that the Strategy, the State plans, and the revised mortality methods cannot be considered adequate regulatory mechanisms because they are not legally enforceable. Numerous commenters also noted that the habitat standards described in the Strategy will be unenforceable due to the 2005 USDA Forest Service Planning Regulations, which revoked the use of ''standards'' in Forest Land Management Plans (70 FR 1023).

Response—By signing the Strategy, responsible agencies demonstrate that they are committed to implementing the features within their discretion and authority. The Strategy provides adequate assurance that the participating agencies will implement the agreement, which is sufficient to meet the reasonableness required for regulatory mechanisms. Furthermore, the USDA Forest Service finalized the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests and has incorporated this Amendment into the affected National Forests' Land Management Plans (USDA Forest Service 2006a, 2006b, p. 4). This amendment was completed pursuant to the 1982 planning regulations and supported by full Environmental Impact Statement analysis under the National Environmental Policy Act and would not be invalidated by a revision of the Forest Plan pursuant to the 2005 planning regulations. Yellowstone and Grand Teton National Parks appended the habitat standards to their Park Superintendent's Compendiums, thereby assuring that these National Parks would manage habitat in accordance with the habitat standards (Grand Teton National Park 2006, p. 1; Yellowstone National Park 2006, p. 44). These issues, and the use and impact of the various forest planning regulations (1982 and 2005), are discussed under Factor D below.

Issue 2—One commenter noted that the States of Wyoming, Montana, and Idaho do not currently have sufficient State laws to prevent excessive mortality. Some commenters suggested that the Interagency Grizzly Bear Committee petition Congress for legally binding, habitat protection for the PCA as a prerequisite for delisting, resulting in a piece of legislation that provides permanent, Federal, legal protection for the Yellowstone grizzly bear DPS similar to that afforded to bald eagles (*Haliaeetus leucocephalus*) by the Bald Eagle Protection Act of 1940.

Response—State agencies have the authority and the necessary State laws to limit human-caused mortality (U.S. Fish and Wildlife Service 2007, pp. 72–76) and have committed to do so by signing the Strategy (U.S. Fish and Wildlife Service 2007, p. 13).

Issue 3—Some commenters noted that because of the 2005 Roadless Rule (70 FR 25653, May 13, 2005), Inventoried Roadless Areas cannot be considered secure habitat protected by adequate regulatory mechanisms.

Response—The State Petitions for Inventoried Roadless Area Management Rule (70 FR 25654, May 13, 2005) that replaced the Roadless Area Conservation Rule (''Roadless Rule'') (66 FR 3244, January 12, 2001) was overturned September 19, 2006. Management of roadless areas must comply with the provisions of the 2001 Roadless Rule. Such areas are protected by adequate regulatory mechanisms. For further discussion, see Factor D below and our response to Issue 3 under subheading H above.

Issue 4—Some commenters noted that the proposed rule failed to include significant habitat on the Wind River Reservation. These commenters recommended that the final rule recognize the Eastern Shoshone and Northern Arapaho Tribes as active participants and discuss their plans to create grizzly bear management plans for the Wind River Reservation.

Response—The Eastern Shoshone and the Northern Arapaho Tribes of the Wind River Reservation manage wildlife within their Federally recognized boundaries (see Figure 1 above). Both of these tribes have been invited to participate as representatives on the Coordinating Committee under the Strategy (U.S. Fish and Wildlife Service 2007, p. 9). They are working with us to develop a Grizzly Bear Management Plan specific to their lands. Less than three percent of all suitable habitat will be affected by Tribal management decisions. We anticipate that their management plan will encourage grizzly bear occupancy in areas of suitable habitat on the Wind River Reservation. We have recommended that the Tribal Grizzly Bear Management Plan (currently being drafted) include grizzly bear occupancy of the Wind River Mountains on the Reservation, as this will allow grizzly bears continued access to high-elevation whitebark pine and army cutworm moths in these mountains.

Issue 5—Some commenters noted that case history (*Federation of Fly Fishers* v. *Daley,* 131 F. Supp. 2d 1158, 1167–68 (N.D. Cal. 2000)) suggests that the Strategy cannot be considered an adequate regulatory mechanism because ''no reliable source for its future funding'' exists.

Response—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)), but by signing the Strategy, State and Federal management agencies have committed to implement the protective features that are within their discretion and authority, and to seek adequate funding for implementation. The Strategy provides adequate assurance that the participating agencies will implement the agreement, which is sufficient to meet the reasonableness required for regulatory mechanisms. We are authorized to provide grants to States to assist in monitoring the status of recovered species under section 6(d) of the Act.

Issue 6—Some commenters disagreed with our assertion that the NEPA will adequately protect habitat outside of the PCA regarding road construction and resource extraction. They noted that reliance on NEPA or ''sensitive species'' designation to adequately protect suitable habitat outside of the PCA is not adequate because of the 2005 USDA Forest Service Planning regulations, which eliminated species' viability requirements.

Response—We believe that the potential effects on grizzly bears of any proposed projects on public land will be fully and adequately considered through the requirements of NEPA. The USDA Forest Service is designating the Yellowstone grizzly bear DPS a ''species of concern'' upon delisting (USDA Forest Service 2006b, p. 26). This designation means that the GYA National Forests must ''* * * provide the appropriate ecological conditions (i.e., habitats) necessary to continue to provide for a recovered population'' (USDA Forest Service 2006b, p. 26). For further discussion of the USDA Forest Service Planning regulations, see Factor D below.

Issue 7—Some commenters disputed the adequacy of State management plans because none of the plans contain clearly defined standards or methods of enforcing compliance of their population goals, and because States cannot compel Federal land management agencies to manage their lands in accordance with the State plans or the Strategy.

Response—It is true that States cannot compel Federal agencies to manage their lands in accordance with their State plans. However, as participants in the Strategy, both State and Federal agencies have agreed to carry out all provisions of the Strategy, including the appended State plans.

Issue 8—Some commenters expressed concern about the decentralization of grizzly bear monitoring and management efforts, believing that it would be confusing and challenging to effectively implement monitoring and management efforts across multiple jurisdictions without the cohesive force of the Act.

Response—All monitoring, reporting results, and management actions are centralized under the Coordinating Committee and the Study Team, as described in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 25–67), which all the State and Federal agencies have signed and agreed to implement. The agencies responsible for managing the Yellowstone grizzly bear population upon delisting helped develop the Strategy and have been effectively cooperating and communicating with each other about grizzly bear management decisions for the last 25 years.

R. Genetic Concerns, Isolation, and Connectivity With Other Grizzly Bear Populations

Issue 1—Numerous commenters expressed concern that, due to the isolation of the Yellowstone population, we should maintain an effective population size of at least 500 individuals to ensure long-term viability. Therefore, many commenters believe that we should set a population objective of 2,000 to 3,000 bears in the GYA or reestablish connectivity among all grizzly bear populations in the Lower 48 States (so that the total population size is approximately 2,000) before delisting occurs.

Response—Although the effective population size (i.e., the number of breeding individuals in an idealized population that would show the same amount of dispersion of allele frequencies under random genetic drift or the same amount of inbreeding as the population under consideration) of the Yellowstone grizzly bear population is lower than recommended for evolutionary success in the absence of management in published literature on evolutionary theory (e.g., Franklin 1980, p.136), the genetic program for the Yellowstone grizzly bear population will effectively address future genetic concerns (Hedrick 1995, p. 1004; Miller and Waits 2003, p. 4338). As Miller and Waits (2003, p. 4338) recommend, we will continue efforts to reestablish natural connectivity, but our partners will transplant one to two effective migrants per generation if no movement or genetic exchange is documented by 2020 (U.S. Fish and Wildlife Service 2007, p. 37).

Issue 2—Several commenters believe that the reduced heterozygosity of the Yellowstone population increases their vulnerability to disease epidemics due to a likely decrease in allelic diversity at the major histocompatibility complex locus. They noted that because the Yellowstone DPS has been isolated for the last 100 years and has not been challenged with any epidemic diseases, disease-resistant genetic material may have decreased, thereby ensuring that if an epidemic does occur, it will be severe.

Response—We do not know that allelic diversity has declined at the major histocompatibility complex locus in the GYA grizzly population. Because overall allelic diversity has declined some over the 20th century (Miller and Waits 2003, p. 4337), it may have declined at the major histocompatibility complex locus too. We do not know that the GYA population has not been challenged by epidemic diseases in the past 100 years. We can say that epidemic diseases are not known to have caused high mortality in any grizzly or brown bear population, including the Kodiak Island, Alaska population, in which heterozygosity, and presumably allelic diversity, is much lower than in the GYA population. The Study Team monitors the health of GYA grizzlies by examining all bears captured each year (approximately 60–80 captures per year) and all known mortalities. If disease or an epidemic occurs, it will be detected promptly and responded to appropriately.

Issue 3—Some commenters noted that relatively modest decreases in heterozygosity values (the proportion in an individual of loci that have more than one allele) correspond to much larger decreases in allelic diversity (due to inbreeding) and that the proposed rule does not contain an adequate discussion of this effect or its conservation implications. In other words, they believe that a population could be experiencing declines in allelic diversity that would not be detected if the only measure of genetic diversity was heterozygosity, and that we should evaluate the biological and conservation implications of a reduction in allelic diversity, if this is occurring in the Yellowstone DPS.

Response—Although allelic diversity has declined in the GYA population over the 20th century, the decline was not as precipitous as previously anticipated (Miller and Waits 2003, p. 4338). As measured by Miller and Waits (2003, p. 4337), allelic richness decreased from approximately 5.89 alleles per locus at the beginning of the 20th century (1910s) to 5.50 at the end of the century (1990s). Considering all of the information available that

examines heterozygosity and allelic diversity of grizzly bears in the GYA, Miller and Waits (2003, p. 4338) conclude that ''the viability of the Yellowstone grizzly bear population is unlikely to be compromised by genetic factors in the near future * * *'' and that ''* * * one to two effective migrants per generation from the NCDE to the YE (Yellowstone ecosystem) is an appropriate level of gene flow.'' We considered these conclusions pertinent to the genetic management of the DPS and incorporated them into the Strategy (U.S. Fish and Wildlife Service 2007, p. 37).

Issue 4—One commenter noted that our statement in Appendix D of the Strategy that ''current levels of genetic diversity * * * are not resulting in deleterious effects'' is not supported by the literature and that Miller and Waits' (2003, p. 4335) study was not designed to answer this question. Another commenter noted that deleterious effects to the Yellowstone population as a result of genetic isolation have already been documented by Dr. Michael Gilpin in his guest commentary in the Bozeman Chronicle newspaper on January 23, 2006, and that the level of inbreeding in the Yellowstone grizzly bear population is analogous to mating with first cousins.

Response—Indicators of fitness in the Yellowstone population demonstrate that the current levels of genetic heterozygosity are adequate, as evidenced by measures such as litter size, little evidence of disease, high survivorship, an equal sex ratio, normal body size and physical characteristics, and an increasing population. These indicators of fitness will be monitored annually, in perpetuity. The assertion by Dr. Gilpin that grizzly bears in the GYA are experiencing inbreeding coefficients of 12.5 percent, equivalent to mating with their first cousins, is incorrect (Miller 2006). Dr. Gilpin did not cite a source for his reported inbreeding coefficient for GYA bears, and we are unaware of this figure being reported elsewhere. Miller (2006) estimated an inbreeding coefficient for the GYA population of approximately 6 percent over the last 10 generations, not 12.5 percent over a single generation, as implied by a scenario in which first cousins mate with each other. The very low rate of loss of heterozygosity over the 20th century, in combination with the introduction of 1 or 2 effective migrants per generation (naturally or through augmentation), will ensure long-term genetic viability, and the recovered status, of the Yellowstone grizzly bear DPS (Miller and Waits 2003, p. 4338).

Issue 5—A few commenters believed that we failed to consider the relationship between isolation and elevated extinction risk. Extinction of isolated populations can occur simply as a function of their isolation and habitat size or due to increases in the magnitude of population fluctuations resulting from environmental and demographic stochasticity. They believe that we should fully consider these sources of stochasticity on the extinction risk of the Yellowstone grizzly bear DPS.

Response—This comment refers to PVAs and questions whether the persistence of the Yellowstone grizzly bear population will be significantly impacted by the effects of environmental and demographic stochasticity due to its isolation. The Service has considered population viability in considerable depth (Boyce *et al.* 2001, p. 2). Boyce *et al.* (2001, p. 1) concluded that the available data ''provide optimistic projections of the likelihood of persistence for grizzly bears in the GYE; a 99.2% probability that the GYE grizzly bear population will persist for 100 years.''

Boyce *et al.* (2001, pp. 30–31) discuss the implications of several types of stochastic (random) events on the likelihood of persistence for the Yellowstone grizzly bear population. Catastrophes were believed merely to represent extreme environmental events that had a low probability of occurrence and were unpredictable. They believe that there are insufficient data on grizzly bear genetics to understand or model genetic stochasticity, such as inbreeding depression or genetic drift. Boyce *et al.* (2001, p. 30) believe that demographic stochasticity, such as chance events associated with births and deaths, only affects viability when populations are very small (e.g., 30 to 50 bears). Similarly, Harris *et al.* (2006, p. 50) found that demographic stochasticity had little effect on the growth rate estimates unless population size fell below 100 females.

Environmental stochasticity is generally thought to be more important than demographic stochasticity when calculating extinction risk (Lande 1988, p. 1457). In light of this, Boyce *et al.* (2001, pp. 31–32, 34) recommend that the best possible analysis of population viability for the Yellowstone grizzly bear population would be based on relationships between grizzly bear vital rates (survival and reproduction) and habitat factors (a habitat-based PVA). However, the range of possible outcomes of such a modeling exercise, based on compound uncertainties, provides little management value and minimal confidence about future viability. Instead, the Strategy will ensure monitoring of multiple indices and use an adaptive management system that allows rapid feedback about the success of management actions designed to address the maintenance of a viable population.

Because it is generally accepted that isolated populations are at greater risk of extinction over the long-term, we will continue efforts to reestablish natural connectivity between the GYA and other grizzly bear ecosystems. Although natural connectivity is the best possible scenario, isolation does not constitute a long-term threat to the Yellowstone grizzly bear population because of intensive monitoring and adaptive management strategies that will remain in effect post-delisting.

Issue 6—One commenter requested that we undertake an in-depth discussion of what inbreeding depression is and the three ways in which it is manifested: (1) The unmasking of recessive, lethal alleles; (2) unmasking of partially recessive, deleterious alleles; and (3) decreases in genetic diversity; and what conservation implications these have for the Yellowstone DPS.

Response—This issue is discussed in the Supplemental Information Appended to the Recovery Plan, its supporting literature, and the literature cited in this final rule. Both the Strategy and this final rule recognize that declines in genetic diversity due to inbreeding effects are expected in isolated populations (Ralls *et al.* 1986, p. 35; U.S. Fish and Wildlife Service 2007, p. 37). We agree that inbreeding depression has the potential to negatively affect the Yellowstone grizzly bear DPS if genetic diversity declines below current levels. For this reason, we have reviewed relevant literature about this topic (Ralls and Ballou 1983, pp. 147–179; Allendorf and Leary 1986, pp. 72–76; Ralls *et al.* 1986, pp. 35–37; Lande 1988, pp. 1455–1456, 1460; Roelke *et al.* 1993, pp. 344–348; Hunter 1996, pp. 88–90; Wang *et al.* 1999, pp. 168–176) and, upon the recommendation of Miller and Waits (2003, p. 4338), our partners will translocate grizzly bears from other populations into the GYA to maintain current levels of genetic diversity if natural movement of grizzly bears into the GYA from other areas is not documented by 2020.

Issue 7—We received numerous comments regarding the plan to augment the Yellowstone DPS with grizzly bears from the NCDE population to address genetic concerns should connectivity between these two

ecosystems not occur naturally by 2020. Some of these comments pertained to the feasibility of transplanting bears from the NCDE to Yellowstone. These commenters noted that, based on augmentation experiments in the Cabinet-Yaak Ecosystem, we may have to move eight bears to get two to stay and reproduce successfully (i.e., become effective migrants). Some commenters also questioned whether survival of augmented bears would be affected by interactions with other grizzly bears and/or a bear's willingness to stay in a new environment instead of one it was highly familiar with. Finally, some commenters suggested that high mortality in the NCDE may preclude this option, because moving bears from the NCDE to Yellowstone would count as a mortality in the NCDE ecosystem.

Response—The feasibility of translocating grizzly bears for genetic augmentation is not untested. Translocation has been successfully employed in the Cabinet-Yaak Ecosystem (Kasworm *et al.*, in press, p. 6). Kasworm *et al.* (in press, pp. 6, 8) were only able to document successful reproduction by one of the three bears that remained in the area after being translocated; confirmation of successful reproduction events for the other two bears was not possible because they lacked reference genetic material. Any bear that is translocated from the NCDE into the GYA will be radio-collared and monitored to determine whether it remains in the area and survives. As in the Cabinet-Yaak Ecosystem, genetic analysis will be used in subsequent years to confirm whether a transplanted bear has successfully reproduced in the GYA. The exact number of translocated migrants into the GYA will be determined through these monitoring activities. Any bear translocated from the NCDE to the GYA would be counted as an NCDE mortality. Please see our response to Issue 12 in this section below for more discussion about the adequacy of the NCDE to serve as a source population. Augmentation in the GYA may not be necessary if natural immigration occurs before 2020.

Issue 8—One commenter questioned our use of the ''one-migrant-per-generation rule'' and believed that our definition of ''effective migrant'' was incorrect. Another commenter believed we failed to consider the effects of other evolutionary processes (mutation, directional, or stabilizing selection) on the one-migrant-per-generation rule. Both recommended more research to answer whether the one-migrant-per-generation rule was appropriate and adequate to address genetic concerns for the Yellowstone DPS.

Response—Our recommendation to augment the population with one migrant per generation is based on Miller and Waits (2003, p. 4338), who conclude that one to two effective migrants per generation is appropriate to maintain current levels of genetic diversity. ''The viability of the Yellowstone grizzly population is unlikely to be compromised by genetic factors in the near future as we hypothesized based on modern samples. Rather, the genetic consequences of inbreeding and isolation are likely to transpire over longer time periods (decades or centuries)'' (Miller and Waits 2003, p. 4338). Regarding our definition of an ''effective migrant'' as one which remains in the area, survives, and successfully reproduces, we recognize that a more complete definition involves measures of relatedness between the source and recipient population, as well as other genetic measures (Wang 2004, p. 335). If translocation is required in the future, our partners will consult with geneticists and use the best available science to determine how many bears must be translocated from the source population to equal one effective migrant to the Yellowstone grizzly bear DPS. Regarding the effects of other selective forces on the one-migrant-per-generation rule, Wang (2004, p. 341) concluded that, ''In general, the one-migrant-per-generation rule is robust to the systematic forces of selection and mutation.''

Issue 9—Most commenters preferred the idea of natural connectivity over artificial augmentation and noted that connectivity is a vital component of recovery and should be restored before delisting can occur. Numerous commenters wanted population connectivity re-established with the NCDE and Bitterroot ecosystem and the Bitterroot population reintroduction implemented. Conversely, some commenters supported the augmentation plan because they viewed it as effectively nullifying the need to establish natural population connectivity.

Response—We prefer natural reconnection as well and are actively involved in efforts to maintain and expand the opportunities for grizzly bears to move into and out of the Yellowstone ecosystem via the linkage zone program. However, we cannot control bear movement and as discussed in the final rule (see Behavior section above), they have limited dispersal mechanisms. By working to maintain current movement opportunities while implementing conservation actions to recover populations in other grizzly bear ecosystems, we anticipate that bears will naturally reestablish themselves between recovery ecosystems and achieve connectivity. We agree that the establishment of a grizzly bear population in the Bitterroot Recovery Zone would contribute to recovery of the grizzly bear in the Lower 48 States (Boyce 2000, p. 6–243). However, the lack of natural connectivity will not threaten the Yellowstone DPS because of the genetic management plan described in the Strategy (U.S. Fish and Wildlife Service 2007, p. 37).

Issue 10—Several commenters objected to relocating bears from the NCDE to the GYA to address genetic concerns because it would violate the Act's vision of ''self-sustaining populations,'' ''recovery of populations in the wild,'' and ''natural recovery.'' They cited the need for augmentation as evidence that the Yellowstone DPS is not truly recovered.

Response—The Act does not require a ''hands off'' approach as a prerequisite for delisting. In fact, the presence of adequate regulatory mechanisms to ensure that appropriate management and monitoring activities continue is required before delisting can occur. For the Yellowstone grizzly bear DPS to remain unthreatened in all or a significant portion of its range in the foreseeable future, active management is necessary to limit mortality, provide adequate habitat, respond to grizzly bear/human conflicts, and maintain genetic diversity either through natural connectivity or through translocation. In this way, the Yellowstone grizzly bear DPS is a ''conservation-reliant species'' (Scott *et al.* 2005, p. 383). Augmentation is proposed as a precautionary measure based on the recommendations of Miller and Waits (2003, p. 4338) to maintain current levels of genetic diversity, should grizzly bear movement into the GYA not occur over the next 20 years.

Issue 11—One commenter suggested that we analyze the benefits and disadvantages of genetic augmentation before concluding that benefits outweigh potential negatives.

Response—The recommendation to either allow bears to move into the Yellowstone ecosystem or to use augmentation in lieu of natural movement was made by genetics experts in Miller and Waits (2003, p. 4338). They detail the biological and genetic rationale for this recommendation, and we agree with their analysis and conclusions. Should future genetic data challenge the conclusions of Miller and Waits (2003, p. 4338), the Study Team and the Coordinating Committee will rely upon the best available scientific

information to guide management of the Yellowstone DPS.

Issue 12—A few commenters noted that our plan to augment the Yellowstone DPS with one to two bears per generation was flawed because it violated a key assumption that the source population is infinite in numbers. They believe that the proposed rule also overlooked the possibility that the Yellowstone grizzly bear DPS could go extinct as a result of the NCDE going extinct; and furthermore, we failed to consider the genetic issues affecting the NCDE, which may itself be an isolated population from Canada, due to ongoing and increasing development just north of the border.

Response—We make no assumption that the NCDE or any other population is infinite in numbers. The NCDE is not genetically isolated from areas in Canada, and male grizzly bear movement across Highway 3 has been documented (Proctor 2003, p. 24). The NCDE population has higher allelic diversity and heterozygosity values than the Yellowstone grizzly bear DPS (Paetkau *et al.* 1998, p. 421) and its relative proximity and short time of separation from the Yellowstone grizzly bear DPS make it an ideal genetic source population. The NCDE population is larger than previously thought, with more than 500 individuals (Kendall 2006), and the portion of the population that is located in the North Fork of the Flathead Valley just north of the United States/Canadian border is the highest density grizzly bear population anywhere in North America outside of Alaska (LeFranc *et al.* 1987, pp. 52–53; McLellan 1994, p. 21; Mowat *et al.* 2005, p. 41). We will continue to cooperate with Canadian wildlife and land management agencies to promote grizzly bear conservation and to mitigate projects in Canada that have the potential to negatively impact U.S. grizzly bear populations.

The placement of bears into the Yellowstone by augmentation would be a precautionary approach to assure that genetic issues are not a factor in the survival of the Yellowstone population. As stated by Miller and Waits (2003, p. 4338)—''The viability of the Yellowstone grizzly population is unlikely to be compromised by genetic factors in the near future.'' Although we view the NCDE as the most likely source population, many other appropriate grizzly bear populations in Canada could serve as source populations, should the NCDE population not be adequate for some unforeseen reason. We have previously cooperated with international partners to translocate bears from the North Fork of the Flathead River in Canada to the Cabinet-Yaak ecosystem (Kasworm *et al.* 1998, p. 148).

S. Comments About The States' Management Approach

Issue 1—Numerous commenters expressed concern over the management approach that will be taken by the States of Montana, Idaho, and Wyoming. In general, commenters questioned the desire of the States to manage the population in the best interest of grizzly bears, and cited the historical and current anti-predator attitudes frequently displayed by residents and State wildlife agencies and commissions, as evidence that State management of the Yellowstone DPS could result in severe decline.

Response—The States are committed to manage grizzlies in accordance with the Strategy and its appended State grizzly bear management plans. By signing the Strategy, all management agencies have agreed to adhere to the sustainable mortality limits.

Issue 2—Some commenters noted that the head of WGFD has said that Wyoming intends to manage the population down to the minimum allowed by the Strategy (500 bears) and other WGFD Commissioners have said they plan to push for an increase in allowable mortality from the recently revised 9 percent to 12 percent. They note that four Wyoming counties, which encompass most grizzly bear habitat in Wyoming, have outlawed grizzlies within their borders and asserted that their State-authorized land use planning legislation trumps the bear management responsibilities of WGFD.

Response—In response to concerns about the ordinances, regulations, or resolutions passed by county governments in Wyoming regarding the presence or distribution of grizzly bears in these counties, we requested a letter from the Wyoming Attorney General's office clarifying the authority of counties in Wyoming to legislate in the area of grizzly bear management. The Wyoming Attorney General's office's response, dated August 8, 2006, states on p. 2, '' '* * * as an arm of the State, the county has only those powers expressly granted by the constitution or statutory law or reasonably implied from the powers granted.' *Laramie Co. Comm'rs* v. *Dunnegan,* 884 P.2d 35, 40 (Wyo. 1994). Neither the Wyoming Constitution nor the legislature has provided the counties in Wyoming with any expressed or implied authority over management of grizzly bears. Therefore, counties lack the authority to enact any ordinances(s), regulation(s), or resolution(s) which would affect the (Wyoming Game and Fish) Commission's Grizzly Bear Plan on mortality or distribution of grizzly bears in Wyoming'' (Martin 2006).

This letter clearly indicates that Wyoming county governments have no authority to affect grizzly bear management in county ordinances and have no legal standing or impact on commitments made by the Wyoming Game and Fish Commission.

Wyoming has committed to the revised (9 percent) thresholds as per their signature on the Wyoming Game and Fish Commission approved Strategy. Changes in mortality limits cannot be completed unilaterally by Wyoming, or any one management agency, but instead must be based on the best available science, and documented by a Study Team lead process that is opened to public comment and approved through a Coordinating Committee majority vote (U.S. Fish and Wildlife Service 2007, p. 63).

T. Lack of a Secure, Long-Term Funding Source

Issue 1—A number of comments received maintained that, before delisting can occur, a long-term secure funding source must be obtained. They stated that this funding issue must be addressed to ensure that the extensive monitoring and management plans, as well as conflict prevention through I & E programs described in the Strategy, are carried out. Some commenters suggested that long-term funding security could be achieved by creating a trust fund as the Yellowstone Ecosystem Subcommittee has discussed at several meetings. Other commenters suggested that inadequate funding in any given year be a trigger for a Biology and Monitoring Review and potential relisting.

Response—It is true that there is no guarantee of long-term funding for grizzly bear management by any of the States or the Federal Government. However, the funding issue remains whether the Yellowstone grizzly bear DPS is delisted or not. It is not possible to predict future governmental appropriations, nor can we commit or require Federal funds beyond those appropriated (31 U.S.C. 1341(a)(1)(A)), but by signing the Strategy, responsible agencies demonstrate that they are committed to implementing the features within their discretion and authority, and to pursuing adequate funding. The Strategy provides adequate assurance that the participating agencies will implement the agreement, which is sufficient to meet the reasonableness

required for regulatory mechanisms. The creation of a trust fund has been explored by the Interagency Grizzly Bear Committee, but would require the acquisition of an estimated $40 million to endow the fund.

In response to these concerns, we have made inadequate funding in any given year a trigger for a Biology and Monitoring Review. The purpose of such a Review would be to determine whether the fiscal short-coming is a threat to the implementation of the Strategy to such an extent that it also threatened the long-term viability of the Yellowstone DPS.

U. Triggers for Relisting and Monitoring Plan

Issue 1—Many commenters were uncomfortable with the process that could lead to relisting, fearing that the process would be slow, bureaucratic, or subject to political influence. Many recommended additional, clearly defined thresholds leading to immediate relisting, rather than merely to the first step in a long process that may lead to relisting (i.e., a Biology and Monitoring Review). Some recommended that we develop an emergency response process specifically designed for the Yellowstone population that gives us authority to bypass the traditional Act listing methods.

Response—The listing procedures described in the Act allow prompt emergency listings if necessary. For instance, the desert tortoise was petitioned in May 1989 and listed on August 7, 1989, in an emergency listing rule (54 FR 32326, August 4, 1989). An emergency relisting can be pursued independently by the Service or in response to a recommendation by the Study Team or Coordinating Committee. This process is adequate to respond to a precipitous decline in the Yellowstone grizzly bear DPS or a significant threat to its habitat in a timely manner and precludes the need for a specific trigger that would begin an emergency response process.

Issue 2—Several commenters believe that because a decline in any of the four major foods represents a decrease in the GYA's carrying capacity, we should include threshold values for these food sources that either trigger a response action or plans to protect additional habitat.

Response—Aside from the well-documented association between whitebark pine cone crop size and subsequent management actions on grizzly bears (Mattson *et al.* 1992, p. 432), we have not been able to detect any statistically significant relationships between abundance of the other three major foods and grizzly bear vital rates. Those foods have either fluctuated (e.g., ungulates, army cutworm moths), or declined (e.g., cutthroat trout), during the period when the Yellowstone grizzly bear population was increasing at a rate between 4 and 7 percent annually. Due to this natural annual variation in abundance and distribution, there is no known way to calculate minimum threshold values for grizzly bear foods. Instead, managers will use an adaptive management approach that addresses poor food years with responsive management actions, such as limiting grizzly bear mortality, increasing Information and Education efforts, and considering relisting, if appropriate.

Issue 3—Several commenters believe we failed to address the issue of lag time between habitat degradation and loss, and changes in vital rates. They believe that the proposed rule relies almost exclusively on monitoring population parameters rather than habitat parameters to detect a future threat, and because of this time lag, we should include habitat thresholds that act as triggers for a Biology and Monitoring Review.

Response—The Strategy commits the management agencies to intensive monitoring of all grizzly bear vital rates, and their relationship to changes in major foods and the levels and types of human activities in their habitat. This monitoring does not solely rely on vital rate monitoring to indirectly infer changes in habitat, but will produce annual results on any changes in habitat values, key food production, and possible disease in key foods. Please see our response to Issue 2 in this subheading, above, for more information.

Issue 4—Many commenters criticized our use of unduplicated counts of females with cubs-of-the-year to estimate population size. They suggested we should abandon this measure for a more reliable and accurate method because of the biases such as observer variability and differences in detection in different habitat types.

Response—The Study Team reviewed the feasibility of several different population estimation methods (Interagency Grizzly Bear Study Team 2005, pp. 12–13, 17–31). Because of the high cost of DNA-based population surveys ($3.5 million to $5 million) and the lag between sampling and a resulting population estimate (3 years), annual use of DNA-based population surveys is not feasible or appropriate for our objectives of establishing annual population estimates and sustainable mortality limits. The Study Team rejected the idea of using capture-mark-recapture techniques with the radio-collared sample of grizzly bears due to unreasonably large confidence intervals (Interagency Grizzly Bear Study Team 2005, p. 12).

Because of the strict rule set used to collect females with cubs-of-the-year data (Knight *et al.* 1995, p. 246), it is inherently conservative and tends to underestimate the number of females with cubs-of-the-year. The Study Team chose to use the Chao2 estimator to correct many of the biases associated with females with cubs-of-the-year data concerning sighting heterogeneity (Keating *et al.* 2002, pp. 170–172; Interagency Grizzly Bear Study Team 2005, p. 20). The Chao2 estimator and the model averaging approach described in the Supplement to the Reassessing Methods Document (Interagency Grizzly Bear Study Team 2006, pp. 2–10) reflect the best available scientific method for calculating an annual population index and establishing biologically sustainable annual mortality limits for the Yellowstone grizzly bear population.

Issue 5—Some commenters stated that a DNA-based survey would be a better monitoring method and that it would provide much more information about the population. One commenter noted that the proposed monitoring of genetic diversity does not specify the point at which population augmentation would be considered necessary. Another believed that the proposed monitoring of genetic diversity would not be sufficient to detect the expected slight decline in heterozygosity, due to inadequate sample size and inadequate statistical power.

Response—We agree that DNA-based surveys may offer more information about the population than population size alone, but because the most immediate factors likely to impact the Yellowstone grizzly bear population will come from habitat degradation and loss, and human-caused mortality, we believe addressing these two sources of potential decline is a more appropriate and relevant approach to ongoing conservation efforts in the GYA. The Strategy clearly establishes that augmentation of the Yellowstone population with grizzly bears from other populations will be pursued if no movement is detected between these two populations by 2020 (U.S. Fish and Wildlife Service 2007, p. 37). Based on the best available science, we have concluded that any threats to genetic diversity will be adequately addressed through this approach (Miller and Waits 2003, p. 4338). There is no defined threshold for acceptable heterozygosity values because there is no consensus as to what value would constitute a

biologically significant threat in any specific bear population. We do not propose to monitor changes in genetic diversity, as the statistical power would likely be insufficient to detect changes over time. To monitor genetic isolation, we will establish a repository for all samples from the Yellowstone population to document any bears moving from the NCDE into the GYA. Such movement will be detected by using an ''assignment test,'' which identifies the area from which individuals are most likely to have originated based on their unique genetic signature (Paetkau *et al.* 1995, p. 350; Waser and Strobeck 1998, pp. 43–44; Paetkau *et al.* 2004, pp. 56–57; Proctor *et al.* 2005, pp. 2410–2415).

Issue 6—A few commenters wanted clearly formalized monitoring programs established outside the PCA, and some wanted monitoring programs inside and outside the PCA to determine trends in use of roads and trails, OHV use, and private land development.

Response—Data on private land development are available from the counties. The Park Service and Forest Service monitor traffic volumes on some roads, and the Park Service controls, through its permit system, overnight use of its backcountry sites. We do not know what predictive value those measures would have for grizzly bear management.

Issue 7—One commenter noted that the planned extent of trapping and radio-collaring of bears was unethical, and that this intensive and invasive monitoring approach should be abandoned in favor of keeping the bears listed as threatened.

Response—Since 1982, there has not been a single capture mortality associated with research trapping in the Yellowstone area spanning more than 468 grizzly bear captures (Servheen *et al.* 2004, p. 21). Because of rigorous protocols dictating proper bear capture, handling, and drugging techniques used today, this type of scientific overutilization is not a significant factor impacting the Yellowstone DPS. The Study Team, bear biologists, and researchers will continue implementing these protocols after delisting.

The Act requires us to delist species that no longer meet the definition of threatened or endangered. As discussed in the final rule, the Yellowstone grizzly bear DPS does not meet either of these definitions. We cannot leave the Yellowstone grizzly bear DPS listed in perpetuity, or neglect to gather data on its status. We are required to use the best available science to recover grizzly bears in the Lower 48 States and monitor their status post-delisting. With existing funding and technology, radio-telemetry is the best way to obtain that information. When equivalent or more effective non-invasive techniques become economically available, they will be employed.

Issue 8—A few commenters suggested that Resource Selection Functions be used to monitor habitat rather than the Cumulative Effects Model. Supporters of Resource Selection Functions said they are more grounded in an empirical approach and, therefore, are superior to the Cumulative Effects Model. Some commenters noted that if we are going to rely on the Cumulative Effects Model so heavily, it should be validated and a protocol developed for training additional personnel on how it works.

Response—The use of Resource Selection Functions offers many advantages over the use of the existing Cumulative Effects Model. However, critics point out that estimated Resource Selection Functions are not always proportional to the true probability of use (Keating and Cherry 2004, p. 788). The Cumulative Effects Model represents the best available scientific information in its ability to provide managers with a comparative index of how much habitat values have changed through time. This remains the case even though the validity of all coefficients has not been confirmed. This method will remain in use until the research community arrives at a consensus or a better method to replace the Cumulative Effects Model is developed.

The Cumulative Effects Model is one of many tools used to monitor habitat in the Yellowstone ecosystem. However, it is not the only tool nor is it the dominant tool. The Forest Service is contracting with a computer programmer to make the Cumulative Effects Model a more user friendly, Windows compatible format. The Study Team is committed to using the best scientific methods and models available to them. Use of such models will change as the science changes.

Issue 9—Some commenters recommended that we monitor litter size and cub survival of radio-collared females as indicators of habitat quality and carrying capacity.

Response—The monitoring program does annually monitor litter size and cub survival. These data are compared to indicators of habitat quality such as annual production and availability of major foods.

Issue 10—Some commenters recommended that we monitor human values and attitudes toward grizzly bears in the GYA. This information could contribute substantially to our understanding of human-caused mortality in the GYA and the human dimensions of grizzly bear management.

Response—Some social science research has been conducted in the GYA on attitudes toward grizzly bears (Kellert 1994, pp. 44–45; Responsive Management 2001, pp. 5–14), but we are not sure of its utility in predicting or reducing human-caused mortalities. Our current methods to reduce human-caused grizzly bear mortality by preventing conflicts and addressing conflicts in a systematic, fair, and prompt manner were adequate to accommodate an increasing Yellowstone grizzly bear population during the last two decades. These efforts to address grizzly bear conflicts will continue to comprise the vast majority of fiscal expenditures post delisting (U.S. Fish and Wildlife Service 2007, p. 154).

V. Using the Best Available Science

Issue 1—Many commenters questioned the quality or interpretation of the data used to support the proposed rule. Some offered alternative explanations for the increases in the population estimates that would not require an actual increase in bear numbers while others were satisfied that the best available science and data had been used in the development of the proposed rule.

Response—The peer-reviewed scientific journal articles used in the final rule represent the best available science. The science available on the Yellowstone grizzly bears and their habitat is the best information available on any bear population in the world. None of the alternative explanations offered for the increasing population size were compelling.

Issue 2—Some commenters objected to the use of data that they believed were out-of-date, particularly regarding the spread of diseases and parasites of whitebark pine, and advocated the use of readily available and more recently collected data sets.

Response—The science and data in the proposed rule were the most recent information available when the rule was written and submitted for review and publication in the **Federal Register**. The final rule incorporates newer data on blister rust and mountain pine beetle (see Factor E below) available since the proposed rule was written.

Issue 3—Some commenters specifically critiqued sources that we used in the proposed rule. One described problems associated with the Monograph cited in the proposed rule as Schwartz *et al.* (2005) [note: the Schwartz *et al.* 2005 citation has been

updated in this final rule as Schwartz *et al.* 2006]. Major commenter concerns included—(1) the study sample is not representative of the population, (2) habitat-based demographic analysis is needed, and (3) heterogeneous mortality rates violate assumptions described in the Monograph. Another comment received was about our assertion that nearly 90 percent of females with cubs-of-the-year occur inside the PCA. The commenter noted that because Schwartz *et al.*'s (2002, pp. 204–205; 2006b, pp. 63–64) survey methods focused primarily on sighting bears within the PCA, these publications do not provide reliable information on what portion of grizzly bears spend any time outside the PCA.

Response—The Monograph fully discusses the assumptions that must be satisfied in order to draw the conclusions stated in the document. These assumptions and conclusions in the Monograph went through extensive independent peer review prior to being accepted for publication. Schwartz *et al.* (2006d, pp. 9–12) clearly describe their experimental design to obtain a representative sample. For our discussion about the need for, and the caveats associated with, habitat-based demographic analysis, please see our response to Issue 2 under subheading B above. Regarding the assertion that heterogeneous mortality rates violate assumptions made in the Monograph, we recognize that mortality rates are heterogeneous. The fact that mortality rates are different inside Yellowstone National Park, outside of Yellowstone National Park but inside the PCA, and outside of the PCA was one of the key findings of the Monograph (Haroldson *et al.* 2006b, p. 40). This comment is suggesting that, because mortality rates are different in the three different areas (*i.e.*, heterogeneous), then we must know the movement rates of bears among those areas. Heterogeneous mortality rates do not violate assumptions made in the Monograph because the study sample is representative of bears living in all three areas of differing mortality rates. We consider the Monograph to be the best available scientific data about the demographics of the Yellowstone grizzly bear DPS.

Regarding the sampling method used by Schwartz *et al.* (2002, pp. 204–205; 2006b, pp. 63–64), the monitoring system for females with cubs includes all areas where bears are known to occur, both inside and outside the PCA. Thirty-seven search areas are flown each year, 12 of which are completely or partially outside the PCA. For an example of the effort in observation flights alone, 74 observation flights were flown in 2005, totaling more than 172 hours of flight time and covering all 37 observation areas. There also were more than 411 hours of telemetry flights in 2005. These telemetry flights also contribute to the total sightings of females with cubs. The details of capture efforts both inside and outside the PCA, along with details on these flights and the efforts to sight females with cubs both inside and outside the PCA, are reported in the Study Team's Annual Reports (Haroldson *et al.* 2006a, pp. 4–10; Haroldson 2006b, pp. 11–16; West 2006a, pp. 18–22; West 2006b, pp. 23–24). The Study Team, the Coordinating Committee, and the responsible agencies will continue to use the best available science to update protocols and direct management responses.

Issue 4—A few commenters suggested that we incorporate the findings of Mattson *et al.* (2002) into the discussion about threats to major foods because it ''provides a solid empirical basis for understanding the extent to which grizzly bears will be able to switch to alternative foods when whitebark pine and cutthroat trout decline.''

Response—Mattson *et al.* (2002, p. 32) cautioned that ''it is unclear to what extent bears can compensate by reverting to extant alternate foods'' if any currently important food were to diminish in abundance. We agree that the extent of the bears' potential compensation is unknown. However, the management response to decreases in carrying capacity established by the Strategy and State management plans includes limiting human-caused mortality, enhancing Information and Education efforts in poor food years, actively restoring whitebark pine communities, eradicating lake trout, minimizing disturbance at known army cutworm moth sites, and monitoring female reproductive parameters.

Issue 5—Some commenters disagreed with the levels of secure habitat and road density standards in the Strategy and noted that these were not based on the best available science. They thought that we accepted road densities present in 1998 instead of defining acceptable road densities based on habitat selection by female grizzly bears. Similarly, some commenters thought that our definition of secure habitat did not include any biological requirements (such as food, denning, and breeding grounds) and ignored the minimum core sizes of approximately 1,012 ha (2,500 ac) preferred by female grizzly bears in other ecosystems as documented by Mace *et al.* (1998) and Kasworm (1997).

Response—The secure habitat levels and road densities in the Yellowstone ecosystem are more secure than the required road density and secure habitat in either the NCDE or the Cabinet/Yaak and Selkirk ecosystems. The best measure of the direct effect of habitat on a population is the trajectory of the population. Under the 1998 levels of road density and secure habitat, the Yellowstone grizzly population has been increasing at between 4 and 7 percent per year. From 1986 to 2002, there was a net reduction of more than 1,000 miles of road on the 6 Yellowstone Ecosystem National Forests (inside and outside the PCA) (USDA Forest Service 2006a, p. 200). Inside the PCA on the National Forests, roads were reduced an average of 42.7 miles per year from 1986 to 2002 (USDA Forest Service 2006a, p. 200). Outside the PCA, an average of 40.5 miles of road were decommissioned for the same time period (USDA Forest Service 2006a, p. 200). The 1998 road density levels are lower than previous road densities and are at a level that has allowed the population to increase.

Regarding secure habitat, the average percentage of secure habitat in each of the 40 subunits inside the PCA is 85.6 percent, and 20 of these 40 subunits contain more than 90 percent secure habitat (USDA Forest Service 2006a, pp. 368–369). These levels of secure habitat are higher than the percentage of secure habitat in the home ranges of adult female grizzly bears reported by Mace *et al.* (1996, p. 1400) (Note that the commenter was incorrect in the date of this citation)), where 56 percent of the composite adult female home range was inside secure habitat. We could not find a publication by Kasworm in 1997 that addressed the issue of road densities and female home range size, but believe the commenter was referring to Wakkinen and Kasworm (1997, p. 24), who found that 44 to 68 percent of adult female home range was in secure habitat. Again, the levels of secure habitat in each subunit within the PCA (approximately the size of an annual female's home range) are greater than what was observed in these studies.

The large secure areas of these subunits do include important feeding and denning areas. The secure or core area size was not limited to areas greater than 1,012 ha (2,500 ac) because that would eliminate protection for all secure habitat areas less than this size. We believe that all secure habitats are important and that secure pockets are very important for grizzly bears, particularly in peripheral habitats.

Issue 6—Some commenters noted that there is no social or scientific literature

to support our contention that delisting will build public support and tolerance for grizzly bear conservation.

Response—We agree that there is no scientific literature documenting that delisting would or could build public support and tolerance for grizzly bears. This result is inferred by professional wildlife biologists familiar with local community attitudes in the Yellowstone ecosystem. We have eliminated this rationale from the final rule.

W. Miscellaneous

Issue 1—A few commenters suggested that we could improve the Coordinating Committee structure by including an opportunity for public involvement on proposed actions and including a conservation organization representative.

Response—The Coordinating Committee process is open to the public, and public comment and involvement at meetings is allowed and encouraged. Although a conservation organization representative is not formally a member of the Coordinating Committee, all conservation organization representatives will continue to be able to comment and be involved in Coordinating Committee meetings.

Issue 2—Numerous commenters suggested that we take a more conservative or precautionary management approach. Some cited Schwartz *et al.* (2006e, p. 62) as supporting this idea, especially in relation to long-term, irreversible habitat alterations such as private land development.

Response—The Reassessing Methods Document and its Supplement (Interagency Grizzly Bear Study Team 2005, pp. 6, 20, 35; Interagency Grizzly Bear Study Team 2006, p. 15–16) advocate a precautionary management approach by establishing biologically sustainable mortality limits to ensure that the population trajectory of the Yellowstone grizzly bear DPS is stable to increasing. The adaptive management system in the Strategy incorporates the results from intensive monitoring of population vital rates, habitat standards, and major foods into management decisions.

Issue 3—Many comments received did not pertain directly to this decision or were outside of our scope and authority. These included comments opposing all livestock grazing on public lands, opposing the sale of public lands proposed in the Fiscal Year 2007 President's budget, favoring the need to switch to alternative energy sources, and opposing or supporting Act reform. Also included was a comment proposing the transfer of public lands in the PCA from the USDA Forest Service and BLM to the National Park Service. A large number of commenters expressed some degree of mistrust about the motivations behind delisting and accused us of catering to the oil and gas industry, timber industry, developers, livestock owners, and hunting interests. Numerous commenters also expressed value-based reasons as to why they opposed delisting, such as animal rights, spiritual importance, the grizzly bear as a national treasure and symbol of wilderness, and that humans should behave as caretakers and stewards of the grizzly bear, not as pillagers of its habitat.

Response—Our decision to delist the Yellowstone DPS is based solely on our assessment of the best scientific and commercial data available, which indicate that the population is neither threatened nor endangered. Otherwise, these comments are either not relevant to the management decision or are outside the scope and authority of the final rule.

Summary of Peer Review Comments

In accordance with the Service's 1994 Peer Review policy (59 FR 34270, July 1, 1994) and the peer review requirements of the Office of Management and Budget's (OMB) Final Information Quality Bulletin for Peer Review (OMB 2004), the Service selected and solicited peer review of the proposed rule (70 FR 69854, November 17, 2005) from nine independent scientific experts. Eight of the nine reviewers accepted the opportunity to review the proposed rule and answered questions pertaining to the logic of our assumptions, arguments, and conclusions. These reviewers were experienced bear biologists and researchers who do not work for the Service, although two of the reviewers are employed by the Department of the Interior, U.S. Geological Survey. They were chosen based on their direct research experience with bears and their experience with the conservation and management of bears. The names and affiliations of the reviewers are—(1) Dr. Joseph D. Clark, Research Ecologist, U.S. Geological Survey, Southern Appalachian Field Branch; (2) Dr. Piero Genovesi, Italian National Wildlife Institute, Italy; (3) Dr. Steven Herrero, Professor Emeritus of Environmental Science, University of Calgary, Canada; (4) Dr. Djuro Huber, Biology Department, University of Zagreb, Croatia; (5) Dr. Bruce McLellan, Wildlife Research Ecologist, British Columbia Ministry of Forests Research Branch, Canada; (6) Dr. Gordon Stenhouse, Alberta Sustainable Resource Development and Foothills Model Forest Grizzly Bear Research Program, Canada; (7) Dr. Jon Swenson, Department of Ecology and Natural Resource Management, Norwegian University of Life Sciences, Norway; and (8) Dr. Frank T. van Manen, Research Ecologist, U.S. Geological Survey, Southern Appalachian Field Branch.

Each reviewer was paid $500 (U.S.) for their analysis (with the exception of those who also work for the U.S. Government, who were not paid for their services). The purpose of seeking independent peer review is to ensure that the best biological and commercial data are being used in the decision-making process, as well as to ensure that reviews by recognized experts are incorporated into the review process of the rulemakings. Peer reviewers were asked to consider, but not limit their comments, to the following questions and provide any other relevant comments, criticisms, or ideas—(1) Does the proposed rule provide adequate review and analysis of the factors relating to the persistence of the grizzly bear population in the GYA (demographics, habitat, adequate regulatory mechanisms, disease and predation, and genetics)?; (2) Is our establishment of this population as a DPS logical and adequate? Specifically, are our arguments pertaining to the discreteness and significance of the population sufficient according to the DPS policy, as described in the rule?; (3) Are our assumptions and definition of suitable habitat logical and adequate?; (4) Are the conclusions we reach logical and supported by the evidence we provide?; (5) Are our conclusions relating to food resources logical and adequate?; (6) Is the post-delisting monitoring program for habitat and population criteria logical and adequate to ensure survival of this population of grizzly bears in the foreseeable future?; and (7) Did we include all the necessary and pertinent literature to support our assumptions/arguments/conclusions?

Peer reviewers provided individual, written responses during the public comment period. Copies of individual peer review responses are available upon request (see **ADDRESSES** section above). The issues raised by the peer reviewers are summarized and responded to below. We have grouped similar comments together under major headings that correspond to the questions we asked peer reviewers and summarized concerns into categories called ''Issues,'' which are followed by our ''Responses.'' Not all peer reviewers commented on all questions. The

comments we received from peer reviewers generally reflected their areas of expertise, so when we discuss specific issues below, we are only summarizing those comments we received. The views discussed do not necessarily reflect all of the peer reviewers' opinions, just the opinions of the reviewers who responded on that particular issue.

Several reviewers also commented on the Reassessing Methods Document. A summary of those issues brought up by the reviewers, as well as responses to their concerns, were incorporated into the final Reassessing Methods Document as an appendix.

A. Does the proposed rule provide adequate review and analysis of the factors relating to the persistence of the grizzly bear population in the GYA?

Issue 1—In general, the peer reviewers believed the Service did an adequate job of discussing the relevant factors related to the persistence of the Yellowstone grizzly bear DPS. One reviewer noted that the Yellowstone DPS does not meet either the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (the first stage toward consideration for protection under the Canadian Species at Risk Act) or the World Conservation Union (IUCN) standards for a non-threatened species. However, they further noted that because the threats to habitat are well understood and manageable (at least in the short-term) and the population has been expanding in size and distribution, delisting may be appropriate so long as the laws, plans, and strategies that are identified in the proposed rule do not get diluted after delisting.

Response—While we view the IUCN and COSEWIC standards as informative in our decision-making process, the Act employs different standards for listing consideration, which are considered below. On the whole, we agree that the laws, plans, and strategies will provide for robust habitat protection measures; therefore, allowing the population to continue to expand and thrive. The Strategy will guide post-delisting management of the Yellowstone grizzly bear DPS. The plans described in the Strategy can change after delisting only if new science becomes available and through agreement within the Coordinating Committee (U.S. Fish and Wildlife Service 2007, p. 63). Any future changes to the management documents for the Yellowstone grizzly bear population will be modified in an adaptive management framework as a result of accumulated knowledge about grizzly bear management.

Issue 2—The reviewers who commented on disease and predation agreed that disease is not an issue for grizzly bear populations. Regarding human-caused predation (i.e., mortality), some reviewers recommended that the Service explore the potential impacts of a hunting season that targeted adult males. It is possible that decreased cub survival through sexually selected infanticide may affect population trajectory. One reviewer also suggested that the final rule be more clear that although the impact of hunting to the total population is negligible, some local populations of bears may be reduced. One reviewer also recommended clarification about whether the penalty for poaching a grizzly bear will be the same as before delisting.

Response—Sexually selected infanticide is the practice by which a territory vacated by an adult male is filled by a newly arrived subadult male, which then kills any cubs in the territory (Swenson *et al.* 1997b, p. 450). That behavior can reduce the population growth rate through cub mortality (Swenson *et al.* 1997b, p. 450). It has been documented in two European brown bear populations (Swenson *et al.* 2001, pp 75–77), and instances of infanticide by North American grizzly bears of both sexes also have been documented (McLellan 1994, pp.15–16). However, Miller *et al.* (2003, p. 144) and McLellan (2005, pp. 153–154) could not find evidence of population level effects of sexually selected infanticide in North American grizzly populations. If sport hunting preferentially removes adult male bears, and if sexually selected infanticide is common, sport hunting might result in some reduction in cub survival in localized areas. However, this would likely have little impact on overall population growth rate because hunting mortality on males would be limited in numbers and extent.

The States have control over when and where a grizzly bear permit holder may hunt, so the targeting of bears in specific areas, or even specific individual bears, is possible. Sport hunting could be used in that way as a compensatory mortality source, by killing bears that would otherwise have to be removed by management action. However, hunting will be allowed only as long as the overall mortality limits are not exceeded.

Each of the three States will establish penalties for poaching grizzly bears in their jurisdictions, and those penalties may not be the same as before delisting. Judges have discretion to impose fines under State law. Predicting the average poaching fine is not possible, due to the variety of circumstances surrounding a poaching incident, numerous State laws that may apply, and various punishments available under those State laws. We have been assured by State wildlife agencies that poaching incidents will continue to be investigated and prosecuted under State law.

Issue 3—A few reviewers commented on the proposed rule's discussion of grizzly bear/human conflicts. One reviewer thought that preventing access to human foods by bears should be better addressed. Another reviewer recommended that ''Emphasis should be placed on managing human/bear conflicts on the interface of bear habitat and humans to ensure that mortality there does not exceed recruitment of the population as a whole.''

Response—We agree that preventing grizzly bear habituation to humans and their foods is a priority. More than two-thirds of all suggested funding to implement the Strategy is designated for managing conflicts and outreach efforts to minimize conflicts (U.S. Fish and Wildlife Service 2007, p. 154). All suitable habitat on GYA National Forests will have food storage orders in effect by 2008. Outreach efforts are directed toward decreasing attractants on private lands. The sustainable mortality limits will ensure that mortality in the outer zone of grizzly occupancy (those bears in closest proximity to private land) does not exceed the recruitment of the population as a whole.

Issue 4—Although genetic isolation should be a consideration, one reviewer noted that, ''Within the foreseeable future, demographic or habitat threats are much more likely than a genetic threat.'' The reviewers endorsed natural population connectivity and stated that these opportunities should not decrease after delisting. Connectivity would increase the chances of long-term population persistence and would be a good buffer against the uncertainties surrounding major foods. One reviewer noted that, ideally, connectivity would be established before delisting occurred. Finally, one reviewer suggested that the Service analyze the ramifications of delisting on the ability to naturally recover the Bitterroot Ecosystem and to link the Yellowstone population with the NCDE.

Response—We agree that demographic or habitat threats are more likely a threat than genetic factors in the foreseeable future, and that natural connectivity is desirable. Efforts to promote connectivity between existing populations will continue after delisting

as these programs are independent of the delisting of the GYA population. Due to the habitat protections, population standards, mortality control, outreach efforts, and the adaptive management approach described in the Strategy, we do not believe isolation is a threat to the Yellowstone grizzly bear population and, therefore, does not preclude delisting. Delisting of the Yellowstone grizzly bear population should have no effect on the potential for natural recovery of grizzly bears through the Bitterroot Ecosystem. Both the GYA and NCDE populations are increasing in size and expanding their geographical ranges, increasing the likelihood of eventual dispersal to the Bitterroot Ecosystem.

Issue 5—One reviewer believed that one of the biggest threats to grizzly bear habitat post-delisting ''* * *will come from those who want to use or develop important grizzly bear habitat and who feel that their action is such a small part of the whole that it doesn't matter.'' He recommended that the Service more fully consider and discuss cumulative impacts of multiple projects.

Response—The intent of the 1998 habitat baseline is to prevent or mitigate those cumulative effects on bear habitat within the PCA, where 84 to 90 percent of the females with cubs occur. By maintaining the amount of secure habitat and restricting increases in the total mileage of roads, the number of developed sites, and livestock allotments, the PCA will be able to support a stable to increasing bear population. The USDA Forest Service will continue to apply and improve the Cumulative Effects Model and run this model at least every 5 years to assess the cumulative effects of development on bears. The Study Team will continue to pursue improved methods to assess cumulative impacts.

Outside the PCA, nearly 60 percent of all suitable habitat is either Designated Wilderness Area, Wilderness Study Area, or Inventoried Roadless Area. These designations will prevent many extractive projects from occurring (see Factor D below). All projects on Federal lands are required to comply with the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq.*) process, which includes a section on the cumulative effects of the proposed project. Any NEPA process for a project on National Forest lands also will include an analysis of the impacts of the proposed project on USDA Forest Service species of concern, which will include the grizzly bear upon delisting (USDA Forest Service 2006b, p. 26).

Issue 6—One reviewer noted, regarding regulatory mechanisms, only Montana appears to possess a law that mentions the importance of research and the best-available science to guide grizzly bear management, and that Idaho and Wyoming should be encouraged to adopt a similar law. One reviewer asked if the Strategy will have the regulatory power to ensure that signatories implement management decisions and that resources are available.

Response—We have no authority to compel the States to enact laws, nor do we believe it is necessary. The Strategy, signed by all three affected States, is based on the best available science to guide Yellowstone grizzly bear management. The adaptive management approach described in the Strategy ensures that decisions are to be made based upon the best available science. While the Strategy cannot legally compel any of the signatories to implement management policies or obligate funding, the various Federal agencies' and State governments' signatures on the Strategy clearly indicate their intention to manage grizzly bears according to the Strategy.

Issue 7—One reviewer commented that the proposed rule focused solely on current status and how future conditions will be monitored but failed to discuss carrying capacity of the GYA and ''* * * what effect population expansion may have on a distinct population unit that has clear limits to range or habitat expansion.'' He recommended that the Study Team start to consider this type of issue.

Response—Schwartz *et al.* (2006c, p. 29) discuss the Yellowstone grizzly bear population's growth towards carrying capacity. Carrying capacity has probably already been reached inside Yellowstone National Park (Schwartz *et al.* 2006c, p. 29), and its effect has been to reduce cub survival to levels found in grizzly bear populations at carrying capacity in Alaska. It does not appear that carrying capacity has been reached outside of Yellowstone National Park (Schwartz *et al.* 2006c, p. 29). There are 14,554 sq km (5,619 sq mi) of suitable habitat in the GYA that are currently unoccupied by grizzly bears. This habitat, coupled with the sustainable mortality limits, will allow the Yellowstone grizzly bear population to continue to increase and expand as per the State management plans.

At some point in the future, monitoring data may demonstrate that carrying capacity has been reached throughout the GYA and that the sustainable mortality limits must be revised to accommodate increasing natural mortality or to stabilize the population. The Study Team will reevaluate demographic parameters including reproductive rate, survival rate, annual population growth rate (lambda), stable age distribution, and transition probabilities—every 8 to 10 years; as directed by a violation of the population standards (for a complete list of all population standards and triggers that are considered violations, see Factor D below); or at the request of the Coordinating Committee. During these formal evaluations, any impacts that density dependence or lowered carrying capacity may have will be identified and addressed through adjustments to methods used to estimate population size, sustainable mortality, unknown and unreported mortality, or other management recommendations. The application of adaptive management will allow prompt application of new data or techniques to management decisions. Future conditions may not be like past conditions and the monitoring and adaptive management systems in place are designed to respond to changes that occur.

B. Is our establishment of this population as a distinct population segment logical and adequate?

Issue 1—Most of the reviewers agreed with our DPS analysis and stated that, due to its discreteness and significance, the GYA grizzly bear population warrants DPS status. Some reviewers did point out that DPS designation is biologically justified but highlights one of the major problems faced by the Yellowstone grizzly bear population is its isolation. Gene flow must be attained, either through natural connectivity or augmentation. One reviewer also stated that DPS status can complicate future augmentation efforts if the source population is not similar enough to the recipient population.

Response—As noted in the final rule, we agree that the Yellowstone population is both discrete and significant, thus qualifying as a DPS under our policy. Regarding isolation of the Yellowstone grizzly bear population, those potential threats are related to genetic concerns and changes in the population's habitat. Based on the best available science (Miller and Waits 2003, p. 4338), the Service concludes that the genetic diversity of the Yellowstone grizzly bear population will be adequately maintained by the immigration or relocation of one to two effective migrants from the NCDE every 10 years. This movement of grizzly bears between ecosystems may occur naturally or through management intervention. Regardless of the method, the Service is confident that genetic impoverishment will not threaten the Yellowstone grizzly bear population.

The source population for augmentation, if augmentation becomes necessary, will be the NCDE population. The NCDE bears are those most closely related to the Yellowstone grizzly bear DPS, having been separated for roughly 100 years (Miller and Waits 2003, p. 4334). Offspring of individuals from these two populations are unlikely to experience outbreeding depression. Limited gene flow, as suggested here, would not compromise the required level of discreteness for DPS status, as the DPS policy does not require complete separation of one DPS from other populations, but instead requires ''marked separation.''

Issue 2—Regarding significance, a few of the reviewers responded that there are other populations of grizzlies that have great access to ungulates and whitebark pine seeds but that diets have not been quantified in these areas. One reviewer questioned just how unique the ecological setting of the GYA really is.

Response—While we recognize that there are populations around the world that have access to large ungulates (Canada, Alaska, northeast Asia) and whitebark pine seeds (Canada), what is unusual and unique about the GYA is that there is relatively high use of ungulate meat. Also, although several berry-producing shrubs occur in the area, these are relatively limited by climatic factors and most grizzly bears in the GYA do not rely on berries as a significant portion of their diets. It is this combination of reliance on large mammals and whitebark pine seeds, while having little opportunity to feed on berries, which makes the ecological setting of the GYA unusual, unique, and significant, as none of these factors alone differentiates the GYA from other ecosystems.

Issue 3—One reviewer thought that the Service should reevaluate the status of all of the grizzly bear populations in the lower 48 simultaneously with the Yellowstone assessment.

Response—The Service intends to initiate a 5-year review of grizzly bear populations in the conterminous States outside of the Yellowstone DPS, based on additional scientific information that is currently being collected and analyzed. This review will likely be initiated a few months after the publication of this final rule.

C. Are our assumptions and definition of suitable habitat logical and adequate?

Issue 1—One reviewer thought it would be helpful for the Service to re-categorize and include an analysis of suitable habitat, potentially suitable habitat (if management decisions favored grizzly bears), and unsuitable habitat, stating that this may help direct management decisions in the future.

Response—In response to this comment and several others received by the general public, we have conducted additional analyses to determine how much potentially suitable habitat there is inside the DPS boundaries that could be made suitable through management actions. We found that an additional 9,637 sq km (3,720 sq mi) of National Forest lands (including the Salt River and Palisades Mountain Range) could be made suitable by eliminating all sheep grazing allotments and existing oil and gas developments. These areas are not currently suitable and would require elimination of existing management activities to make them suitable. Such an action is not biologically necessary to maintain the recovered status of the Yellowstone grizzly bear DPS. These areas do not constitute a significant portion of the range. Please see our response to Issue 2 under subheading G in the Summary of Public Comments section above for additional discussion about this concern.

Issue 2—One reviewer agreed with the first two criteria for suitable habitat but questioned the third criterion (having low mortality risk as indicated through reasonable and manageable levels of grizzly bear/human conflicts). This reviewer suggested that the Service conduct ''Additional work on mortality risk modeling in suitable habitats (Nielsen *et al.* 2006, pp. 220–222) [which] would serve as a valuable supplement to the tracking of conflicts and would have the added benefit of providing a system that could aid in conflict reduction.''

Response—The Service agrees that such additional efforts to assess mortality risk in suitable habitats would be useful and supports such work. The Study Team is currently developing habitat-based risk analysis models that will provide insight into mortality risk across the GYA landscape. One management recommendation (Schwartz *et al.* 2006e, p. 62) was to obtain funds to explore more spatially explicit models beyond the three political zones (*i.e.*, inside Yellowstone National Park, inside the recovery zone but outside Yellowstone National Park, and outside the recovery zone) that were addressed. In fact, before Schwartz *et al.* (2006e) was printed, the Study Team submitted a proposal to address this recommendation and obtained funding for this project. It took more than 1.5 years to create the required spatial layers needed for the analyses. The Study Team then began to construct models looking at hazards on the landscape and how they affect grizzly bear survival. These models consider foods, habitat productivity, and human impacts to the landscape. As part of the adaptive management approach in the Strategy, the Study Team intends to link these hazard models with similar models of reproduction to develop models predicting population change on the landscape. Combined, these models will yield a projection of population viability. These efforts will continuously be updated and improved as new methods and information become available.

The Study Team also analyzes the location of grizzly bear/human conflicts and mortalities in relation to land ownership and type of conflict in their annual reports. In this way, the Study Team identifies ''hotspot'' conflict areas in which I & E and prevention efforts are likely to be most beneficial.

Issue 3—A few reviewers questioned the simplicity of the Service's definition of suitable habitat. These reviewers felt that because the Service and the Study Team have abundant data regarding habitat use, the Service should have employed a more empirical definition ''* * * using data-based, statistical techniques, such as logistic regression (e.g., Mladenoff *et al.* 1995) or Mahalanobis distance (*e.g.*, Thatcher *et al.* 2006).''

Response—We thought it was adequate to use a more generalized, coarse-scale interpretation of what habitat would meet grizzly bear needs. Other models predicting where unoccupied suitable grizzly bear habitat occurs within the GYA produced results similar to ours (Noss *et al.* 2002, p. 903; Merrill and Mattson 2003, pp. 182, 184). The results of our analysis agree with previous studies that have identified the Wind River Mountains and the Centennial Mountains as potentially suitable, but currently unoccupied habitat.

Issue 4—Several reviewers felt that the Service should include some measure of habitat quality in its definition because it also is important to understand other health parameters in suitable habitat, such as body condition, movement rates, habitat use, and reproductive function. A couple of reviewers thought habitat quality was particularly important to include in any definition of suitable habitat in light of climate change and possible shifts in habitat use to respond to declines in food resources. If bears show major shifts in habitat use in response to changing food availability, suitable habitat may need to be redefined.

Response—We used the Middle Rockies Ecoregion as a surrogate for

habitat quality/capacity. This approach is supported by many previous studies which have found that mountainous regions generally possess the habitat components necessary for grizzly bear persistence, including hiding cover, topographic variation necessary to ensure a wide variety of seasonal foods, steep slopes used for denning, and remoteness from humans (Craighead 1980, pp. 8–13; Knight 1980, pp. 1–3; Judd *et al.* 1986, pp. 114–115; Peek *et al.* 1987, 160–161; Aune and Kasworm 1989, pp. 29–58; Merrill *et al.* 1999, pp. 233–235; Pease and Mattson 1999, p. 969; Linnell *et al.* 2000, pp. 403–405; Mattson and Merrill 2002, p. 1128). We have not assigned numerical quality scores to habitats based on grizzly bear body condition or productivity because of the uncertainties surrounding such calculations.

D. Are the conclusions we reach logical and supported by the evidence we provide?

Issue 1—A couple of reviewers criticized our contention that hunted grizzly bear populations may experience lower incidences of vandal killing, and one reviewer noted that data he had collected in Alberta since 1999 do not support the conclusion that sport hunting of grizzly bears lowers mortality from poaching.

Response—The reviewer's evidence convinced us to conclude that sport hunting of grizzly bears may not lower mortality from poaching. We have removed any such wording and logic from this final rule.

Issue 2—One reviewer suggested that we could strengthen our assumptions about secure habitat serving adequately as the primary habitat component monitored, if we expanded the definition of secure habitat to include a probability of grizzly bear occurrence (through ongoing monitoring of food resources in space and time) coupled with mortality risk (Nielsen *et al.* 2006, pp. 220–222)

Response—The negative impacts of humans on grizzly bear survival and habitat use are well documented (Harding and Nagy 1980, p. 278; McLellan and Shackleton 1988, pp. 458–459; Aune and Kasworm 1989, pp. 83–103; McLellan 1989, pp. 1862–1864; McLellan and Shackleton 1989, pp. 377–378; Mattson 1990, pp. 41–44; Mattson and Knight 1991, pp. 9–11; Mattson *et al.* 1992, pp. 436–438; Mace *et al.* 1996, p. 1403; McLellan *et al.* 1999, pp. 914–916; White *et al.* 1999, p. 150; Woodroffe 2000, pp. 166–168; Boyce *et al.* 2001, p. 34; Johnson *et al.* 2004, p. 976). In light of this, the importance of secure habitat, simply defined as a function of distance from roads, is indisputable. Although we do not include any prediction of where grizzly bears may occur or what their mortality risk in identified secure habitat might be, the Study Team will monitor food resources and grizzly bear mortalities in the GYA annually.

E. Are our conclusions relating to food resources logical and adequate?

Issue 1—Many reviewers thought that the proposed rule was too optimistic in its discussion of how bears may respond to declines in major foods. They noted that although bears display some foraging plasticity, the extent to which this behavior might buffer loss of one of the four major foods is not known. In contrast, one reviewer thought that food availability was of minor importance in comparison to other human influences such as roads and human-caused mortality and stated that preventing grizzly bear use of human garbage and food will become increasingly important if traditional foods decrease.

Response—While we agree that the extent to which grizzly bears might be able to compensate for the loss of one of the four major foods is unknown, the rule reflects the best scientific and commercial data available. Future food source availability and the possible grizzly bear reaction to those possible future changes are discussed under Factor E below and in the Summary to Public Comments' sections J, K, L, and M above. We also agree that human-caused mortality is probably the major factor limiting grizzly populations, although mortality can be mediated by food availability (Mattson *et al.* 1992, p. 432). The Study Team will continue to monitor major food abundance and grizzly bear conflicts and mortalities. The combination of results and Study Team analyses from these multiple monitoring indices on foods, bear vital rates, and bear/human conflicts will allow managers to respond to changes as necessary. Managers will respond to poor food years with reductions in allowable mortalities and with increased I & E efforts that forewarn the public about the increased potential for grizzly bear/human conflicts.

Issue 2—The reviewers thought it was important to continue monitoring the abundance and distribution of the four major food sources. One reviewer suggested that the Service use statistical power analyses ''* * * to determine what level of change in each food source can be detected with these surveys' and to make adjustments to improve the effectiveness and efficiency of the food monitoring techniques. Another reviewer recommended that the Service monitor reproductive rates and define threshold values for these as they might be more sensitive to food fluctuations than mortality rates would be. One reviewer suggested that non-invasive methods could be used to monitor reproductive hormone cycles in adult female bears that may tie directly to habitat and landscape conditions.

Response—The Greater Yellowstone Whitebark Pine Monitoring Working Group (2005, pp. 98–107) worked closely with statisticians to ensure the best possible sampling design in terms of statistical power and ecological inference. They have established over 70 transects throughout the GYA to assess the status of whitebark pine. The Study Team also documents annual whitebark pine cone production through monitoring of 19 transects inside the PCA. The Study Team has found that its surveys of whitebark pine cone production can effectively predict the magnitude of the number of management actions taken on grizzly bears during each crop year (Haroldson and Podruzny 2006, p. 45). The Study Team's research has resulted in a tentative threshold value, a mean of 20 cones per tree, which predicts near exclusive use of cones by bears from August through October, and also predicts that management actions will be reduced in such years. This level of predictive ability to detect this effect is adequate for management purposes. Whitebark pine cone production fluctuates from year to year, as an evolved strategy on the part of the trees to avoid seed parasitism and predation. Human management cannot guarantee a large cone crop.

Abundances of the other three major foods (ungulate carcasses, cutthroat trout, and army cutworm moths) have not been reliable predictors of grizzly bear abundance, fecundity, mortality, or management activity. All have fluctuated in abundance during the period in which the grizzly population has continued to increase.

Although adult female survival is the factor most important to population trajectory, the Study Team also monitors reproductive rates to obtain a complete picture of the overall health of the grizzly bear population. Annually, the Study Team monitors litter size through counts of females with cubs-of-the-year. In addition, every 8 to 10 years, the Study Team will recalculate litter size and cub survival based on the radio-collared sample of female grizzly bears. The Study Team does not currently monitor reproductive hormone cycles but will consider its use in the future as it becomes more feasible and cost-effective.

Issue 3—One reviewer thought the Service should make it clear that the four major foods and their potential declines were not included in any models of future population trajectory.

Response—The potential abundances of the four major foods have not been employed in any of the PVAs predicting future population trajectory. The reasons for this and our progress toward this goal are discussed above in our response to Issue 2 under subheading B in the Summary of Public Comments section of this final rule.

Issue 4—Two reviewers thought the Service should analyze the implications of the recently introduced wolf populations on the availability of ungulates to Yellowstone grizzly bears.

Response—Recent models and investigations in the field suggest that reintroduced wolves have had little effect on ungulate availability to grizzly bears in the GYA (Wilmers *et al.* 2003a, pp. 914–915; Barber *et al.* 2005, p. 43; Vucetich *et al.* 2005, p. 259). This issue is discussed in more detail under Factor E below.

F. Is the post-delisting monitoring program for habitat and population criteria logical and adequate to ensure survival of this population of grizzly bears in the foreseeable future?

Issue 1—A couple of the reviewers commented that a clear, unequivocal set of criteria for automatic relisting should be established to reduce process-based uncertainty. One reviewer stated that, given past controversy surrounding listing decisions, relisting cannot be regarded as a potential solution to future problems.

Response—The Act contains no provision for automatic relisting of a species based on quantitative criteria. If, at any time, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing. Any such relisting would be based on the definition of threatened or endangered and the 5-factor analysis. A petition for relisting the Yellowstone grizzly bear DPS would have to go through the same procedure as a species newly petitioned for listing. However, the Service can issue an emergency listing rule independent of the petition process or in response to a petition, as it did for the Mojave population of the desert tortoise (*Gopherus agassizii*) (54 FR 32326, August 4, 1989). The Service would then have 240 days to complete a conventional listing rule before the protections of the emergency rule expire. The Service believes the process described in this final rule is sufficient to ensure that relisting will be carried out if necessary, based upon the best available science.

Issue 2—One reviewer stated that monitoring is not sufficient if the results of investigations are not promptly incorporated in policy and management, and that this type of rapid response requires availability of contingency funds, clear roles and authorities, and the power to impose the necessary actions on all involved partners. One reviewer believes that since the effectiveness of the monitoring program depended ''* * * upon adequate funding to provide research results with scientifically acceptable confidence limits,'' the monitoring plan should have secure funding for at least 5 to 10 years before delisting occurs.

Response—The signatories to the Strategy will practice adaptive management by incorporating the findings of the monitoring programs into management of the GYA grizzly bear population. The Federal Government does not have the statutory or constitutional authority to compel the States or individuals to participate in managing grizzly bears if they choose not to, although the responsible agencies' signatures on the Strategy indicate their willingness to manage the Yellowstone grizzly bear DPS. Funding for government programs is never certain at any level, but the funding to support the grizzly bear and grizzly bear habitat management activities of the various Federal and State agencies has been consistently obligated for the past 30 years.

Issue 3—One reviewer encouraged the Service to investigate human dimensions with a protocol that would allow quantification of changes in the attitudes of the general public, farmers, hunters, and other stakeholders.

Response—Although we agree that the values people hold about grizzly bears may provide some insight into poaching incidents and successful management approaches, due to the complications associated with quantifying shifts in public attitudes, we do not see such research as a priority essential to grizzly bear conservation in the GYA. Instead, we believe successful conservation of the Yellowstone grizzly bear should focus on reducing human-caused mortality, protecting habitat, preventing grizzly bear/human conflicts, and monitoring demographic and habitat parameters. That said, in 2001, the State of Wyoming contracted a private business to survey its residents about their attitudes toward grizzly bear management (Responsive Management 2001, p. i). This information was used in the development of the Wyoming State grizzly bear management plan.

Issue 4—The reviewers supported our post-delisting monitoring plan to maintain a minimum of 25 adult female bears distributed throughout the GYA with radio collars at all times, to examine the trends and welfare of the population. One reviewer recommended to us that such research trapping and radio-collaring should strive to minimize the number of capture events per individual to minimize stress, perhaps by using radio transmitters that have a longer operational life.

Response—The minimization of stress during capture events is always a priority for research-trapped bears. A strict protocol (Jonkel 1993, pp. 1–4) is followed by the Study Team when trapping grizzly bears for research purposes. In addition, the latest veterinary medical research is incorporated into the Study Team's protocol when they renew their veterinary permit annually. These protocols are designed to minimize restraint time, minimize capture-related stress, monitor the health of captured animals, administer appropriate levels of anesthesia, and minimize the duration of anesthesia through the use of appropriate antagonists. As radio-telemetry technology improves, the Study Team will incorporate those advances into the monitoring program. If collars can be safely retained for longer periods, the Study Team will make use of improved battery life as these advancements are made. As collar life increases, the total number of capture events will decrease.

Issue 5—One reviewer believes that the Service should state clearly how often important population parameters such as female survival, litter size, litter interval, population growth rates (lambda), sex ratios, and age ratios will be calculated.

Response—These parameters will be recalculated every 8 to 10 years based on the radio-collared sample (Interagency Grizzly Bear Study Team 2005, p. 45) or as required by a Biology and Monitoring Review triggered by a violation of a habitat or population criterion.

Issue 6—Some reviewers suggested that a DNA-based population estimate be conducted at least once to check the estimate given by using the methods described in the Reassessing Methods Document. Some believe that the Service should integrate large-scale, non-invasive genetic sampling into future monitoring protocol since the data gathered during such sampling provides much more information than just a population estimate. Genetic

sampling also can provide reliable estimates of sex ratio, reproductive success, effective population size, dispersal, allelic diversity, heterozygosity, and inbreeding levels.

Response—The current cost of a one-time, point population estimate using DNA is roughly $3.5 million to $5 million (Interagency Grizzly Bear Study Team 2005, p. 12). The Yellowstone Ecosystem Subcommittee decided in 2001 that such funds would be spent more effectively on other management actions. The Service and the Study Team recognize the need to improve methods to estimate population size and calculate sustainable mortality limits and will continue to consider ways in which this might be accomplished. As the costs associated with DNA amplification and analysis decrease with time, the Study Team may revisit this possibility. The Study Team will continue to take DNA samples opportunistically from all bears trapped for research or management and all known mortalities so that future analyses of other genetic or demographic parameters are possible. For now, as long as mortality continues to remain within the sustainable mortality limits as evidenced by a Chao2 estimate of at least 48 females with cubs of the year, there are no data to indicate that this method is inadequate to manage for a stable to increasing Yellowstone grizzly bear population.

Issue 7—Several reviewers thought the 1998 baseline gives reasonable assurance that grizzly bear habitat needs within the PCA will continue to be met. One reviewer commented that the assumption that 1998 habitat conditions allowed the population to increase by 4 to 7 percent is ''largely valid,'' but questioned the Service's choice of the year 1998 and the biological justification behind the criteria for acceptable road densities and levels of secure habitat. A couple of reviewers agreed with the Service that, currently, there is no known way to deductively calculate habitat quality for grizzly bears (e.g., security) and that the use of surrogates (e.g., levels of secure habitat) was appropriate, but reminded us that ''If we are monitoring the wrong surrogates, however, there is no guarantee that the true 1998 habitat baseline will be met. We should acknowledge this and continue to strive for better measures of what constitutes true habitat quality for bears.''

Response—The year 1998 was chosen because we know that levels of secure habitat and site developments had been roughly the same during the previous 10 years (USDA Forest Service 2004, p. 27), and that, during these years, the population was increasing (Eberhardt and Knight 1996, p. 419; Harris *et al.* 2006, p. 48). Therefore, the selection of any other year between 1988 and 1998 would have resulted in approximately the same baseline values for roads and developed sites but the selection of the latter date allowed improvements made since 1988 to be included in the baseline. To address the possibility that we could be monitoring the ''wrong surrogates,'' the responsible agencies also will be monitoring a suite of other factors including habitat parameters, population criteria, mortalities, and conflicts. Our partners will improve the technique for the monitoring of habitat as better methods become available and as the relationships between habitat quality and vital rates are better documented.

Issue 8—A couple of reviewers suggested that in order to truly maintain 1998 conditions, the level of human use also must be maintained at 1998 levels because the intensity of human use is the driving factor behind security, not the sheer number of developed sites and roads on the landscape; intensity of use will only increase as the human population in the area increases. One reviewer suggested that the Service create limits on the numbers of visitors (visitors/days) allowed in Yellowstone National Park. He believes that this limitation on human activities is especially important in light of uncertainties surrounding food sources. One reviewer also noted that, in light of potential decreases in important foods, it would be preferable to institute habitat guidelines that are more restrictive toward resource exploitation than the 1998 baseline.

Response—Human use of the GYA, as measured by the annual number of people visiting Yellowstone National Park, has increased since the grizzly was listed as threatened in 1975 (Gunther 2000, p. 48). During the 1970s, the average annual number of people visiting the Park was 2,243,737. In the 1990s, this number was 3,023,916 (Gunther 2000, p. 48). However, during that period, the grizzly population also has increased, and the bears within Yellowstone National Park appear to have reached the carrying capacity of the Park habitat (Schwartz *et al.* 2006c, p. 29). The Service considers the establishment of habitat thresholds for human population growth and recreation to be unrealistic and feels that the 1998 baseline will address these issues adequately through access management and limitations on site development. Using the adaptive management approach described in the Strategy, management agencies will respond with adequate restrictions and enforcement if recreation on public lands due to increased human populations in the GYA becomes detrimental to the Yellowstone grizzly bear population.

Resource extraction in grizzly bear habitat is primarily timber harvest, and it has declined. Habitat quality, as measured by road density and timber harvest, has increased due to declines in these activities in grizzly habitat. Timber harvest volumes and road construction have declined since the mid-1990s. Under the 1998 level of secure habitat, the Yellowstone grizzly bear population has been increasing at between 4 to 7 percent per year (Harris *et al.* 2006, p. 48). From 1986 to 2002 there has been a net reduction of more than 1,600 km (1,000 mi) of road on the six GYA National Forests (inside and outside the PCA). Inside the PCA on National Forests, there was an average reduction (elimination) of 59.9 km (37.2 mi) of road per year from 1986 to 2002 (USDA Forest Service 2006a, p. 200). Similarly, outside the PCA, there was an average reduction of 40.7 km (25.3 mi) of road per year for this time period (USDA Forest Service 2006a, p. 200). There are no active oil and gas wells in Service-defined suitable grizzly habitat. There has never been any high-density oil and gas development in suitable grizzly habitat in the GYA. Inside the PCA, the potential for increased resource extraction in the future is severely limited due to the constraints on road construction and site development established by the Strategy.

We do not anticipate a dramatic increase in resource extraction outside of the PCA either due to the quantity of National Forest land designated as Wilderness Area (6,799 sq km (2,625 sq mi)), Wilderness Study Area (708 sq km (273 sq mi)), or Inventoried Roadless Area (6,179 sq km (2,386 sq mi)). Approximately 79 percent of all suitable habitat on National Forest lands outside the PCA falls into one of these categories.

Issue 9—One reviewer stated that there are no clear management responses described if habitat threshold values are not achieved. Another reviewer recommended that threshold values for habitat effectiveness be established, as these would be helpful for managers, even if they do not trigger exact management responses like the demographic criteria do.

Response—Because of the natural annual variability in the distribution and abundance of grizzly bear foods, there were no threshold values

established for these habitat parameters. Instead, the 1998 baseline attempted to establish realistic habitat standards that ensure adequate habitat security and minimum livestock conflicts within the PCA. The Study Team will continue to communicate with managers and the media about whitebark pine production as they obtain data each year. The goal of this effort is to inform the public of ways to avoid grizzly bear conflicts in poor food years.

Issue 10—One reviewer noted that the time lag in the feedback loop between habitat changes and population size (Doak 1995, p. 1378) poses a problem for monitoring population size alone. This reviewer suggested that a major research focus for the future should be to strive to improve habitat monitoring protocols such that habitat is monitored directly, not just via grizzly bear vital rates.

Response—The Strategy commits the agencies to intensive monitoring of all grizzly bear vital rates and the relationship of these vital rates to changes in major foods and levels and types of human activities in their habitat. This monitoring does not solely rely on vital rate monitoring to indirectly infer changes in habitat. Annual habitat monitoring will produce results on any changes in habitat values and key food production and possible disease in key foods. Thus, the system in place will not rely on indirect measures of habitat values but will produce direct measures of habitat values annually. Since our partners will be monitoring a suite of vital rates including survival of radio-collared bears, mortality of all conflict bears, and fecundity, we feel confident that we will be able to detect the consequences of significantly reduced habitat productivity.

Issue 11—One reviewer wanted to see more emphasis placed on not only tracking and categorizing private land development, but predicting it as well, to allow for proactive management.

Response—Data on private land development are gathered by, and are available from, the counties. These data are used by nongovernmental organizations and university researchers to project future growth and prioritize private lands that are most important to landscape connectivity and species diversity. For more information on recent land sale statistics, please see our response to Issue 6 under subheading H of the Summary of Public Comments section above.

The Service contends that grizzly bears can coexist with projected human population growth and land use in the foreseeable future, if an adequate management framework (i.e., the Strategy) is in place to manage grizzly bear mortality and habitat quality (Linnell *et al.* 2001, p. 348).

Issue 12—One reviewer recommended that the Service abandon the current Cumulative Effects Model in favor of a model that employs Resource Selection Functions. He contends that Resource Selection Functions models avoid many of the limitations associated with the Cumulative Effects Model including ''* * * lack of empiricism, pre-defined model structure, and arbitrary threshold criteria.'' Another reviewer also endorsed the use of Resource Selection Functions models and noted that they are becoming sophisticated enough to incorporate mortality risk, which would be invaluable to grizzly bear management.

Response—The Study Team is currently exploring alternative habitat models to the Cumulative Effects Model. Resource Selection Functions models are not always the best way to describe habitat relationships because estimated resource selection functions are not always proportional to the true probability of use (Keating and Cherry 2004, p. 788). We agree that linking habitat conditions to demographic data would be an invaluable management tool. The Study Team is currently developing habitat-based risk analysis models that will provide insight into these relationships. These models consider foods, habitat productivity, and human impacts to the landscape. As part of the adaptive management approach in the Strategy, the Study Team intends to link these hazard models with similar models of reproduction to develop models predicting population change on the landscape. Combined, these models will yield a projection of population viability. These efforts will continuously be updated and improved as new methods and information become available.

Issue 13—Several reviewers recommended that the Cumulative Effects Model be validated with empirical data and suggested that predicted use may not correlate well with actual grizzly bear use. They believed such validation would be helpful since the Service relies on the Cumulative Effects Model as a monitoring tool for habitat effectiveness and habitat mitigation. One reviewer suggested an approach that could link habitat (foods) and mortality so that the Cumulative Effects Model is adequate.

Response—Although we currently view the Cumulative Effects Model as the best scientific and commercial data available, we agree that it would be valuable to confirm the Cumulative Effects Model with empirical data. This criticism of the Cumulative Effects Model is one reason that the Strategy does not include threshold values for habitat effectiveness as calculated by the Cumulative Effects Model as a trigger for management action or a Biology and Monitoring Review. What the Cumulative Effects Model does provide is a relative measure of whether habitat quality has increased or decreased in areas across the landscape. However, it does not provide a reliable estimate of exactly how those changes in habitat quality will affect the Yellowstone grizzly bear population. The Study Team is currently exploring alternative habitat models to the Cumulative Effects Model. As the science further evolves, the Study Team will continue to use the best scientific and commercial information available.

G. Did we include all the necessary and pertinent literature to support our assumptions, arguments, and conclusions?

Issue 1—Several peer reviewers suggested additional literature to consider and possibly include in the final rule.

Response—The literature used and recommended by the peer reviewers has been considered and incorporated, as appropriate, in this final rule.

Summary of Factors Affecting the Species

Section 4 of the Act and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424) set forth the procedures for listing, reclassifying, and delisting species. A species may be delisted, according to 50 CFR 424.11(d), if the best scientific and commercial data available demonstrate that the species is no longer endangered or threatened because of (1) extinction; (2) recovery; or (3) error in the original data used for classification of the species.

A recovered population is one that no longer meets the Act's definition of threatened or endangered. The analysis for a delisting due to recovery must be based on the five factors outlined in section 4(a)(1) of the Act. This analysis must include an evaluation of threats that existed at the time of listing and those that currently exist or that could potentially affect the species in the foreseeable future once the protections of the Act are removed.

The Act defines ''species'' to also include any subspecies or, for vertebrates, any DPS. Because the Yellowstone grizzly bear population is discrete and significant, as defined

above, it warrants recognition as a DPS under the Act and our policy (61 FR 4722, February 7, 1996). Therefore, our analysis only covers the Yellowstone DPS.

In terms of the ''foreseeable future,'' for the purposes of this final rule, we view ''foreseeable'' as ''such as reasonably can or should be anticipated: Such that a person of ordinary prudence would expect it to occur or exist under the circumstances'' (Merriam-Webster's Dictionary of Law 1996; *Western Watershed Project* v. *Foss* (D. Idaho 2005)). We use this definition, as opposed to an a priori time period (e.g., 100 years), to avoid placing an arbitrary limit on our time horizon. The foreseeable future is likely to differ for each factor potentially impacting the DPS. When evaluating population models or other modeling efforts (e.g., climate change models), with respect to foreseeable future, we take into consideration model variance over time and model outputs along with the decay in confidence as we forecast further into the future. This approach is more robust than simply looking at a single time-horizon because it uses all available data and takes into consideration the predictive value of that data. However, the Strategy which is intended to guide all management post-delisting, is anticipated to continue in perpetuity. To provide assurance that the DPS remains recovered beyond the foreseeable future, the Strategy provides that if future threats arise or known threats increase in magnitude, the Study Team and the Coordinating Committee are to adapt management to address any new or increased threats.

A species is ''endangered'' for purposes of the Act if it is in danger of extinction throughout all or a ''significant portion of its range'' and is ''threatened'' if it is likely to become endangered within the foreseeable future throughout all or a ''significant portion of its range.'' The following describes how we interpret the terms ''range'' and ''significant'' as used in the phrase ''significant portion of its range,'' and explains the basis for our use of those terms in this rule.

''Range''—The word ''range'' in the phrase ''significant portion of its range'' refers to the range in which a species currently exists, not to the historical range of the species where it once existed. The context in which the phrase is used is crucial. Under the Act's definitions, a species is ''endangered'' only if it ''is in danger of extinction'' in the relevant portion of its range. The phrase ''is in danger'' denotes a present-tense condition of being at risk of a future, undesired event. To say that a species ''is in danger'' in an area that is currently unoccupied, such as unoccupied historical range, would be inconsistent with common usage. Thus, ''range'' must mean ''currently-occupied range,'' not ''historical range.'' This interpretation of ''range'' is further supported by the fact that section 4(a)(1)(A) of the Act requires us to consider the ''present'' or ''threatened'' (i.e., future), rather than the past, ''destruction, modification, or curtailment'' of a species' habitat or range in determining whether a species is endangered or threatened.

However, the Ninth Circuit Court of Appeals appeared to conclude, without any analysis or explanation that the ''range'' referred to in the ''significant portion of its range'' phrase includes the historical range of the species. The court stated that a species ''can be *extinct* 'throughout * * * a significant portion of its range' if there are major geographical areas in which it is no longer viable but once was,'' and then faults the Secretary for not ''at least explain[ing] her conclusion that the area in which the species can no longer live is not a significant portion of its range.'' *Defenders of Wildlife* v. *Norton,* 258 F.3d 1136, 1145 (emphasis added). This would suggest that the range we must analyze in assessing endangerment includes unoccupied historical range—i.e., the places where the species was once viable but no longer exists.

The statute does not support this interpretation. This interpretation is based on what appears to be an inadvertent misquote of the relevant statutory language. In addressing this issue, the Ninth Circuit states that the Secretary must determine whether a species is ''extinct throughout * * * a significant portion of its range.'' *Id.* If that were true, we would have to study the historical range. But that is not what the statute says, and the Ninth Circuit quotes the statute correctly elsewhere in its opinion. Under the Act, we are not to determine if a species is ''extinct throughout * * * a significant portion of its range,'' but are to determine if it ''is in danger of extinction throughout * * * a significant portion of its range.'' A species cannot presently be ''in danger of extinction'' in that portion of its range where it ''was once viable but no longer is''—if by the latter phrase the court meant lost historical habitat. In that portion of its range, the species has by definition ceased to exist. In such situations, it is not ''in danger of extinction''; it is extinct.

Although we must focus on the range in which the species currently exists, data about the species' historical range and how the species came to be extinct in that location may be relevant in understanding or predicting whether a species is ''in danger of extinction'' in its current range and therefore relevant to our 5 factor analysis. But the fact that it has ceased to exist in what may have been portions of its historical range does not necessarily mean that it is ''in danger of extinction'' in a significant portion of the range where it currently exists.

''Significant''—The Act does not clearly indicate what portion(s) of a species' range should be considered ''significant.'' Most dictionaries list several definitions of ''significant.'' For example, one standard dictionary defines ''significant'' as ''important,'' ''meaningful,'' ''a noticeably or measurably large amount,'' or ''suggestive'' (Merriam-Webster's Collegiate Dictionary 1088 (10th ed. 2000)). If it means a ''noticeably or measurably large amount,'' then we would have to focus on the size of the range in question, either in relation to the rest of the range or perhaps even in absolute terms. If it means ''important,'' then we would have to consider factors in addition to size in determining a portion of a species' range is ''significant.'' For example, would a key breeding ground of species be ''significant,'' even if it was only a small part of the species' entire range?

One district court interpreted the term to mean ''a noticeably or measurably large amount'' without analysis or any reference to other alternate meanings, including ''important'' or ''meaningful.'' *Defenders of Wildlife* v. *Norton,* 239 F. Supp. 2d 9, 19 (D.D.C. 2002). We consider the court's interpretation to be unpersuasive because the court did not explain why we could not employ another, equally plausible definition of ''significant.'' It is impossible to determine from the word itself, even when read in the context of the entire statute, which meaning of ''significant'' Congress intended. Moreover, even if it were clear which meaning was intended, ''significant'' would still require interpretation. For example, if it were meant to refer to size, what size would be ''significant'': 30 percent, 60 percent, 90 percent? Should the percentage be the same in every case or for each species? Moreover, what factors, if any, would be appropriate to consider in making a size determination? Is size all by itself ''significant,'' or does size only become ''significant'' when considered in combination with other factors? On the other hand, if ''significant'' were meant to refer to importance, what factors would need to be considered in

deciding that a particular portion of a species' range is ''important'' enough to trigger the protections of the Act?

Where there is ambiguity in a statute, as with the meaning of ''significant,'' the agency charged with administering the statute, in this case the Service, has broad discretion to resolve the ambiguity and give meaning to the term. As the Supreme Court has stated:

> In *Chevron,* this Court held that ambiguities in statutes within an agency's jurisdiction to administer are delegations of authority to the agency to fill the statutory gap in reasonable fashion. Filling these gaps, the Court explained, involves difficult policy choices that agencies are better equipped to make than courts. If a statute is ambiguous, and if the implementing agency's construction is reasonable, *Chevron* requires a federal court to accept the agency's construction of the statute, even if the agency's reading differs from what the court believes is the best statutory interpretation.

Nat'l Cable & Telecomms. Ass'n v. *Brand X Internet Servs.,* 545 U.S. 967, 980 (2005) (internal citations omitted).

We have broad discretion in defining what portion of a species' range is ''significant.'' No ''bright line'' or ''predetermined'' percentage of historical range loss is considered ''significant'' in all cases, and we may consider factors other than simply the size of the range portion in defining what is ''significant.'' In light of the general ecosystems conservation purposes and findings in section 2 of the Act, our goal is to define ''significant'' in such a way as to insure the conservation of the species protected by the Act. In determining whether a range portion is significant, we consider the ecosystems on which the species that use that range depend as well as the values listed in the Act that would be impaired or lost if the species were to become extinct in that portion of the range or in the range as a whole.

However, our discretion in defining ''significant'' is not unlimited. The Ninth Circuit Court of Appeals, while acknowledging that we have ''a wide degree of discretion in delineating'' what portion of a range is ''significant,'' appeared to set outer limits of that discretion. *See Defenders of Wildlife* v. *Norton,* 258 F.3d 1136. On the one hand, it rejected what it called a quantitative approach to defining ''significant,'' where a ''bright line'' or ''predetermined'' percentage of historical range loss is considered ''significant'' in all cases. 258 F.3d. at 1143. As the court explained:

> First, it simply does not make sense to assume that the loss of a predetermined percentage of habitat or range would necessarily qualify a species for listing. A species with an exceptionally large historical range may continue to enjoy healthy population levels despite the loss of a substantial amount of suitable habitat. Similarly, a species with an exceptionally small historical range may quickly become endangered after the loss of even a very small percentage of habitat.

The Ninth Circuit concluded that what is ''significant'' must ''necessarily be determined on a case by case basis,'' and must take into account not just the size of the range but also the biological importance of the range to the species. 258 F.3d. at 1143. At the other end of the spectrum, the Ninth Circuit rejected what it called ''the faulty definition offered by us,'' a definition that holds that a portion of a species' range is ''significant'' only if the threats faced by the species in that area are so severe as to threaten the viability of the species as a whole. 258 F.3d. at 1143, 1146. It thus appears that within the two outer boundaries set by the Ninth Circuit, we have wide discretion to give the definitive interpretation of the word ''significant'' in the phrase ''significant portion of its range.''

Based on these principles, we considered the following factors in determining whether a portion of the grizzly's range is ''significant''—quality, quantity, and distribution of habitat relative to the biological requirements of the species; the historical value of the habitat to the species; the frequency of use of the habitat; the uniqueness or importance of the habitat for other reasons, such as breeding, feeding, migration, wintering, or suitability for population expansion; genetic diversity; and other biological factors. We focused on portions of the grizzly's range important to its conservation, such as identified ''recovery units''; unique habitat or other ecological features that provide adaptive opportunities that are of conservation importance to the species; and ''core'' populations that generate additional individuals of a species that can, over time, replenish depleted populations or stocks at the periphery of the species' range. We did not apply the term ''significant'' to portions of the species' range that constitute less-productive peripheral habitat, artificially-created habitat, or areas where the species has established itself in urban or suburban settings. Such portions of the species' range are not ''significant,'' in our view, to the conservation of the species as required by the Act.

The following analysis utilizes these definitions and examines all important factors currently affecting the Yellowstone grizzly bear DPS or likely to affect it within the foreseeable future. Therefore, this analysis was conducted over the entire current and foreseeable range of the grizzly bear including all ''suitable habitat'' (defined and discussed under Factor A below) within the DPS boundaries.

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

Habitat destruction and modification were major contributing factors leading to the listing of the grizzly bear as a threatened species under the Act in 1975 (40 FR 31734–31736, July 28, 1975). Both the dramatic decreases in historical range and land management practices in formerly secure grizzly bear habitat led to the 1975 listing (40 FR 31734–31736, July 28, 1975). To address this source of population decline, the Study Team was created in 1973 to collect, manage, analyze, and distribute science-based information regarding habitat and demographic parameters upon which to base management and recovery. Then, in 1983, the Interagency Grizzly Bear Committee was created to coordinate management efforts across multiple Federal lands and different States within the various Recovery Zones ultimately working to achieve recovery of the grizzly bear in the lower 48 States. Its objective was to change land management practices on Federal lands that supported grizzly bear populations at the time of listing to provide security and maintain or improve habitat conditions for the grizzly bear. Since 1986, National Forest and National Park plans have incorporated the Guidelines (USDA Forest Service 1986, pp. 1–2) to manage grizzly bear habitat in the Yellowstone Recovery Zone.

Management improvements made as a result of the Guidelines include, but are not limited to—(1) Federal and State agency coordination to produce nuisance bear guidelines that allow a quick response to resolve and minimize grizzly bear/human confrontations; (2) reduced motorized access route densities through restrictions, decommissioning, and closures; (3) highway design considerations to facilitate population connectivity; (4) closure of some important habitat areas to all human access in National Parks during certain seasons that are particularly important to grizzlies; (5) closure of many areas in the GYA to oil and gas leasing, or implementing restrictions such as no surface occupancy; (6) elimination of two sheep allotments on the Caribou-Targhee National Forest in 1998, resulting in a 46 percent decrease in total sheep

animal months inside the Yellowstone Recovery Zone; and (7) expanded I & E programs in the Yellowstone Recovery Zone to help reduce the number of grizzly mortalities caused by big-game hunters. Overall, adherence to the Guidelines has changed land management practices on Federal lands to provide security and to maintain or improve habitat conditions for the grizzly bear. Implementation of these Guidelines has led to the successful rebound of the Yellowstone grizzly bear population, allowing it to significantly increase in size and distribution since its listing in 1975.

In 2002, an interagency group representing pertinent State and Federal parties released the draft Final Conservation Strategy for the Grizzly Bear in the GYA to guide management and monitoring of the habitat and population of Yellowstone grizzly bears after delisting. The Strategy identifies and provides a framework for managing two areas, the PCA and adjacent areas of suitable habitat where occupancy by grizzly bears is anticipated in the foreseeable future. What follows is an assessment of present or threatened destruction, modification, or curtailment of the grizzly bear's habitat and range. More specifically, this analysis evaluates all areas capable of supporting grizzly bears including the PCA and all suitable habitat within the DPS. These terms and areas are defined below.

Suitable Habitat—Because we used easily recognized boundaries to delineate the Yellowstone DPS, the DPS includes both suitable and unsuitable habitat (see Figure 1 above). For the purposes of this final rule, suitable habitat is considered the area within the DPS boundaries capable of supporting a viable grizzly bear population now or in the foreseeable future. We have defined suitable habitat for grizzly bears as areas having three characteristics—(1) being of adequate habitat quality and quantity to support grizzly bear reproduction and survival; (2) contiguous with the current distribution of Yellowstone grizzly bears such that natural re-colonization is possible; and (3) having low mortality risk as indicated through reasonable and manageable levels of grizzly bear mortality. For more information see our response to Issue 2 under subheading G in the Summary of Public Comments section above.

Our definition and delineation of suitable habitat is built on the widely accepted conclusions of extensive research (Craighead 1980, pp. 8–11; Knight 1980, pp. 1–3; Peek *et al.* 1987, pp. 160–161; Merrill *et al.* 1999, pp. 233–235; Pease and Mattson 1999, p. 969) that grizzly bear reproduction and survival is a function of both the biological needs of grizzly bears and remoteness from human activities, which minimizes mortality risk for grizzly bears. Mountainous areas provide hiding cover, the topographic variation necessary to ensure a wide variety of seasonal foods, and the steep slopes used for denning (Judd *et al.* 1986, pp. 114–115; Aune and Kasworm 1989, pp. 29–58; Linnell *et al.* 2000, pp. 403–405). Higher elevation, mountainous regions in the GYA (Omernik 1987, pp. 118–125; Omernik 1995, pp. 49–62; Woods *et al.* 1999; McGrath *et al.* 2002; Chapman *et al.* 2004) contain high-energy foods such as whitebark pine seeds (Mattson and Jonkel 1990, p. 223; Mattson *et al.* 1991a, p. 1623) and army cutworm moths (Mattson *et al.* 1991b, 2434; French *et al.* 1994, p. 391).

For our analysis of suitable habitat, we considered the Middle Rockies ecoregion, within which the Greater Yellowstone Area is contained, (Omernik 1987, pp. 120–121; Woods *et al.* 1999; McGrath *et al.* 2002; Chapman *et al.* 2004) to meet grizzly bear biological needs providing food, seasonal foraging opportunities, cover, and denning areas (Mattson and Merrill 2002, p. 1125). The Middle Rockies ecoregion has Douglas-fir, subalpine fir, and Engelmann spruce forests and alpine areas. Forests can be open. Foothills are partly wooded or shrub- and grass-covered. Intermontane valleys are grass- and/or shrub-covered and contain a mosaic of terrestrial and aquatic fauna that is distinct from the nearby mountains. Many mountain-fed, perennial streams occur and differentiate the intermontane valleys from the Northwestern Great Plains. Recreation, logging, mining, and summer livestock grazing are common land uses in this ecoregion.

Although grizzly bears historically occurred throughout the area of the Yellowstone DPS (Stebler 1972, pp. 297–298), many of these habitats are not, today, biologically suitable for grizzly bears. While there are records of grizzly bears in eastern Wyoming near present-day Sheridan, Casper, and Wheatland, even in the early 19th century, indirect evidence suggests that grizzly bears were less common in these eastern prairie habitats than in mountainous areas to the west (Rollins 1935, p. 191; Wade 1947, p. 444). Grizzly bear presence in these drier, grassland habitats was associated with rivers and streams where grizzlies used bison carcasses as a major food source (Burroughs 1961, pp. 57–60; Herrero 1972, pp. 224–227; Stebler 1972, pp. 297–298; Mattson and Merrill 2002, pp. 1128–1129). Because wild bison herds no longer exist in these areas, these areas are no longer capable of contributing, in a meaningful way, to the overall status of the Yellowstone DPS. Thus, we did not include drier sagebrush, prairie, or agricultural lands within our definition of suitable habitat because these land types no longer contain adequate food resources (i.e., bison) to support grizzly bears. Figure 1 above illustrates suitable habitat within the Yellowstone DPS.

Unavoidable and uncontrollable mortality also can impact which habitat might be considered suitable. Some mortality, including human-caused mortality, is unavoidable in a dynamic system where hundreds of bears inhabit large areas of diverse habitat with several million human visitors and residents. The negative impacts of humans on grizzly bear survival and habitat use are well documented (Harding and Nagy 1980, p. 278; McLellan and Shackleton 1988, pp. 458–459; Aune and Kasworm 1989, pp. 83–103; McLellan 1989, pp. 1862–1864; McLellan and Shackleton 1989, pp. 377–378; Mattson 1990, pp. 41–44; Mattson and Knight 1991, pp. 9–11; Mattson *et al.* 1992, pp. 436–438; Mace *et al.* 1996, p. 1403; McLellan *et al.* 1999, pp. 914–916; White *et al.* 1999, p. 150; Woodroffe 2000, pp. 166–168; Boyce *et al.* 2001, p. 34; Johnson *et al.* 2004, p. 976). These effects range from temporary displacement to actual mortality. Mattson and Merrill (2002, pp. 1129–1134) found that grizzly bear persistence in the contiguous United States between 1920 and 2000 was negatively associated with human and livestock densities. As human population densities increase, the frequency of encounters between humans and grizzly bears also increases, resulting in more human-caused grizzly bear mortalities due to a perceived or real threat to human life or property (Mattson *et al.* 1996, pp. 1014–1015). Similarly, as livestock densities increase in habitat occupied by grizzly bears, depredations follow. Although grizzly bears frequently coexist with cattle without depredating them, when grizzly bears encounter domestic sheep, they usually are attracted to such flocks and depredate the sheep (Jonkel 1980, p. 12; Knight and Judd 1983, pp. 188–189; Orme and Williams 1986, pp. 199–202; Anderson *et al.* 2002, pp. 252–253). If repeated depredations occur, managers either relocate the bear or remove it from the population, resulting in such domestic sheep areas becoming

population sinks (Knight *et al.* 1988, pp. 122–123).

Because urban sites and sheep allotments possess high mortality risks for grizzly bears, we did not include these areas as suitable habitat (Knight *et al.* 1988, pp. 122–123). Based on 2000 Census data, we defined urban areas as census blocks with human population densities of more than 50 people per sq km (129 people per sq mi). Cities within the Middle Rockies ecoregion such as West Yellowstone, Gardiner, Big Sky, and Cooke City, Montana, and Jackson, Wyoming, were not included as suitable habitat. There are large, contiguous blocks of sheep allotments in peripheral areas of the ecosystem in the Wyoming Mountain Range, the Salt River Mountain Range, and portions of the Wind River Mountain Range on the Bridger-Teton and the Targhee National Forests (see Figure 1 above). This spatial distribution of sheep allotments on the periphery of suitable habitat results in areas of high mortality risk to bears within these allotments and a few small, isolated patches or strips of suitable habitat adjacent to or within sheep allotments. These strips and patches of land possess higher mortality risks for grizzly bears because of their enclosure by and proximity to areas of high mortality risk. This phenomenon in which the quantity and quality of suitable habitat is diminished because of interactions with surrounding less suitable habitat is known as an ''edge effect'' (Lande 1988, pp. 3–4; Yahner 1988, pp. 335–337; Mills 1995, p. 396). Edge effects are exacerbated in small habitat patches with high perimeter-to-area ratios (i.e., those that are longer and narrower) and in wide-ranging species such as grizzly bears because they are more likely to encounter surrounding, unsuitable habitat (Woodroffe and Ginsberg 1998, p. 2126). Due to the negative edge effects of this distribution of sheep allotments on the periphery of grizzly range, our analysis did not classify linear strips and isolated patches of habitat as suitable habitat.

Finally, dispersal capabilities of grizzly bears were factored into our determination of which potential habitat areas might be considered suitable. Although the Bighorn Mountains west of I–90 near Sheridan, Wyoming, are grouped within the Middle Rockies ecoregion, they are not connected to the current distribution of grizzly bears via suitable habitat or linkage zones, nor are there opportunities for such linkage. The Bighorn Mountains are comprised of 6,341 sq km (2,448 sq mi) of habitat that is classified as part of the Middle Rockies ecoregion, but are separated from the current grizzly bear distribution by approximately 100 km (60 mi) of a mosaic of private and BLM lands primarily used for agriculture, livestock grazing, and oil and gas production (Chapman *et al.* 2004). Although there is a possibility that individual bears may emigrate from the GYA to the Bighorns occasionally, this dispersal distance exceeds the average dispersal distance for both males (30 to 42 km (19 to 26 mi)) and females (10 to 14 km (6 to 9 mi)) (McLellan and Hovey 2001, p. 842, Proctor *et al.* 2004, p. 1108). Without constant emigrants from suitable habitat, the Bighorns will not support a self-sustaining grizzly bear population. Therefore, due to the fact that this mountain range is disjunct from other suitable habitat and current grizzly bear distribution, our analysis did not classify the Bighorns as suitable habitat within the Yellowstone DPS boundaries.

Some areas that are not considered suitable habitat by our definition are occasionally used by grizzly bears (4,635 sq km (1,787 sq mi)) (see Figure 1 above) (Schwartz *et al.* 2002, p. 209; Schwartz *et al.* 2006b, pp. 64–66). The records of grizzly bears in these unsuitable habitat areas are generally due to recorded grizzly bear/human conflicts or to transient animals. These areas are defined as unsuitable due to the high risk of mortality resulting from these grizzly bear/human conflicts. These unsuitable habitat areas do not permit grizzly bear reproduction or survival because bears that repeatedly come into conflict with humans or livestock are usually either relocated or removed from these areas.

According to the habitat suitability criteria described above, the Yellowstone DPS contains approximately 46,035 sq km (17,774 sq mi) of suitable grizzly bear habitat within the DPS boundaries; or roughly 24 percent of the total area within the DPS boundaries (see Figure 1 above). This amount of suitable habitat is sufficient to meet all habitat needs of a recovered grizzly bear population and provide ecological resiliency to the population through the availability of widely distributed, high-quality habitat that will allow the population to respond to environmental changes. Grizzly bears currently occupy about 68 percent of that suitable habitat (31,481 sq km (12,155 sq mi)) (Schwartz *et al.* 2002, pp. 207–209; Schwartz *et al.* 2006b, pp. 64–66). It is important to note that the current grizzly bear distribution shown in Figure 1 does not mean that equal densities of grizzly bears are found throughout the region. Instead, most grizzly bears (approximately 84 to 90 percent of females with cubs-of-the-year) are found within the PCA (Schwartz *et al.* 2006b, pp. 64–66). Grizzly bear use of suitable habitat may vary seasonally and annually with different areas being more important than others in some seasons or years (Aune and Kasworm 1989, pp. 48–62). An additional 14,554 sq km (5,619 sq mi) of suitable habitat is currently unoccupied by grizzly bears (see Figure 1 above) (Schwartz *et al.* 2002, pp. 207–209; Schwartz *et al.* 2006b, pp. 64–66). We expect natural recolonization of much, if not all, of this area in the next few decades (Pyare *et al.* 2004, pp. 5–6).

Significant Portion of Range—We determined whether a portion of the species range is significant based on the biological needs of the species and the nature of the threats to the species. As stated above, the factors we used to determine significance include, but may not be limited to the following: Quality, quantity, and distribution of habitat relative to the biological requirements of the species; the historic value of the habitat to the species; the frequency of use of the habitat; the uniqueness or importance of the habitat for other reasons, such as breeding, feeding, migration, wintering, or suitability for population expansion; genetic diversity (the loss of genetically based diversity may substantially reduce the ability of the species to respond and adapt to future environmental changes or perturbations); and other biological factors (*e.g.* resilience to recover from periodic disturbances or environmental variability).

After careful examination of the Yellowstone grizzly bear DPS in the context of our definition of ''significant portion of its range,'' we have determined all suitable habitat in the DPS (as per our definition above) (approximately 46,035 sq km (17,774 sq mi)) (see Figure 1 above), to varying levels, is a significant portion of its range. Within suitable habitat, the PCA represents the most significant portion of the range. As such, this area is designated the ''primary'' conservation area and provides the highest levels of protective management. This area was originally selected as the focus of our recovery efforts because it was seen ''as an area large enough and of sufficient habitat quality to support a recovered grizzly bear population'' (U.S. Fish and Wildlife Service 1982, pp. 55–58; U.S. Fish and Wildlife Service 1993, pp. 41). This area includes approximately 51 percent of the suitable habitat within the DPS and approximately 84 to 90 percent of the population of female grizzly bears with cubs (Schwartz *et al.* 2006b, pp. 64–66). Because an estimated

86.5 percent of the GYA grizzly bears live within the PCA and these bears have experienced positive annual population increases of 4 percent inside Yellowstone National Park, and 12 percent in the area inside the PCA but outside of Yellowstone National Park (Schwartz *et al.* 2006e, p. 58), the PCA is particularly biologically significant to the Yellowstone DPS. It serves as a source area from which grizzly bears can expand into peripheral areas and currently unoccupied suitable habitat. Additionally, the PCA's geographic location in the northwest corner of the DPS area adds to its biological significance because it is the area nearest to other grizzly bear recovery ecosystems. If and when connectivity is established among grizzly bear populations in the lower 48 States, the PCA will play a role in providing dispersers to other ecosystems and providing secure, quality habitat for dispersers from other grizzly bear ecosystems. This portion of the range is necessary for maintaining a recovered population.

While the PCA provides for the primary biological needs of the Yellowstone grizzly bear DPS, suitable habitat outside the PCA also plays a role in ensuring the future viability of the species, in that it allows for continued population expansion into adjacent areas of public land in the GYA, and therefore, provides additional ecological resiliency to respond to environmental change. Given this differential level of importance, differential levels of management and protection (one standard inside the PCA and another standard for suitable habitat outside the PCA) are justified.

As noted above, we do not believe that areas of unsuitable habitat: Contribute, in a meaningful way, to the biological requirements of the species; are of especially important historical value; represent unique habitats or other ecological features that provide adaptive opportunities that are of conservation importance to the species; or, are necessary to maintain genetic diversity. Unsuitable habitat, by and large, constitutes less-productive peripheral habitat. Therefore, we believe unsuitable habitat, as defined in this section above, is not ''significant'' to the conservation of the species and does not constitute a significant portion of range. A lack of occupancy in unsuitable habitat will not impact whether this population is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Suitable Habitat Management within the Primary Conservation Area—As per the Strategy and the habitat-based recovery criteria discussed above, the PCA will be a core secure area for grizzlies where human impacts on habitat conditions will be maintained at or below levels that existed in 1998 (U.S. Fish and Wildlife Service 2007, p. 38). The 1998 baseline for habitat standards was chosen because the levels of secure habitat and developed sites remained relatively constant in the 10 years preceding 1998 (USDA Forest Service 2004, pp. 140–141), and the selection of 1998 assured that the habitat conditions that allowed the population to increase at a rate of 4 to 7 percent per year (Harris *et al.* 2006, p. 48) would be maintained. For each of the 40 bear management subunits, the 1998 baseline was determined through a GIS analysis of the amount of secure habitat, open and closed road densities, the number and capacity of livestock allotments, the number of developed sites on public lands, and habitat effectiveness.

Secure habitat refers to those areas with no motorized access that are at least 4 ha (10 ac) in size and more than 500 m (1650 ft) from a motorized access route or reoccurring helicopter flight line (USDA Forest Service 2004, pp. 160–161). Grizzly bear habitat security is primarily achieved by managing motorized access which—(1) minimizes human interaction and reduces potential grizzly bear mortality risk; (2) minimizes displacement from important habitat; (3) minimizes habituation to humans; and (4) provides habitat where energetic requirements can be met with limited disturbance from humans (Mattson *et al.* 1987, pp. 269–271; McLellan and Shackleton 1988, pp. 458–459; McLellan 1989, pp. 1862–1864; Mace *et al.* 1996, pp. 1402–1403; Mattson *et al.* 1996, pp. 1014–1015). Secure habitat is important to the survival and reproductive success of grizzly bears, especially adult female grizzly bears (Mattson *et al.* 1987, p. 270; Interagency Grizzly Bear Committee 1994, p. 2). In the 1998 baseline, secure habitat comprised 45.4 to 100 percent of the total area within a given subunit with an average of 85.6 percent throughout the entire PCA (U.S. Fish and Wildlife Service 2007, pp. 133–144, Appendix F). These levels of secure habitat have been successfully maintained and will continue to be maintained and improved, where possible, as directed by the Strategy (U.S. Fish and Wildlife Service 2007, p. 135, Table 2 in Appendix F). Because of the positive effect that secure habitat has on grizzly bear survival and reproduction, it is especially important to maintain these levels of secure habitat inside the PCA so that it will continue to function as a source area for grizzly bears.

Open road densities of more than 1.6 km/2.6 sq km (1 mi/sq mi) were calculated for two seasons to account for seasonal road closures. The percentage of land within each subunit containing road density values higher than 1.6 km/2.6 sq km (1 mi/sq mi) in 1998 ranged from 0 to 46.1 percent, although the average for all subunits was only 10.7 percent. Lands containing total road density values of more than 3.2 km/2.6 sq km (2 mi/sq mi) in 1998 comprised 0 to 28.1 percent of the total area within each subunit, with an average for all subunits of 5.3 percent (U.S. Fish and Wildlife Service 2007, p. 135). These levels of motorized access have been effectively maintained or improved from 1998 levels. The Strategy assures that current levels of secure habitat will be maintained at 1998 levels (U.S. Fish and Wildlife Service 2007, p. 38).

Several subunits within the boundaries of the Gallatin National Forest (Henry's Lake No. 2, Gallatin No. 3, and Madison No. 2) within the PCA have been identified as needing improvement in access parameters. However, the high road density values and subsequently low levels of secure habitat in these subunits is primarily due to motorized access on private land (U.S. Fish and Wildlife Service 2007, p. 145–152, Appendix G). The Gallatin National Forest is working on several land exchange efforts with private parties in these subunits. These land exchanges would allow management of the roads on these private parcels and increase the secure habitat in these subunits. All the above-mentioned subunits on the Gallatin National Forest have the potential for improvement in the long term. The timing and amount of improvement will be determined through the Gallatin National Forest travel management planning process (Gallatin National Forest 2006, pp. 82–85). Improved levels of secure habitat as per the Gallatin National Forest travel management plan will assure that the habitat security will be maintained.

The Gallatin Range Consolidation and Protection Act of 1993 (Pub. L 103–91) and the Gallatin Range Consolidation Act of 1998 (Pub. L 105–267) will result in trading timber for land in the Gallatin No. 3 and Hilgard No. 1 subunits. The private land involved will become public land under the jurisdiction of the Gallatin National Forest. In order to complete the exchange, access values in these two subunits will temporarily decline below 1998 values. However, upon completion of this sale and land

exchange, secure habitat will increase and motorized access route density will decrease in these subunits from the 1998 baseline (U.S. Fish and Wildlife Service 2007, pp. 133–144, Appendix F).

The Strategy also identified several subunits within the boundaries of the Targhee National Forest within the PCA in need of improvement in terms of motorized access (Plateau No. 1, Plateau No. 2, and Henry's Lake No. 1). The Strategy states that full implementation of the access management changes in the revised 1997 Targhee Forest Plan would result in those subunits having acceptable levels of road densities and secure habitat, due to the decommissioning of roughly 697 km (433 mi) of roads within the PCA (U.S. Fish and Wildlife Service 2007, pp. 43–44). As of 2005, the Targhee National Forest completed this decommissioning work (USDA Forest Service 2006a, pp. 200–201). The 1998 baseline (U.S. Fish and Wildlife Service 2007, pp. 133–144, Appendix F) for these subunits was modified to reflect these road closures. Henry's Lake subunit No. 1 and No. 2 still have high levels of motorized access density and a low secure habitat level due to motorized access routes on private lands as well as county roads, State and Federal highways, and roads to special use sites (such as the Federal Aviation Administration radar site on Sawtell Peak) that cannot be closed (U.S. Fish and Wildlife Service 2007, pp. 133–144, Appendix F). These levels of secure habitat do not constitute a threat to the grizzly bear population in all or a significant portion of its range.

At least 3 million people visit and recreate in the National Parks and National Forests of the GYA annually (USDA Forest Service 2006a, pp. 176, 184). This volume of people in grizzly bear habitat presents a potential for grizzly bear/human conflicts, yet the average number of conflicts per year between 1992 and 2004 was only 135 (Gunther *et al.* 2006, p. 58). Based on past trends, visitation and recreation are expected to increase in the future. For instance, Yellowstone National Park has shown an approximate 15 percent annual increase in the number of people visiting each decade since the 1930s (USDA Forest Service 2006a, p. 183); however, the number of people recreating in the backcountry there has remained relatively constant from the 1970s through 1999 (Gunther 2000, p. 48). Many grizzly bear/human conflicts with people recreating occur on National Forest lands and are related to hunting (Servheen *et al.* 2004, p. 21) (also see our discussion under Factor C below). Black bear hunting is not allowed in either National Park and elk hunting is only allowed in Grand Teton National Park. Elk hunters in Grand Teton National Park are required to carry bear pepper spray in an accessible location. The number of elk hunter visits in the PCA on National Forests has declined 26 percent from 1991 to 2001 (USDA Forest Service 2006a, p. 186). Most conflicts between grizzly bears and people recreating in grizzly bear habitat can be avoided if proper I & E materials are received and used, especially pertaining to food and carcass storage, and therefore ensure the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range within the foreseeable future.

Recreation in the GYA can be divided into 6 basic categories based on season of use (winter or all other seasons), mode of access (motorized or non-motorized), and level of development (developed or dispersed) (USDA Forest Service 2006a, p. 187). Inside the PCA, the vast majority of lands available for recreation are accessible through non-motorized travel only (USDA Forest Service 2006a, p. 179). Motorized recreation during the summer, spring, and fall inside the PCA will be limited to existing roads as per the standards in the Strategy that restrict increases in roads or motorized trails. Similarly, recreating at developed sites such as lodges, downhill ski areas, and campgrounds will be limited by the developed sites' habitat standard described in the Strategy. The number and capacity of existing developed sites will not increase once delisting occurs. For a more complete discussion of projected increases in recreation in the GYA National Forests, see the Final Environmental Impact Statement for the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests (USDA Forest Service 2006a, pp. 176–189).

Habitat standards described in the Strategy regarding livestock require that the number of commercial livestock allotments and permitted sheep animal months within the PCA not increase above 1998 levels (U.S. Fish and Wildlife Service 2007, p. 43). Livestock allotments, particularly sheep allotments, decrease habitat security (*i.e.*, habitat effectiveness) as grizzly bears occupying lands with sheep are more likely to come into conflict with these sheep. This increase in encounters between bears and livestock or their human owners decreases survival rates of grizzly bears in areas of active sheep allotments, as repeat depredators are removed from the population. Although sheep and cattle also can compete directly to some degree with grizzly bears during late spring and early summer for desired foods such as grasses, sedges, and forbs (Jonkel 1980, p. 12), this is considered negligible to grizzly bear population dynamics. Due to the higher prevalence of grizzly bear conflicts associated with sheep grazing, existing sheep allotments will be phased out as the opportunity arises with willing permittees (U.S. Fish and Wildlife Service 2007, p. 43).

A total of 100 livestock allotments existed inside the PCA in 1998. Of these allotments, there were—69 active and 13 vacant cattle allotments; and 11 active and 7 vacant sheep allotments with a total of 23,090 animal months (USDA Forest Service 2006a, p. 382). Sheep animal months are calculated by multiplying the permitted number of animals by the permitted number of months. Any use of vacant allotments will only be permitted after an analysis is completed to evaluate impacts on grizzly bears. Since 1998, the Caribou-Targhee National Forest has closed five sheep allotments within the PCA while the Shoshone National Forest has closed two sheep allotments (USDA Forest Service 2005, p. 50). This has resulted in a reduction of 7,889 sheep animal months under the total calculated for 1998 within the PCA, and is a testament to the commitment land management agencies have to the ongoing success of the grizzly bear population in the GYA. As of 2006, there are a total of two active sheep allotments within the PCA, both on the Targhee National Forest. The permittee of the two allotments on the Gallatin National Forest that were active in 2005 when the Proposed rule was published, agreed to waive the grazing permit back to the Gallatin National Forest without preference and these two sheep allotments were closed in 2006. The Gallatin National Forest plans to close three other vacant allotments when they revise their current Forest Plan. This Forest Plan revision process is scheduled to be completed by 2010 (USDA Forest Service 2005, p. 11). The mandatory restriction on creating new livestock allotments and the voluntary phasing out of livestock allotments with recurring conflicts further ensure that the PCA will continue to function as source habitat.

The National Parks and National Forests within the PCA will manage developed sites at 1998 levels within each bear management subunit, with some exceptions for administrative and maintenance needs (U.S. Fish and Wildlife Service 2007, pp. 38–56). Developed sites refer to sites on public land developed or improved for human

use or resource development. Examples include campgrounds, trailheads, lodges, summer homes, restaurants, visitor centers, oil and gas exploratory wells, production wells, and work camps. The primary concerns related to developed sites are direct mortality from bear/human encounters, food conditioning, and habituation of bears to humans (Mattson *et al.* 1987, p. 271). Habituation occurs when grizzly bears encounter humans or developed sites frequently, and without negative consequences, so that the bears no longer avoid humans and areas of human activity (U.S. Fish and Wildlife Service 1993, p. 6). Habituation does not necessarily involve human-related food sources. Food conditioning occurs when grizzly bears receive human-related sources of food and thereafter seek out humans and human use areas as feeding sites (U.S. Fish and Wildlife Service 1993, p. 6). In areas of suitable habitat inside the PCA, the National Park Service and the USDA Forest Service enforce food storage rules aimed at decreasing grizzly bear access to human foods (U.S. Fish and Wildlife Service 2007, pp. 23–24). These regulations will continue to be enforced and are in effect, or proposed, for all currently occupied grizzly bear habitat within the Yellowstone DPS boundaries (U.S. Fish and Wildlife Service 2007, pp. 23–24).

Gunther (1994, pp. 558–559) noted that grizzly bear management in Yellowstone National Park has shifted from problems involving food-conditioned bears to problems involving habituated (but not food-conditioned) bears seeking natural foods within developed areas or along roadsides. New or expanded developed sites can impact bears through temporary or permanent habitat loss and displacement, increased length of time of human use, increased human disturbance to surrounding areas, and, potentially unsecured bear attractants.

Developed sites on public lands are currently inventoried in existing GIS databases and are input in the Yellowstone Grizzly Bear Cumulative Effects Model. As of 1998, there were 598 developed sites on public land within the PCA (USDA Forest Service 2005, pp. 56–57). All changes in developed sites since 1998 have been evaluated against the baseline and have been determined to be acceptable under the standard for developed sites identified in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 44–45). For a new developed site to be determined acceptable, it must be demonstrated that it will have no effect on grizzly bears (U.S. Fish and Wildlife Service 2007, pp. 42). For example, a cell phone tower would fit this criterion because there is no human occupancy, nor human attractants such as garbage or other potential food sources. However, campgrounds, trailheads, lodges, summer homes, restaurants, visitor centers, oil and gas exploratory wells, production wells, and work camps would not be considered acceptable. Inside the PCA, no changes in the 1998 baseline have occurred in terms of site developments. The maintenance of the number and capacity of developed sites at 1998 levels further protects this significant portion of the DPS' range and ensures the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range within the foreseeable future.

Management of oil, gas, and mining are tracked as part of the developed site monitoring effort (U.S. Fish and Wildlife Service 2007, p. 44). There were no active oil and gas leases inside the PCA as of 1998 (USDA Forest Service 2006a, p. 209). There are approximately 631 sq km (244 sq mi) of secure habitat potentially available for timber projects and 243 sq km (94 sq mi) of secure habitat that allows surface occupancy for oil and gas, projects within the PCA (USDA Forest Service 2006a, Figures 48, 96). This comprises less than 4 percent of all suitable habitat within the PCA. Additionally, 1,354 mining claims existed in 10 of the subunits inside the PCA (U.S. Fish and Wildlife Service 2007, p.134, Appendix F), but only 27 of these mining claims had operating plans. These operating plans are included in the 1998 developed site baseline. Under the conditions of the Strategy, any new project will be approved only if it conforms to secure habitat and developed site standards (U.S. Fish and Wildlife Service 2007, pp. 44–45). For instance, any project that reduces the amount of secure habitat permanently will have to provide replacement secure habitat of equivalent habitat quality (as measured by the Cumulative Effects Model or equivalent technology) and any change in developed sites will require mitigation equivalent to the type and extent of the impact, and such mitigation must be in place before project initiation or be provided concurrently with project development as an integral part of the project plan (U.S. Fish and Wildlife Service 2007, p. 40–41). For projects that temporarily change the amount of secure habitat, only one project is allowed in any subunit at any time (U.S. Fish and Wildlife Service 2007, pp. 40–41). Mitigation of any project will occur within the same subunit and will be proportional to the type and extent of the project (U.S. Fish and Wildlife Service 2007, p. 40–41).

Finally, we established a habitat effectiveness baseline by documenting habitat effectiveness values using the Cumulative Effects Model and 1998 habitat data (U.S. Fish and Wildlife Service 2007, pp. 52–53). Habitat effectiveness values reflect the relative amount of energy (derived from natural foods) that is available to grizzly bears given their response to human activities. Important foods are key habitat-based criteria. The inverse relationship between whitebark pine cone production and grizzly conflicts in the Yellowstone Ecosystem has been documented (Mattson *et al.* 1992, p. 436; Gunther *et al.* 1997, p. 38; Gunther *et al.* 2004, pp. 13–14). However, the relationship between other important foods such as spring ungulate carcasses, cutworm moths, and cutthroat trout is not as clear cut. Therefore, it is important to monitor foods and continue to relate major food abundance to demographics and human/bear conflicts. Monitoring habitat effectiveness using the Cumulative Effects Model is valuable in understanding and maintaining important habitats for grizzly bears. The Study Team will continue coordinating with the National Forests and National Parks within the PCA to update and evaluate habitat effectiveness against the 1998 baseline.

To establish the 1998 baseline for habitat effectiveness values, the USDA Forest Service calculated habitat effectiveness within each subunit for four important bear seasons—spring (March 1 to May 15); estrus (May 16 to July 15); early hyperphagia (July 16 to August 31); and late hyperphagia (September 1 to November 30) (U.S. Fish and Wildlife Service 2007, pp. 133–144, Table 6 in Appendix F). High habitat effectiveness values during estrus are associated with cutthroat trout spawning streams (U.S. Fish and Wildlife Service 2007, p. 140). Similarly, high habitat effectiveness values during early hyperphagia and late hyperphagia are associated with moth aggregation sites and whitebark pine, respectively (U.S. Fish and Wildlife Service 2007, p. 140). Habitat effectiveness values also are directly influenced by the amount of secure habitat in a subunit. This combination of the distribution and abundance of natural foods and the distribution and abundance of human activities produces relative values indicative of how effective a certain subunit is at supporting grizzly bear growth, reproduction, and survival (U.S. Fish

and Wildlife Service 2007, p. 140). As such, values varied widely among seasons and across seasons within subunits (U.S. Fish and Wildlife Service 2007, p 141, Table 6 in Appendix F). Because the National Park Service and the USDA Forest Service have not changed levels of road densities, secure habitat, developed sites, or livestock allotments except to improve upon the 1998 baseline, the 1998 habitat effectiveness values remain applicable. Regardless of habitat effectiveness values, the Yellowstone grizzly bear population has continued to grow and expand in distribution (Harris *et al.* 2006, p. 48; Schwartz *et al.* 2006b, pp. 64–66). Upon delisting, the USDA Forest Service will measure changes in seasonal habitat effectiveness values in each Bear Management Unit and subunit by regular application of the Cumulative Effects Model or best available system and compare outputs with the 1998 baseline values (U.S. Fish and Wildlife Service 2007, pp. 52–53). The Cumulative Effects Model provides a relative index of habitat change over time and how it has increased or decreased since 1998. The Cumulative Effects Model databases will be reviewed annually and updated as needed (U.S. Fish and Wildlife Service 2007, pp. 52–53).

The Strategy calls for maintaining or improving the existing habitat effectiveness values in secure habitat in each subunit but recognizes that they change annually and seasonally due to natural processes such a wildfire and natural variations (U.S. Fish and Wildlife Service 2007, pp. 52–53). The best way to maintain existing habitat effectiveness values is to manage motorized access and developed sites, as described in the Strategy. Private land development also will be monitored and linked to numbers of human-bear conflicts, causes of human-bear conflicts, and distribution of human-bear conflicts so as to direct management efforts to improve food supply and minimize bear/human conflicts in such areas.

Within the PCA, each National Forest and National Park will monitor adherence to the secure habitat, developed site, and livestock standards inside the PCA, as established by the Strategy (U.S. Fish and Wildlife Service 2007, p. 64). The Study Team will monitor habitat effectiveness and track any changes to the habitat from fire, insects, and disease, and other human activities not measured by the habitat standard monitoring efforts. The agencies will measure changes in seasonal habitat value and effectiveness in each bear management unit and subunit by regular application of the Cumulative Effects Model or the best available system, and compare outputs to the 1998 baseline. These databases incorporate information regarding vegetation, the abundance and distribution of the four major bear foods, location, duration, and intensity of use for motorized access routes, non-motorized access routes, developed sites, and front-country and back-country dispersed uses. The Study Team will review Cumulative Effects Model databases annually to refine and verify Cumulative Effects Model assumptions and update them as needed to reflect changes in intensity or duration of human use. The Coordinating Committee may review and revise habitat standards based on the best available science, after appropriate public processes have been conducted by the affected land management agencies.

To prevent habitat fragmentation and degradation, the Strategy requires that all road construction projects in suitable habitat on Federal lands throughout the entire GYA (both inside and outside of the PCA) evaluate the impacts of the project on grizzly habitat connectivity during the NEPA process (U.S. Fish and Wildlife Service 2007, pp. 38–39). By identifying areas used by grizzly bears, officials can mitigate potential impacts from road construction both during and after a project. Federal agencies will identify important crossing areas by collecting information about known bear crossings, bear sightings, ungulate road mortality data, bear home range analyses, and locations of game trails. Potential advantages of this requirement include reduction of grizzly bear mortality due to vehicle collisions, access to seasonal habitats, maintenance of traditional dispersal routes, and decreased fragmentation of individual home ranges. For example, work crews will place temporary work camps in areas with lower risk of displacing grizzly bears, and food and garbage will be kept in bear-proof containers. Highway planners will incorporate warning signs and crossing structures such as culverts or underpasses into projects when possible to facilitate safe highway crossings by wildlife.

''Suitable Habitat'' Management Outside the Primary Conservation Area—In suitable habitat outside of the PCA within the DPS, the USDA Forest Service, BLM, and State wildlife agencies will monitor habitat and population criteria to prevent potential threats to habitat, ensuring that the measures of the Act continue to be unnecessary (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 2–3; MTFWP 2002, p. 2; WGFD 2005, p. 1; USDA Forest Service 2006a, pp. 44–45; U.S. Fish and Wildlife Service 2007, p. 5). Factors impacting suitable habitat outside of the PCA in the future may include increased road densities, livestock allotments, developed sites, human presence, and habitat fragmentation. Both Federal and State agencies are committed to managing habitat so that the measures of the Act are not required to assure the Yellowstone grizzly bear DPS is not likely to become endangered in all or a significant portion of its range in the foreseeable future (U.S. Fish and Wildlife Service 2007, pp. 12–85; Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 2–3; MTFWP 2002, p. 2; WGFD 2005, p. 1) (see Factor D below). In suitable habitat outside of the PCA, restrictions on human activities are more flexible but still the USDA Forest Service, BLM, and State wildlife agencies will carefully manage these lands, monitor bear/human conflicts in these areas, and respond with management as necessary to reduce such conflicts to account for the complex needs of both grizzly bears and humans (U.S. Fish and Wildlife Service 2007, p. 58; Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 16–17; MTFWP 2002, pp. 55–56; WGFD 2005, pp. 25–26; USDA Forest Service 2006b, pp. A1–A27).

Currently, there are 22,783 sq km (8,797 sq mi) of suitable habitat outside of the PCA within the DPS boundaries (see Figure 1 above). Of this, 17,292 sq km (6,676 sq mi) are on National Forest lands. About 10 to 16 percent of the population of female grizzly bears with cubs occurs outside the PCA (Schwartz *et al.* 2006b, pp. 64–66). Management decisions on USDA Forest Service lands will continue to consider potential impacts on grizzly bear habitat and will be managed so as to maintain the habitat conditions necessary to support a recovered grizzly bear population (USDA Forest Service 2006b, p. 26). Approximately 79 percent of suitable habitat outside the PCA on National Forest lands within the DPS is currently designated a Wilderness Area (6,799 sq km (2,625 sq mi)), a Wilderness Study Area (708 sq km (273 sq mi)), or an Inventoried Roadless Area (6,179 sq km (2,386 sq mi). The amount of designated Wilderness Area, Wilderness Study Area, and Inventoried Roadless Area within each National Forest ranges from 56 to 90 percent, depending upon the forest. This large area of widely distributed habitat allows for continued population expansion and provides

additional resiliency to environmental change.

Wilderness areas outside of the PCA are considered secure because they are protected from new road construction by Federal legislation. In addition to restrictions on road construction, the Wilderness Act of 1964 (Pub. L. 88–577) also protects designated wilderness from permanent human habitation and increases in developed sites. The Wilderness Act allows livestock allotments existing before the passage of the Wilderness Act and mining claims staked before January 1, 1984, to persist within wilderness areas, but no new grazing permits or mining claims can be established after these dates. If pre-existing mining claims are pursued, the plans of operation are subject to Wilderness Act restrictions on road construction, permanent human habitation, and developed sites.

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. 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. As such, they are safeguarded from decreases in grizzly bear security. Furthermore, 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.

Inventoried Roadless Areas currently provide 4,891 sq km (1,888 sq mi) of secure habitat for grizzly bears outside of the PCA within the DPS boundaries. A USDA Forest Service Interim Directive (69 FR 42648, July 16, 2004) which instructs National Forests to preserve the ''roadless characteristics'' of roadless areas remained in effect until November 2006. In September 2006, a Federal court remanded the 2005 State Petitions for Inventoried Roadless Area Management Rule (70 FR 25653–25662, May 13, 2005) and reinstated the 2001 Roadless Areas Conservation Rule (66 FR 3244–3273, January 12, 2001) (see Factor D below for a more complete discussion of this court decision and the two different Federal Rules issued regarding Roadless Area Management). The 2001 Roadless Areas Conservation Rule prohibits road construction, road re-construction, and timber harvest in Inventoried Roadless Areas (66 FR 3244–3273, January 12, 2001). This restriction on road building makes mining activities and oil and gas production much less likely because access to these resources becomes cost-prohibitive or impossible without new roads. Potential changes in the management of these areas are not anticipated, but are discussed further under Factor D.

An estimated 7,195 sq km (2,778 sq mi) of suitable habitat outside the PCA on USDA Forest Service lands within the DPS could experience permanent or temporary changes in road densities. Because grizzly bears will remain on the USDA Forest Service Sensitive Species list after delisting and will be classified as a ''species of concern'' (USDA Forest Service 2006b, p. 26) under the 2005 USDA Forest Service Planning Regulations, any increases in roads on National Forests would have to comply with National Forest Management Act and be subject to the NEPA process considering potential impacts to grizzly bears.

Importantly, all three State grizzly bear management plans recognize the importance of areas that provide security for grizzly bears in suitable habitat outside of the PCA within the DPS boundaries on Federal lands. Although State management plans apply to all suitable habitat outside of the PCA, habitat management on public lands is directed by Federal land management plans, not State management plans. The Montana and Wyoming plans recommend limiting average road densities to 1.6 km/2.6 sq km (1 mi/sq mi) or less in these areas (MTFWP 2002, pp. 32–34; WGFD 2005, pp. 22–25). Both States have similar standards for elk habitat on State lands and note that these levels of motorized access benefit a variety of wildlife species while maintaining reasonable public access. Similarly, the Idaho State plan recognizes that management of motorized access outside the PCA should focus on areas that have road densities of 1.6 km/2.6 sq km (1 mi/sq mi) or less. The area most likely to be occupied by grizzly bears outside the PCA in Idaho is on the Caribou-Targhee National Forest. The 1997 Targhee Forest Plan includes motorized access standards and prescriptions outside the PCA with management prescriptions that provide for long-term security in 59 percent of existing secure habitat outside of the PCA (USDA Forest Service 2006a, pp. 78, 109).

In suitable habitat outside the PCA within the DPS boundaries, there are roughly 150 active cattle allotments and 12 active sheep allotments (USDA Forest Service 2004, p. 129). The Targhee Forest closed two of these sheep allotments in 2004 (USDA Forest Service 2006a, p. 168). The USDA Forest Service will allow these allotments within suitable habitat to persist along with other existing livestock allotments outside of suitable habitat. Although conflicts with livestock have the potential to result in mortality for grizzly bears, the Strategy will prevent mortality from exceeding established sustainable mortality limits and preclude population level impacts. The Strategy directs the Study Team to monitor and spatially map all grizzly bear mortalities (both inside and outside the PCA), causes of death, the source of the problem, and alter management to maintain a recovered population and prevent the need to relist the population under the Act (U.S. Fish and Wildlife Service 2007, pp. 31–34).

There are over 500 developed sites on the 6 National Forests in the areas identified as suitable habitat outside the PCA within the DPS boundaries (USDA Forest Service 2004, p. 138). Grizzly bear/human conflicts at developed sites are the most frequent reason for management removals (Servheen *et al.* 2004, p. 21). Existing USDA Forest Service food storage regulations for these areas will continue to minimize the potential for grizzly bear/human conflicts through food storage requirements, outreach, and education. The number and capacity of developed sites will be subject to management direction established in Forest Plans. Should the Study Team determine developed sites are related to increases in mortality beyond the sustainable limits discussed above, they may recommend closing specific developed sites or otherwise altering management in the area in order to maintain a recovered population and prevent the need to relist the population under the Act. Due to the USDA Forest Service's commitment to manage National Forest lands in the GYA such that a viable grizzly bear population is maintained (U.S. Fish and Wildlife Service 2007, pp. 42–43; USDA Forest Service 2006b, pp. iii, A–6), we do not expect livestock allotments or developed sites in suitable habitat outside of the PCA to reach densities that are likely to threaten the Yellowstone DPS in all or a significant portion of its range in the foreseeable future.

Less than 19 percent (3,213 sq km (1,240 sq mi)) of suitable habitat outside the PCA within the DPS boundaries on

USDA Forest Service land allows surface occupancy for oil and gas development and 11 percent (1,926 sq km (744 sq mi)) has both suitable timber and a management prescription that allows scheduled timber harvest. The primary impacts to grizzly bears associated with timber harvest and oil and gas development are increases in road densities, with subsequent increases in human access, grizzly bear/human encounters, and human-caused grizzly bear mortalities (McLellan and Shackleton 1988, pp. 458–459; McLellan and Shackleton 1989, pp. 377–379; Mace *et al.* 1996, pp. 1402–1403). Although seismic exploration associated with oil and gas development or mining may disturb denning grizzly bears (Harding and Nagy 1980, p. 278; Reynolds *et al.* 1986, pp. 174–175), actual den abandonment is rarely observed, and there has been no documentation of such abandonment by grizzly bears in the GYA. Additionally, only a small portion of this total land area will contain active projects at any given time, if at all. For example, among the roughly 1,926 sq km (744 sq mi) identified as having both suitable timber and a management prescription that allows timber harvest, from 2000 to 2002, an average of only 5 sq km (2 sq mi) was actually logged annually (USDA Forest Service 2004, p. 118). Similarly, although nearly 3,213 sq km (1,240 sq mi) of suitable habitat on National Forest lands allow surface occupancy for oil and gas development, there currently are no active wells inside these areas (USDA Forest Service 2004, pp. 170–171).

Ultimately, the six affected National Forests (the Beaverhead-Deerlodge, Bridger-Teton, Caribou-Targhee, Custer, Gallatin, and Shoshone) will manage the number of roads, livestock allotments, developed sites, timber harvest projects, and oil and gas wells outside of the PCA in suitable habitat to allow for a viable grizzly bear population and ensure that the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range within the foreseeable future. Because the grizzly bear will be classified as a sensitive species (or a species of concern when Forest Management Plans are again revised using the 2005 USDA Forest Service planning regulations and the USDA Forest Service Manual), land management activities will be managed so as to a provide for the needs of a recovered population. Any road construction, timber harvest, or oil and gas projects would require compliance with the NEPA and the National Forest Management Act of 1976 (15 U.S.C. 1600), considering all potential impacts to the Yellowstone grizzly bear population and its habitat.

Rapidly accelerating growth of human populations in some areas in grizzly bear habitat within the DPS boundaries but outside of the PCA continues to define the limits of grizzly habitat, and will likely limit the expansion of the Yellowstone grizzly bear population onto private lands in some areas outside the PCA. Urban and rural sprawl (low-density housing and associated businesses) has resulted in increasing numbers of grizzly bear/human conflicts with subsequent increases in grizzly bear mortality rates. Private lands account for a disproportionate number of bear deaths and conflicts (see Figures 15 and 16 in the Strategy). Nearly 9 percent of all suitable habitat outside of the PCA is privately owned. As private lands are developed and as secure habitat on private lands declines, State and Federal agencies will work together to balance impacts from private land development (U.S. Fish and Wildlife Service 2007, p. 54). Outside the PCA, State agencies will assist non-government organizations and other entities to identify and prioritize potential lands suitable for permanent conservation through easements and other means as possible (U.S. Fish and Wildlife Service 2007, p. 54). Due to the large areas of widely distributed suitable habitat on public lands managed by agencies committed to the maintenance of a recovered grizzly bear population, human population growth on private lands is not likely to endanger the Yellowstone DPS in all or a significant portion of its range in the foreseeable future.

Summary of Factor A—In summary, the primary factors related to past habitat destruction and modification have been directly addressed through changes in management practices. Within suitable habitat, differential levels of management and protection (one standard inside the PCA and another standard for suitable habitat outside the PCA) are applied to areas based on their level of importance. Within the PCA, the most significant portion of the range where 84 to 90 percent of the females with cubs live (Schwartz *et al.* 2006b, p. 66), comprehensive protections are in place. For this area, the Service developed objective and measurable habitat criteria concerning secure habitat, human site developments, and livestock allotments which will be habitat requirements on public lands once this final rule becomes effective (U.S. Fish and Wildlife Service 2007, pp. 39–45). In addition, the Study Team, State, National Park Service, and USDA Forest Service biologists and technicians will monitor the availability and abundance of the four major foods, and of habitat value and habitat effectiveness using the Cumulative Effects Model or other appropriate methods (U.S. Fish and Wildlife Service 2007, pp. 45–52). The Coordinating Committee will respond to these monitoring data with adaptive management (Holling 1978, pp. 11–16) as per the Strategy (U.S. Fish and Wildlife Service 2007, pp. 63–64). Accordingly, the PCA, which comprises 51 percent of the suitable habitat within the DPS boundaries and is occupied by 84 to 90 percent of all females with cubs (Schwartz *et al.* 2006b, p. 64), will be a highly secure area for grizzlies upon delisting, with habitat conditions maintained at or above levels documented in 1998. Maintenance of this portion of the range, as described above, will satisfy the habitat requirements of the species relative the Yellowstone grizzly bear DPS's biological demands and is sufficient to support a recovered grizzly bear population.

Suitable habitat outside the PCA is also significant, albeit to a lesser extent, in that it allows for continued population expansion into adjacent areas of public land in the GYA, and therefore, provides additional ecological resiliency to respond to environmental change. These areas will be carefully monitored and managed to ensure that the measures of the Act are not again required. Management in this area will provide for the complex needs of both grizzly bears and humans. In suitable habitat outside the PCA on USDA Forest Service lands, 74 percent (12,860 sq km or 4,965 sq mi) is currently secure habitat, 68 percent of which (8,737 sq km or 3,373 sq mi) is likely to remain secure. Areas outside the PCA contain 10 to 16 percent of GYA's females with cubs (Schwartz *et al.* 2006b, p. 64). Management of public land outside the PCA administered by State and Federal agencies also will continue to consider potential impacts of management decisions on grizzly bear habitat. Efforts by non-government organizations and State and county agencies will seek to minimize bear/human conflicts on private lands (U.S. Fish and Wildlife Service 2007, pp. 54, 57–59). These and other conservation measures discussed in this final rule will allow for continued population expansion so that grizzly bears will likely occupy the remainder of the suitable habitat within the DPS within the foreseeable future.

A total of 88 percent of all suitable habitat within the DPS boundaries (40,293 sq km (15,557 sq mi)) is

managed by the USDA Forest Service or National Park Service. These public lands are already managed, and will continue to be managed, such that adequate habitat for the Yellowstone grizzly bear population is maintained (U.S. Fish and Wildlife Service 2007, pp. 38–56; USDA Forest Service 2006b, pp. 4–7, 26). Significant areas of the suitable habitat outside the PCA are designated as wilderness where human development actions are prohibited. For example, 2,948 sq km (1,138 sq mi) of the Wind River Range including almost all of the high elevation whitebark pine stands are in designated Wilderness Areas. Habitat and population standards described in the Strategy have been incorporated into National Park Compendiums and National Forest Land Management Plans (Yellowstone National Park 2006, p. 12; Grand Teton National Park, p. 1; USDA Forest Service 2006b, pp. 4–7, 26) (see Factor D below). Collectively, these differential levels of management and protection (one standard inside the PCA and another standard for suitable habitat outside the PCA) guarantee appropriate protective measures for each part of the significant portion of range.

Therefore, the lack of present or threatened destruction, modification, or curtailment of the Yellowstone DPS's habitat and range ensures this species is not likely to become endangered within the foreseeable future in all or a significant portion of its range. No current or foreseeable threats to habitat or range imperil the recovered status of the Yellowstone DPS. And all areas necessary for maintaining a recovered population are adequately safeguarded so that this population no longer requires the measures of the Act to protect habitat or range.

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

No grizzly bears have been legally removed from the GYA in the last 30 years for commercial, recreational, or educational purposes. The only commercial or recreational take anticipated post-delisting is a limited, controlled hunt. The States will manage grizzly bears as a game animal, potentially with a carefully regulated hunt (for a more detailed discussion, see the State Management Plans section under Factor D below). Should such a season be implemented, all hunting mortalities will be counted toward the ecosystem-wide mortality limits for the population and will be strictly controlled to assure that mortality limits are not exceeded and the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range by this discretionary mortality source. Significant take for educational purposes is not anticipated. Mortality due to illegal poaching, defense of life and property, mistaken identity or other accidental take, and management removals are discussed under Factor C below.

Between 1980 and 1982, three accidental trap mortalities were associated with scientific research (Servheen *et al.* 2004, p. 21). Since 1982, there has not been a single capture mortality associated with research trapping in the GYA spanning more than 468 grizzly bear captures (Servheen *et al.* 2004, p. 21). Because of rigorous protocols dictating proper bear capture, handling, and drugging techniques used today, this type of scientific overutilization is not a threat to the Yellowstone grizzly bear population. The Study Team, bear biologists, and researchers will continue implementing these protocols after delisting. Therefore, mortalities associated with scientific research are likely to remain an insignificant factor in population dynamics into the foreseeable future.

C. Disease or Predation

Disease—Although grizzly bears have been documented with a variety of bacteria and other pathogens, parasites, and disease, fatalities are uncommon (LeFranc *et al.* 1987, p. 61) and do not appear to have population-level impacts on grizzly bears (Jonkel and Cowan 1971, pp. 31–32; Mundy and Flook 1973, p. 13; Rogers and Rogers 1976, p. 423). Researchers have demonstrated that some grizzly bears have been documented with brucellosis (type 4), clostridium, toxoplasmosis, canine distemper, canine parvovirus, canine hepatitis, and rabies (LeFranc *et al.* 1987, p. 61; Zarnke and Evans 1989, p. 586; Marsilio *et al.* 1997, p. 304; Zarnke *et al.* 1997, p. 474). However, based on 30 years of research by the Study Team, natural mortalities in the wild are rare (Interagency Grizzly Bear Study Team 2005, pp. 34–35) and it is likely that mortalities due to any of these bacteria or pathogens are negligible components of total mortality in the GYA. Disease is not common in grizzly bears, and has only very rarely been documented in Yellowstone grizzly bears (Craighead *et al.* 1988, p. 11). Disease is likely to remain an insignificant factor in population dynamics into the foreseeable future.

Natural Predation—Grizzly bears are occasionally killed by other wildlife. Adult grizzly bears kill cubs, sub-adults, or other adults (Stringham 1980, p. 337; Dean *et al.* 1986, pp. 208–211; Hessing and Aumiller 1994, pp. 332–335; McLellan 1994, p. 15; Schwartz *et al.* 2003b, pp. 571–572). This type of intraspecific killing seems to occur rarely (Stringham 1980, p. 337) and has only been observed among Yellowstone grizzly bears in the GYA 14 times between 1986 and 2004 (Haroldson 2005). Wolves and grizzly bears often scavenge similar types of carrion and, sometimes, will interact with each other in an aggressive manner. From 1995 through 2003, Gunther and Smith (2004, pp. 233–236) documented 96 wolf-grizzly bear interactions and 2 incidents in which wolf packs likely killed grizzly bear cubs. Overall, these types of aggressive interactions among grizzly bears or with other wildlife are rare and are likely to remain an insignificant factor in population dynamics into the foreseeable future.

Human Predation—Humans have historically been the most effective predators of grizzly bears. Excessive human-caused mortality is one of the major contributing factors to grizzly bear decline during the nineteenth and twentieth centuries (Leopold 1967, p. 30; Koford 1969, p. 95; Servheen 1990, p. 1; Servheen 1999, pp. 50–52; Mattson and Merrill 2002, pp. 1129, 1132; Schwartz *et al.* 2003b, p. 571), eventually leading to their listing as a threatened species in 1975. Grizzlies were seen as a threat to livestock and to humans and, therefore, an impediment to westward expansion. The Federal government, as well as many of the early settlers in grizzly bear country, was dedicated to eradicating large predators. Grizzly bears were shot, poisoned, and killed wherever humans encountered them (Servheen 1999, p. 50). By the time grizzlies were listed under the Act in 1975, there were only a few hundred grizzly bears remaining in the lower 48 States in less than 2 percent of their former range (U.S. Fish and Wildlife Service 1993, pp. 8–12).

From 1973 to 2002, a total of 372 known grizzly bear deaths occurred in the GYA (Haroldson and Frey 2003, p. 27). Of these, 272 (73 percent of total) were human-caused (Haroldson and Frey 2003, p. 27). Since 1975, levels of human-caused mortality have remained relatively constant (Servheen *et al.* 2004, p. 15). Although humans have been and remain the single greatest cause of mortality for grizzly bears (McLellan *et al.* 1999, pp. 914–916; Servheen *et al.* 2004, p. 21), rates of human-caused mortality have been low enough to allow Yellowstone bear population growth and range expansion (Harris *et al.* 2006, p. 48; Schwartz *et al.* 2006b, pp. 64–66). Implementation of the revised mortality limits ensure that

mortality will continue to be managed at sustainable levels. Below we consider human predation impacts including illegal poaching, defense of life and property, accidental mortality, and management removals.

We define vandal killing as poaching, which is malicious, illegal killing of a grizzly bears. People may kill grizzly bears for several reasons, including a general perception that grizzly bears in the area may be dangerous, frustration over depredations of livestock, or to protest land use and road use restrictions associated with grizzly bear habitat management (Servheen *et al.* 2004, p. 21). Regardless of the reason, poaching continues to occur. We are aware of at least 27 vandal killings in the GYA between 1980 and 2002 (Servheen *et al.* 2004, p. 21). Although this level of take occurred during a period where poaching was enforceable by Federal prosecution, we do not expect vandal killing to significantly increase after delisting.

State and Federal law enforcement agents have cooperated to ensure consistent enforcement of laws protecting grizzly bears. Currently, State and Federal prosecutors and enforcement personnel from each State and Federal jurisdiction work together to make recommendations to all jurisdictions, counties, and States, on uniform enforcement, prosecution, and sentencing relating to illegal grizzly bear kills. Upon delisting, all three affected States will classify grizzly bears of the Yellowstone population as game animals, which cannot be taken without authorization by State wildlife agencies (U.S. Fish and Wildlife Service 2007, pp. 72–75; Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, pp. 18–21; MTFWP 2002, p. 2; WGFD 2005, p. 20). In other words, it will still be illegal for private citizens to kill grizzly bears unless it is in self defense, they have a hunting license issued by State wildlife agencies, or in the Montana portion of the DPS, if a grizzly bear is caught in the act of attacking or killing livestock (87–3–130 MCA). States will continue to enforce, prosecute, and sentence poachers just as they do for any game animal such as elk, black bears, and cougars. Although it is widely recognized that poaching still occurs, this illegal source of mortality is not significant enough to hinder the continuing growth and range expansion of the Yellowstone grizzly bear population (Pyare *et al.* 2004, pp. 5–6; Schwartz *et al.* 2002, p. 203).

One way to address vandal killing is to change human values, perceptions, and beliefs about grizzly bears and Federal regulation of public lands (Servheen *et al.* 2004, p. 27). To address the concerns of user groups who have objections to land use restrictions that accommodate grizzly bears, Federal and State agencies market the benefits of restricting motorized access to multiple species. For example, both Montana and Wyoming have recommendations for elk habitat security similar to those for grizzly bears (less than 1.6 km/2.6 sq km (1 mi/sq mi)) and this level of motorized access meets the needs of a variety of wildlife species, while maintaining reasonable opportunities for public access. To address the concerns of citizens who feel that grizzly bears are a threat to their safety or their lifestyle, I & E programs aim to change perspectives on the danger and behavior of grizzly bears (for a detailed discussion of I & E programs, see Factor E below).

From 1980 to 2002, humans killed 49 grizzly bears in self-defense or defense of others. This constituted nearly 17 percent of known grizzly bear mortalities during this time period (Servheen *et al.* 2004, p. 21). These grizzly bear/human conflicts occurred primarily over livestock or hunter-killed carcasses, but also at camp and home sites. Federal and State agencies have many options to potentially reduce these conflicts (Servheen *et al.* 2004, p. 27). By promoting the use of pepper spray and continuing current I & E programs, many of these grizzly bear deaths may be avoided.

Humans kill grizzly bears unintentionally with vehicles or by mistaking them for other species when hunting. From 1980 to 2002, the Yellowstone grizzly bear population incurred 9 mortalities from roadkills and 13 mortalities associated with mistaken identification (totaling 9 percent of known mortality for this time period) (Servheen *et al.* 2004, p. 21). Measures to reduce vehicle collisions with grizzly bears include removing roadkill carcasses from the road so that grizzly bears are not attracted to the roadside (Servheen *et al.* 2004, p. 28). Cost-effective mitigation efforts to facilitate safe crossings by wildlife will be voluntarily incorporated in road construction or reconstruction projects on Federal lands within suitable grizzly bear habitat.

Mistaken identification of grizzly bears by black bear hunters is a manageable source of mortality. The Strategy identifies I & E programs targeted at hunters that emphasize patience, awareness, and correct identification of targets to help reduce grizzly bear mortalities from inexperienced black bear and ungulate hunters (U.S. Fish and Wildlife Service 2007, pp. 61–62). Beginning in license year 2002, the State of Montana required that all black bear hunters pass a Bear Identification Test before receiving a black bear hunting license (see *http://fwp.state.mt.us/bearid/* for more information and details). In addition, Montana and Wyoming include grizzly bear encounter management as a core subject in basic hunter education courses (WGFD 2005, p. 34; MTFWP 2002, p. 63).

Big-game hunters in the GYA are another source of mortality for grizzly bears. Between 1980 and 2002, 71 percent (35 of 49) of grizzly bears killed in self defense were hunting-related (Servheen *et al.* 2004, p. 21). These deaths occur during surprise encounters in heavy cover, at hunter-killed carcasses or gut piles, or when packing out carcasses. Elk hunters in Grand Teton National Park are required to carry pepper spray in an accessible location (WGFD 2006).

The last source of human predation on grizzly bears is associated with management removal of nuisance bears following grizzly bear/human conflicts. Effective nuisance bear management benefits the conservation of the Yellowstone grizzly bear population by promoting tolerance of grizzly bears and minimizing illegal killing of bears by citizens. The Strategy and the State grizzly bear management plans will guide nuisance bear management post-delisting. The Strategy is consistent with current protocol as described in the Guidelines (USDA Forest Service 1986, pp. 53–54), emphasizing the individual's importance to the entire population, with females continuing to receive a higher level of protection than males. Location, cause of incident, severity of incident, history of the bear, health, age, and sex of the bear, and demographic characteristics are all considered in any relocation or removal action. Upon delisting, State and National Park Service bear managers would continue to consult with each other and other relevant Federal agencies (i.e., USDA Forest Service, BLM) before any nuisance bear management decision is made, but consultation with us will no longer be required. The Strategy emphasizes removal of the human cause of the conflict when possible, or management and education actions to limit such conflicts (U.S. Fish and Wildlife Service 2007. pp. 57–60). In addition, an I & E team will continue to coordinate the development, implementation, and dissemination of programs and materials to aid in preventative management of human/bear conflicts. The Strategy recognizes that successful

management of grizzly bear/human conflicts requires an integrated, multiple-agency approach to continue to keep human-caused grizzly bear mortality within sustainable levels.

The largest increase in grizzly bear mortalities since 1994 is related to grizzly bear/human conflicts at or near developed sites (Servheen *et al.* 2004, p. 21). In fact, 20 percent (59 of 290) of known mortalities between 1980 and 2002 were related to site conflicts (Servheen *et al.* 2004, p. 21). These conflicts involved food-conditioned bears actively seeking out human sources of food or bears that are habituated to human presence seeking natural sources of food in areas that are near human structures or roads. The increase in site conflicts during the last decade is likely due to a combination of encroaching human presence coinciding with an increasing and expanding grizzly bear population. These conflicts usually involve attractants such as garbage, human foods, pet/livestock/wildlife foods, livestock carcasses, and wildlife carcasses, but also are related to attitudes and personal levels of knowledge and tolerance toward grizzly bears. Both State and Federal I & E programs are aimed primarily at reducing grizzly bear/human conflicts proactively by educating the public about potential grizzly bear attractants. Accordingly, roughly 68 percent of the total budgets of the agencies responsible for implementing the Strategy and managing the Yellowstone grizzly bear DPS post-delisting is for grizzly bear/human conflict management, outreach, and education (U.S. Fish and Wildlife Service 2007, Appendix H, p. 154). To address public attitudes and knowledge levels, I & E programs will present grizzly bears as a valuable public resource while acknowledging the potential dangers associated with them (for a detailed discussion of I & E programs, see Factor E below).

Management removals due to grizzly bear conflicts with livestock accounted for nearly 4 percent of known mortalities between 1980 and 2002 (Servheen *et al.* 2004, p. 21). Several steps to reduce livestock conflicts are currently underway. The USDA Forest Service and National Park Service are phasing out sheep allotments within the PCA as opportunities arise and, currently, only 2 active sheep allotments inside the PCA remain (USDA Forest Service 2006a, p. 167). The USDA Forest Service also has closed sheep allotments outside the PCA to resolve conflicts with species such as bighorn sheep as well as grizzly bears. Additionally, the alternative chosen by the USDA Forest Service during their Environmental Impact Statement process to amend the six national forest plans for grizzly bear habitat conservation includes direction to resolve recurring conflicts on livestock allotments through retirement of those allotments with willing permittees (USDA Forest Service 2006b, pp. 16–17). Livestock grazing permits include special provisions regarding reporting of conflicts, proper food and attractant storage procedures, and carcass removal. The USDA Forest Service monitors compliance to these special provisions associated with livestock allotments annually (Servheen *et al.* 2004, p. 28). Upon delisting, the USDA Forest Service will continue to implement these measures that minimize grizzly bear conflicts with livestock. The Strategy also recognizes that active management of individual nuisance bears is required. Removal of repeat depredators of livestock has been an effective tool for managing grizzly bear/livestock conflicts as most depredations are done by a few individuals (Jonkel 1980, p. 12; Knight and Judd 1983, p.188; Anderson *et al.* 2002, pp. 252–253).

The Study Team coordinates an annual analysis of the causes of conflicts, known and probable mortalities, and proposed management solutions (Servheen *et al.* 2004, pp. 1–29). The Yellowstone Ecosystem Subcommittee reviews these reports and initiates appropriate action if improvements in Federal or State management actions can minimize conflicts. As directed by the Strategy, upon delisting, the Study Team will continue to summarize nuisance bear control actions in their Annual Reports and the Coordinating Committee will continue with their review (U.S. Fish and Wildlife Service 2007, p. 60). The Study Team also would continue preparing annual spatial distribution maps of conflicts so that managers can identify where problems occur and compare trends in locations, sources, land ownership, and types of conflicts. This will facilitate proactive management of grizzly/human conflicts.

Summary of Factor C—Overall, from 1980 to 2002, the Yellowstone grizzly bear population incurred an average of 12.6 human-caused grizzly bear mortalities per year (Servheen *et al.* 2004, p. 21). Despite these mortalities, the Yellowstone grizzly bear population has continued to increase in size and expand its distribution in the last 2 decades (Eberhardt *et al.* 1994, pp. 361–362; Knight and Blanchard 1995, pp. 2–11; Boyce *et al.* 2001, pp. 1–11; Harris *et al.* 2006, p.48; Pyare *et al.* 2004, pp. 5–6; Schwartz *et al.* 2006b, pp. 64–66). Disease and natural predation are not currently a threat, nor are they likely to become a threat to the Yellowstone DPS in the foreseeable future in all or a significant portion of its range. Although humans are still directly or indirectly responsible for the majority of grizzly bear deaths in suitable habitat within the DPS boundaries, we have learned that this source of mortality can be effectively controlled through management and I & E.

We have institutionalized careful management and monitoring of human-caused mortality in the Strategy, Forest Plans, National Park management plans, and State grizzly bear management plans (see Factor D below). In addition, we revised our methodology for calculating the total allowable mortality limits (see the Recovery; Population and Demographic Management section above) to include natural mortalities and estimates of unreported/undetected deaths, so that mortality in the Yellowstone grizzly bear population can be managed at sustainable levels. Because of these actions, human sources of mortality are not currently a threat, nor are they likely to become a threat in the foreseeable future in all or a significant portion of the Yellowstone DPS's range. All significant areas are adequately protected.

D. The Inadequacy of Existing Regulatory Mechanisms

The lack of regulatory mechanisms to control take and protect habitat was a contributing factor to grizzly bear population declines (40 FR 31734–31736, July 28, 1975). Upon listing under the Act, the grizzly bear immediately benefited from a Federal regulatory framework that included prohibition of take (defined under the Act to include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct); prohibition of habitat destruction or degradation if such activities harm individuals of the species; the requirement that Federal agencies ensure their actions will not likely jeopardize the continued existence of the species; and the requirement to develop and implement a recovery plan for the species. These protective measures have improved the status of the Yellowstone grizzly bear population to the point where delisting is now appropriate.

The management of grizzly bears and their habitat draws from the laws and regulations of the Federal and State agencies in the Yellowstone DPS boundaries (U.S. Fish and Wildlife Service 2007, pp. 68–78). Forty Federal laws, rules, guidelines, strategies, and

reports and 33 State laws, statutes, and regulations are in place that apply to management of the Yellowstone grizzly bear population (U.S. Fish and Wildlife Service 2007, pp. 157–160, Appendix J). These laws and regulations provide the legal authority for controlling mortality, providing secure habitats, managing grizzly bear/human conflicts, controlling hunters, limiting access where necessary, controlling livestock grazing, maintaining I & E programs to control conflicts, monitoring populations and habitats, and requesting management and petitions for relisting if necessary.

Recovery of the Yellowstone grizzly bear population is the result of ongoing partnerships between Federal and State agencies, the governors of these States, county and city governments, educational institutions, numerous non-government organizations, private landowners, and the public who live, work, and recreate in the GYA. Just as recovery of the Yellowstone grizzly bear population could not have occurred without these excellent working relationships, maintenance of a recovered grizzly population will be the result of the continuation of these partnerships.

The Strategy is the plan which will guide the management and monitoring of the Yellowstone grizzly bear population and its habitat after delisting. It establishes a regulatory framework and authority for Federal and State agencies to take over management of the Yellowstone grizzly bear population from the Service. The Strategy also identifies, defines, and requires adequate post-delisting monitoring to maintain a healthy Yellowstone grizzly bear population (U.S. Fish and Wildlife Service 2007, pp. 25–56). The Strategy is an adaptive and dynamic document that allows for continuous updating based on new scientific information (U.S. Fish and Wildlife Service 2007, p. 14). The Strategy also has a clear response protocol that requires the agencies to respond with active management changes to deviations from the habitat and population standards in a timely and publicly accessible manner (U.S. Fish and Wildlife Service 2007, pp. 63–67). It represents a decade-long collaborative effort between us and the USDA Forest Service, National Park Service, BLM, U.S. Geological Survey, the Study Team, IDFG, MTFWP, and WGFD. State grizzly bear management plans were developed, reviewed, opened for public comment, revised, and completed in all three affected States (Idaho, Montana, and Wyoming) (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002; MTFWP 2002; WGFD 2005). These State plans were then incorporated into the Strategy to ensure that the plans and the Strategy are consistent and complementary (accessible at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*). The Strategy then went through a separate public comment process (65 FR 11340, March 2, 2000) before being revised and finalized. All the State and Federal agencies which are party to the agreement have signed a memorandum of understanding in which they have agreed to implement the Strategy.

The Strategy and the State plans describe and summarize the coordinated efforts required to manage the Yellowstone grizzly bear population and its habitat such that its continued conservation is ensured. The Strategy will direct management of grizzly bears inside the PCA, the most significant portion of range, whereas the State plans will cover all suitable habitat outside of the PCA. These documents specify the population, habitat, and nuisance bear standards to maintain a recovered grizzly bear population. The plans also document the regulatory mechanisms and legal authorities, policies, management, and post-delisting monitoring plans that exist to maintain the recovered grizzly bear population. Overall, the measures committed to in the Strategy and the State grizzly bear management plans provide assurances to us that adequate regulatory mechanisms exist to maintain a recovered grizzly bear population in the Yellowstone DPS after delisting (i.e., they ensure that the species is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range).

In areas of suitable habitat outside of the PCA (areas considered ''significant'' to the extent that they allow for continued population expansion into adjacent areas of public land in the GYA, and therefore, provide additional ecological resiliency to respond to environmental change), individual National Forest Plans and State grizzly bear management plans apply. Upon delisting, the USDA Forest Service will place grizzly bears on its Sensitive Wildlife Species list (USDA Forest Service 2006b, p. 26). This requires the USDA Forest Service to conduct a biological evaluation for any project which may ''result in loss of species viability or create significant trends toward Federal listing'' (USDA Forest Service Manual 2006). Under the revised Forest Planning Regulations (70 FR 1023, January 5, 2005), Yellowstone grizzly bears will be classified as a ''species of concern'' (USDA Forest Service 2006b, p. 26). This designation provides protections similar to those received when classified as a sensitive species and requires that Forest Plans include additional provisions to accommodate these species and provide adequate ecological conditions (i.e., habitats) to continue to provide for the needs of a recovered population.

The USDA Forest Service conducted a NEPA analysis and produced a Draft Environmental Impact Statement regarding the potential options available, and the effects of implementing the Strategy (USDA Forest Service 2004, p. iii). This analysis was undertaken by all six affected National Forests (Beaverhead, Bridger-Teton, Custer, Gallatin, Shoshone, and Targhee) in suitable habitat and was completed in July 2004 (accessible at *http://mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm*). The overall purpose of the Draft Environmental Impact Statement was to analyze the impacts of incorporating the habitat standards outlined in the Strategy and other relevant provisions into the Forest Plans of the six affected forests, to ensure conservation of habitat to sustain the recovered Yellowstone grizzly bear population. The USDA Forest Service Final Environmental Impact Statement and Record of Decision were released in April 2006 (USDA Forest Service 2006a, p. 1; USDA Forest Service 2006b, p. 36). The chosen alternative from the Final Environmental Impact Statement was Alternative 2-Modified to amend the Forest Plans to include all the habitat standards described in the Strategy (USDA Forest Service 2006b, p. iii). This alternative amends current Forest Plans in the GYA with the habitat standards required in the Strategy. In addition, Alternative 2-Modified includes guidance and direction for managing suitable habitat, as described in the State plans, outside of the PCA. This guidance and direction includes: a goal for accommodating grizzly bears outside the PCA; direction on managing livestock allotments with recurring conflicts through retirement of such allotments with willing permittees; direction emphasizing the use of food storage orders to minimize grizzly bear/human conflicts; a guideline to maintain, to the extent feasible, important grizzly bear food resources; and several monitoring items that will enhance habitat management outside of the PCA (USDA Forest Service 2006a, pp. 34–37). These amendments to the GYA National Forest Land Management Plans, completed within the framework

established by the 1982 planning regulations, become effective upon delisting.

Under the revised Forest Planning Regulation (70 FR 1023, January 5, 2005), future revisions to Forest Plans will be based upon a ''need for change'' approach. Under this approach, ''it is highly unlikely that any changes relating to the Yellowstone grizzly bear amendments * * * will be identified during the revision process'' (Aus 2005). ''This means that the management direction developed in the amendment(s) will be transferred to the new planning format and will not change. The bottom line is that any potential changes to management direction in either the current plans or during the revision effort will be guided by the agreements reached in the Strategy and its adaptive provisions'' (Aus 2005). In addition, we received written assurance from the Chief of the USDA Forest Service (Bosworth 2006) stating, ''It is Forest Service policy under the new 2005 planning regulations * * * to provide for both ecosystem diversity and species diversity, including providing appropriate ecological conditions if needed to help avoid the need to list under the Act. In our judgment, this management framework provides adequate regulatory mechanisms to redeem our federal agency responsibilities under the Act. This is fundamental to our mission and specifically to our commitment to grizzly bear conservation.'' Finally, ''the National Forest Management Act, requires that all projects carried out on a forest be consistent with the plans adopted under the regulations, regardless of whether they are 1982 or 2005 planning regulations'' (Bosworth 2006).

Roughly 30 percent of all suitable habitat outside of the PCA is within a designated Wilderness Area (6,799 of 22,783 sq km (2,625 of 8,797 sq mi) while another 27 percent is within an Inventoried Roadless Area (6,179 of 22,783 sq km (2,386 of 8,797 sq mi)). Another three percent of all suitable habitat outside the PCA is considered Wilderness Study Area. The Wilderness Act of 1964 does not allow road construction, new livestock allotments, or new oil, gas, and mining developments in designated Wilderness Areas; therefore, about 6,799 sq km (2,625 sq mi) of secure habitat outside of the PCA will remain secure habitat protected by adequate regulatory mechanisms. This secure suitable habitat is biologically significant to the Yellowstone DPS because it will allow population expansion into these areas that are minimally affected by humans.

The State Petitions for Inventoried Roadless Area Management Rule (70 FR 25653–25662, May 13, 2005) which replaced the Roadless Area Conservation Rule (''Roadless Rule'') (66 FR 3244–3273, Jan. 12, 2001) was overturned on September 19, 2006 (*People Of The State Of California Ex Rel. Bill Lockyer, et al.* v. *United States Department of Agriculture; The Wilderness Society, California Wilderness Coalition, et al.* v. *United States Forest Service, Dale Bosworth, et al.*, C05–03508 EDL). The State Petitions for Inventoried Roadless Area Management Rule was set aside and the Roadless Area Conservation Rule, including the Tongass Amendment, was reinstated. The USDA Forest Service was enjoined from taking any further action contrary to the Roadless Area Conservation Rule without undertaking environmental analysis consistent with the court opinion.

Even if this rule had remained in effect, the affected National Forest would have used the NEPA process and public involvement to consider the impacts any changes in Roadless Area management may have had on other resources and management goals. The USDA Forest Service would have monitored any impacts these changes may have had on habitat effectiveness, while the Study Team would have monitored any increases in grizzly bear mortality these changes may have caused. Before the 2006 court decision, the USDA Forest Service Interim Directive 1920–2004–1 regulated activities in Inventoried Roadless Areas (69 FR 42648–42649, July 16, 2004). Under this directive, little road building or timber harvest could be done in Inventoried Roadless Areas until Forest Plans were revised or amended to specifically address activities in roadless areas. The Targhee National Forest was exempt from this interim directive because it operates under a Revised Forest Plan, which addresses the management of roadless areas. Motorized access and other management activities are addressed by specific Management Prescription direction in the Revised Forest Plan. In general, this Management Prescription directs that roadless areas in the Targhee National Forest remain roadless. Similarly, a 1994 amendment to the Shoshone National Forest Plan implemented a standard for no net increase in roads (USDA Forest Service 2004, p. 73).

The National Park Service has incorporated the habitat, population, monitoring, and nuisance bear standards described in the Strategy into their Superintendent's Compendium for each affected National Park. This was completed prior to the publication of this final rule (Grand Teton National Park 2006, p. 1; Yellowstone National Park 2006, p. 12). Because the BLM manages less than 2 percent of all suitable habitats, they are not modifying existing management plans. Instead, the BLM expressed their commitment to the long-term conservation of the Yellowstone grizzly bear population by signing the memorandum of understanding in the Strategy.

The three State grizzly bear management plans direct State land management agencies to maintain or improve habitats that are important to grizzly bears and to monitor population criteria outside the PCA. Idaho, Montana, and Wyoming have developed management plans for areas outside the PCA to—(1) assure that the measures of the Act continue to be unnecessary for the grizzly bears in the Yellowstone DPS; (2) support expansion of grizzly bears beyond the PCA, into areas of biologically and socially acceptable suitable habitat; and (3) manage grizzly bears as a game animal, including allowing regulated hunting when and where appropriate. The plans for all three States were completed in 2002, and grizzly bears within the Yellowstone DPS will be incorporated into existing game species management plans after delisting.

Together, the Eastern Shoshone Tribe and the Northern Arapaho Tribe manage wildlife within the boundaries of the Wind River Reservation (see Figure 1 above). The Eastern Shoshone and Northern Arapaho Tribes have participated in Yellowstone Ecosystem Subcommittee meetings. At the 2002 Annual Tribal Consultation, organized by Yellowstone National Park, we formally briefed the Tribe about the Strategy, but the Tribe did not provide input or feedback about the Strategy, nor did they sign the memorandum of understanding in the Strategy. The Eastern Shoshone Tribe is currently working with the Service's Lander, Wyoming office to develop its own Grizzly Bear Management Plan. We anticipate that the Tribal management plan will allow for grizzly bear occupancy of suitable habitat on Tribal land and cooperation on managing and monitoring population parameters. Less than 3 percent of all suitable habitats (1,360 sq km (525 sq mi)) are potentially affected by Tribal decisions, so their management would never constitute a threat to the Yellowstone grizzly bear population. Their management plan will facilitate grizzly bear occupancy in areas of suitable habitat on the Wind River

Reservation and would allow grizzly bears greater access to high-elevation whitebark pine and army cutworm moths, thus allowing for additional resiliency of the Yellowstone DPS in response to changing environmental conditions.

Once this final rule becomes effective, the Strategy will be implemented, and the Coordinating Committee will replace the Yellowstone Ecosystem Subcommittee as the lead entity coordinating implementation of the habitat and population standards, and monitoring (U.S. Fish and Wildlife Service 2007, p. 63). Similar to the Yellowstone Ecosystem Subcommittee, the Coordinating Committee members include representatives from Yellowstone and Grand Teton National Parks, the six affected National Forests, BLM, U.S. Geological Survey, IDFG, MTFWP, WGFD, one member from local county governments within each State, and one member from each Native American Tribe within suitable habitat. All meetings will be open to the public. Besides coordinating management, research, and financial needs for successful conservation of the Yellowstone grizzly bear population, the Coordinating Committee will review the Study Team's Annual Reports and review and respond to any deviations from habitat or population standards. The Coordinating Committee will decide on management recommendations to be implemented by appropriate member agencies to rectify problems and to assure that the habitat and population standards will be met and maintained.

The Strategy's habitat standards are the 1998 levels of secure habitat, developed sites, livestock allotments, and habitat effectiveness (U.S. Fish and Wildlife Service 2007, p. 38). The Strategy signatories have agreed that if there are deviations from any population or habitat standard, the Coordinating Committee will implement a Biology and Monitoring Review to be carried out by the Study Team. A Biology and Monitoring Review will be triggered by any of the following causes—(1) a total population estimate of less than 500, as indicated by a $Chao_2$ estimate (Keating *et al.* 2002, pp. 167–170) of less than 48 females with cubs-of-the-year, for 2 consecutive years; (2) exceedance of the 9 percent total mortality limit for independent females for 2 consecutive years; (3) exceedance of the total mortality limits for independent males or dependent young for 3 consecutive years; (4) failure to meet any of the habitat standards described in the Strategy pertaining to levels of secure habitat, new developed sites, and number of livestock allotments in any given year; or (5) failure to receive adequate funding to fully implement the monitoring and management requirements of the Strategy in any given year.

A Biology and Monitoring Review is led by the Study Team and will examine habitat management, population management, or monitoring efforts of participating agencies with an objective of identifying the source or cause of failing to meet a habitat or demographic goal. This review also will provide management recommendations to correct any such deviations. If the Biology and Monitoring Review is triggered by inadequate funding, the Review would focus on whether this fiscal short-coming was a threat to the implementation of the Strategy to such an extent that it required that the measures of the Act would be necessary to assure the recovered status of the Yellowstone DPS. If the Review is triggered by failure to meet a population goal, the Review would involve a comprehensive review of vital rates including survival rates, litter size, litter interval, grizzly bear/human conflicts, and mortalities. The Study Team will attempt to identify the reason behind any variation in vital rates such as habitat conditions, vandal killings, excessive roadkill, etc., and determine if the reasons that the measures of the Act are necessary to assure the recovered status of the population. Similarly, if the Review was triggered by failure to meet a habitat standard, the Review would examine what caused the failure, whether this requires that the measures of the Act are necessary to assure the recovered status of the population, and what actions may be taken to correct the problem. This Review will be completed and made available to the public within 6 months of initiation.

The Coordinating Committee is to respond to a Biology and Monitoring Review with actions to address deviations from habitat standards or, if the desired population and habitat standards specified in the Strategy cannot be met in the opinion of the Coordinating Committee, then the Coordinating Committee will petition us for relisting (U.S. Fish and Wildlife Service 2007, p. 66). Although anyone can petition us for relisting, the Coordinating Committee's petition is important because it is requested by the actual management agencies in charge of the Yellowstone grizzly bear population. Additionally, the Coordinating Committee possesses the resources, data, and experience to provide us with a strong argument for the petition. Once a potential petition is received, we determine if the petition presents substantial information. If so, we conduct a full status review to determine if relisting is warranted, warranted-but-precluded by higher priority actions, or not warranted. We also could consider emergency listing, in accordance with section 4(b)(7) of the Act, if the threat were severe and immediate (16 U.S.C. 1533(g)). Such an emergency relisting would be effective the day the regulation is published in the **Federal Register** and would be effective for 240 days. During this time, a conventional rule regarding the listing of the species based on the five factors of section 4(a)(1) of the Act could be drafted and take effect after the 240-day limit on the emergency relisting has expired. Both emergency listing and the normal listing process also could be undertaken by the Service independent of the petition process.

The management of nuisance bears within the Yellowstone DPS boundaries will be based upon existing laws and authorities of State wildlife agencies and Federal land management agencies, and guided by protocols established in the Strategy and State management plans. Inside the National Parks, Yellowstone or Grand Teton National Park grizzly bear biologists will continue to respond to grizzly bear/human conflicts. In all areas outside of the National Parks, State wildlife agencies will coordinate and carry out any management actions in response to grizzly bear/human conflicts. In areas within the Yellowstone DPS boundaries that are outside of the PCA, State grizzly bear management plans will apply and State wildlife agencies will respond to and manage all grizzly bear/human conflicts. The focus and intent of nuisance grizzly bear management inside and outside the PCA will be predicated on strategies and actions to prevent grizzly bear/human conflicts. Active management aimed at individual nuisance bears will be required in both areas.

The Idaho, Montana, and Wyoming plans recognize that measures to reduce grizzly bear/human conflicts are paramount to successfully and completely addressing this issue. The State of Idaho Yellowstone Grizzly Bear Management Plan states that such measures must be given priority, as they are more effective than simply responding to problems as they occur (Idaho's Yellowstone Grizzly Bear Delisting Advisory Team 2002, p. 15). Similarly, the Grizzly Bear Management Plan for Southwestern Montana maintains that the key to dealing with all nuisance situations is prevention rather than responding after damage has

occurred (MTFWP 2002, p. 48). The Wyoming Grizzly Bear Management Plan also mandates the WGFD to emphasize long-term, non-lethal solutions, but relocation and lethal removal may occur to resolve some conflicts (WGFD 2005, pp. 25–25). All three State management plans are accessible at *http:// mountain-prairie.fws.gov/species/mammals/grizzly/yellowstone.htm.* The ways in which the Strategy and the State plans intend to address preventative measures are described in detail in the Factor E-Human Attitudes Toward Grizzly Bear Recovery and Information & Education Efforts to Improve these Attitudes section below. All three State plans allow for preemptive relocation of grizzly bears out of areas that have a high probability of conflicting with humans or their property, including livestock. The States are committed to responding to grizzly bear/human conflicts in an efficient, timely manner.

The killing of grizzly bears in self-defense by humans will continue to be allowed under both Federal and State management plans. State management plans do not allow for legal take of grizzly bears by humans unless it is within the designated seasons and limits for grizzly mortality or, in the Montana portion of the DPS, if a grizzly bear is caught ''in the act'' of attacking or killing livestock (87–3–130 MCA). This would have to be verified by a law enforcement investigation. Any mortality due to hunting will be within the sustainable mortality limits, as described in the Strategy (U.S. Fish and Wildlife Service 2007, p. 126). The goal of such a hunting season is to reduce grizzly density in areas of high grizzly bear/human conflicts, in order to achieve management objectives so that future management actions would be reduced. A hunt would only occur if annual mortality limits specified for the Yellowstone grizzly bear population are not exceeded.

State management plans provide the necessary regulatory framework and guidelines to State wildlife agencies for managing and maintaining a recovered Yellowstone grizzly bear population in significant portions of the range outside of the PCA. By identifying the agencies responsible for nuisance bear management and responding to grizzly bear/human conflicts using a clearly orchestrated protocol, these State plans create a framework within which grizzly bears and people can both flourish. Effective nuisance bear management benefits the conservation of the Yellowstone grizzly bear population and State management plans adequately address this issue.

Summary of Factor D—In addition to the Strategy, National Park Superintendent's Plans, USDA Forest Service Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests, and State grizzly bear management plans, more than 70 State and Federal laws, regulations, rules, and guidelines are currently in place. We are confident that these mechanisms provide an adequate regulatory framework within which the Yellowstone grizzly bear population will continue to experience population stability and be appropriately distributed throughout significant portions of the range for the foreseeable future. These mechanisms also provide detailed protocols for future management, I & E programs, and monitoring for the foreseeable future. In summary, these mechanisms provide reasonable assurance to us and regulatory certainty that potential future threats to the Yellowstone grizzly bear population will not jeopardize this recovered population and ensure that the Yellowstone DPS is not likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Three other considerations warrant discussion as to whether or not they are likely to appreciably impact the Yellowstone grizzly bear DPS including—(1) genetic concerns; (2) invasive species, disease, and other impacts to food supply; and (3) human attitudes toward grizzly bear recovery and I & E efforts to improve these attitudes.

Genetic Management—Levels of genetic diversity in Yellowstone grizzly bears have been a concern in the past because of small population size and lack of genetic exchange with other grizzly bear populations. However, levels of genetic diversity in the Yellowstone grizzly bear population are not as low as previously feared, and the need for novel genetic material is not urgent (Miller and Waits 2003, p. 4338). Because the Yellowstone grizzly bear population is an isolated population, declines in genetic diversity over time are expected (Allendorf *et al.* 1991, p. 651; Burgman *et al.* 1993, p. 220), but will occur gradually over decades (Miller and Waits 2003, p. 4338). Miller and Waits (2003, p. 4338) state, ''In our opinion, it is unlikely that genetic factors will have substantial effect on the viability of the Yellowstone grizzly over the next several decades.'' Therefore, we do not view genetic diversity as a current threat to the Yellowstone DPS. However, low levels of gene flow, as seen historically, may be necessary in the future to maintain genetic diversity within the Yellowstone DPS. In order to assure the long-term genetic health of the Yellowstone grizzly bear DPS, we have considered genetic issues for the period beyond the next several decades.

Miller and Waits (2003, p. 4338) recommend that in order to avoid negative, short-term genetic effects associated with small population size, the effective population size (i.e., the number of breeding individuals in an idealized population that would show the same amount of change in allele frequencies due to random genetic drift or the same amount of inbreeding as the population under consideration) of the Yellowstone grizzly bear DPS should remain above 100 animals, and this will likely be achieved by maintaining a total population size above 400 animals. In response to this recommendation, the Strategy states that it is the goal of the implementing agencies to maintain the total population size at or above 500 animals to assure that the effective population size does not decline to less than 100 (U.S. Fish and Wildlife Service 2007, p. 26).

Miller and Waits (2003, p. 4338) state that the genetic diversity necessary for the long-term genetic health of the population can only be maintained through gene flow from other grizzly bear populations, either through translocation or natural connectivity. Our DPS policy does not require complete geographic or reproductive isolation among populations, and allows for some limited interchange among population segments considered to be discrete (61 FR 4722). Although movement of just a few individuals between populations may be sufficient to prevent loss of genetic diversity, movement of a few individuals would not be sufficient to create or maintain significant demographic connectivity between grizzly bear populations. We believe that there is currently no connectivity between the Yellowstone DPS and other grizzly bear populations. Future efforts to maintain genetic diversity, either through translocation or natural connectivity, may provide for genetic exchange among grizzly bear populations but is unlikely to result in the Yellowstone DPS becoming no longer markedly separate from other grizzly bear populations. Natural connectivity will continue to be monitored after delisting. To document natural connectivity, Federal and State agencies will continue to monitor bear movements on the northern periphery of the Yellowstone DPS boundaries and

the southern edges of the NCDE using radio-telemetry and will collect genetic samples from all captured or dead bears to document gene flow between these two ecosystems. Such movement will be detected by using an ''assignment test'' which identifies the area from which individuals are most likely to have originated based on their unique genetic signature (Paetkau *et al.* 1995, p. 348; Waser and Strobeck 1998, p. 43; Paetkau *et al.* 2004, p. 56; Proctor *et al.* 2005, pp. 2410–2412). This technique also has the ability to identify bears that may be the product of reproduction between Yellowstone and NCDE bears (Dixon *et al.* 2006, p. 158). In addition to monitoring for gene flow and movements, we will continue interagency efforts to complete the linkage zone task in the Recovery Plan (U.S. Fish and Wildlife Service 1993, pp. 24–26) to provide and maintain movement opportunities for grizzly bears, and reestablish natural connectivity and gene flow between the Yellowstone grizzly bear DPS and other grizzly bear populations.

Experimental and theoretical data suggest that one to two effective migrants per generation is an appropriate level of gene flow to maintain or increase the level of genetic diversity in isolated populations (Mills and Allendorf 1996, pp. 1510, 1516; Newman and Tallmon 2001, pp. 1059–1061; Miller and Waits 2003, p. 4338). We have defined an effective migrant as an individual that emigrates into an isolated population from an outside area, survives, breeds, and whose offspring survive (we further discuss this issue in Issue 8 under subheading R in the Summary of Public Comments section above). Based on Miller and Waits (2003, p. 4338), the Strategy recommends that if no movement or successful genetic interchange is detected by 2020, two effective migrants from the NCDE be translocated into the Yellowstone grizzly bear population every 10 years (i.e., one generation) to maintain current levels of genetic diversity (U.S. Fish and Wildlife Service 2007, p. 37). Based on previous attempts in other grizzly bear recovery ecosystems to augment the grizzly bear population (Kasworm *et al.* in press, pp. 6–7), the Service recognizes that it may take several re-located bears to equal one or two effective migrants. Each bear that would be relocated from the NCDE into the GYA would be radio-collared and monitored to determine if additional translocations were necessary. In this way, we can be certain that genetic impoverishment will not become a threat to the Yellowstone grizzly bear DPS.

Adequate measures to address genetic concerns will continue and, thus, genetic concerns will not adversely impact the long-term conservation of the Yellowstone grizzly bear population or its expansion into suitable habitat. The Study Team will carefully monitor movements and the presence of alleles from grizzly populations outside the Yellowstone DPS boundaries (U.S. Fish and Wildlife Service 2007, p. 37) so that reduction of genetic diversity due to the geographic isolation of the Yellowstone grizzly bear population will not become a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range in the foreseeable future.

Invasive Species, Disease, and Other Impacts to Food Supply—Four food items have been identified as major components of the Yellowstone grizzly bear population's diet (Mattson *et al.* 1991a, p. 1623). These are seeds of the whitebark pine, army cutworm moths, ungulates, and spawning cutthroat trout. These food sources may exert a positive influence on grizzly bear fecundity and survival (Mattson *et al.* 2002, p. 2) and are some of the highest sources of digestible energy available to grizzly bears in the GYA (Mealey 1975, pp. 84–86; Pritchard and Robbins 1990, p. 1647; Mattson *et al.* 1992, p. 436; Craighead *et al.* 1995, pp. 247–252). Each of these food sources is limited in distribution and subject to natural annual fluctuations in abundance and availability. Because of this natural variability, threshold values of abundance for each food have not been established. However, whitebark pine, ungulates, cutthroat trout, and army cutworm moths are all monitored either directly or indirectly on an annual basis (see Post-Delisting Monitoring Plan section below). Monitoring these important foods provides managers with some ability to predict annual seasonal bear habitat use, and estimate, prepare for, and avoid grizzly bear/human conflicts due to a shortage of one or more foods. For instance, the Coordinating Committee issues press releases annually about the abundance of fall foods, particularly whitebark pine. In poor whitebark pine years, these press releases warn people that bears might be found in lower elevation areas and that encounters with bears will likely be more common. In Yellowstone National Park, similar warnings are issued to people during poor food years when they obtain their backcountry permits and, in some years, warning signs are posted at trailheads.

While there is much debate about the rates at which carbon dioxide levels, atmospheric temperatures, and ocean temperatures will rise, the Intergovernmental Panel on Climate Change (IPCC), a group of leading climate scientists commissioned by the United Nations, concluded there is a general consensus among the world's best scientists that climate change is occurring (Intergovernmental Panel on Climate Change 2001, pp. 2–3; Intergovernmental Panel on Climate Change 2007, p. 4). The twentieth century was the warmest in the last 1,000 years (Inkley *et al.* 2004, pp. 2–3) with global mean surface temperature increasing by 0.4 to 0.8 degrees Celsius (0.7 to 1.4 degrees Fahrenheit). These increases in temperature were more pronounced over land masses as evidenced by the 1.5 to 1.7 degrees Celsius (2.7 to 3.0 degrees Fahrenheit) increase in North America since the 1940s (Vincent *et al.* 1999, p.96; Cayan *et al.* 2001, p. 411). According to the IPCC, warmer temperatures increase 1.1 to 6.4 degrees Celsius (2.0 to 11.5 degrees Fahrenheit) by 2100 (Intergovernmental Panel on Climate Change 2007, pp. 10–11). The magnitude of warming in the northern Rocky Mountains has been particularly great, 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 northern Rockies 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 GYA may eventually experience milder, wetter winters and warmer, drier summers (Bartlein *et al.* 1997, p. 786). Additionally, the pattern of snowmelt runoff also may 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.

Changing climate conditions have the potential to impact several of the Yellowstone grizzly bear's food sources, including whitebark pine seeds, winter-killed ungulates, and army cutworm moths. However, the extent and rate to which each of these food sources will be impacted is difficult to foresee with any level of confidence. The specific ways in which climate change may affect each major grizzly bear food in the GYA is discussed within each of their respective sections that follow.

In response to normal changes in food supplies due to plant phenology and responses to weather (e. g., frost,

rainfall), grizzly bear annual home ranges may change in size and extent (Aune and Kasworm 1989, pp. 48–62). By expanding the distribution and range of bears into currently unoccupied suitable habitat within the DPS boundaries, as per the State plans, additional areas with additional food resources will be available. These additional habitats will provide habitat flexibility for bears to respond to changes in annual food supplies and distribution.

Regarding impacts to cutthroat trout, several factors have the potential to play significant roles on the abundance of this food source. In 1994, nonnative lake trout (*Salvelinus naymaycush*) were discovered in Yellowstone Lake (Reinhart *et al.* 2001, pp. 281–282). Lake trout are efficient predators of juvenile cutthroat trout and, on average, consume 41 cutthroat trout per year (Ruzycki *et al.* 2003, p. 23). In 1998, *Myxobolus cerebralis*, the parasite that causes whirling disease, was found in juvenile and adult cutthroat trout collected from Yellowstone Lake. The Intermountain West has experienced drought conditions for the past 6 years, which has resulted in increased water temperatures, lowered lake levels, and a reduction in peak stream flows; all of which negatively affect cutthroat trout spawning success (Koel *et al.* 2005, p. 10). This combination of lake trout, whirling disease, and drought conditions has resulted in declines in the Yellowstone cutthroat trout population, with subsequent decreases in grizzly bear fishing activity (Koel *et al.* 2005, pp. 10–11). In fact, both black and grizzly bear activity at spawning streams decreased 87 percent between 1989 and 2004 (Koel *et al.* 2005, p. 14).

Efforts to reduce introduced lake trout populations have been somewhat successful. The Yellowstone National Park managers have removed more than 100,000 lake trout since 1994, and the average size of lake trout caught has decreased, indicating that gillnetting efforts may be effective. The Yellowstone National Park managers will continue to monitor the Yellowstone Lake cutthroat trout population using fish weirs, spawning stream surveys, and hydroacoustic techniques and continue attempts to suppress nonnative lake trout in Yellowstone Lake through gillnetting, capturing on spawning grounds, and fishing regulations which target lake trout (Yellowstone National Park 2003, p. 33). The Yellowstone National Park biologists will continue to assess the impacts of nonnative lake trout on cutthroat trout populations and will provide an annual summary to the Study Team regarding the abundance of both cutthroat and lake trout.

According to Stewart *et al.* (2004, p. 223), cutthroat trout in the Yellowstone Lake drainage (a small portion of the overall range of Yellowstone cutthroat trout) may be affected by climate change and its effects on the hydrologic regime potentially causing spring runoff to occur as much as 30 to 40 days earlier and perhaps reduced scouring of streambeds. Should this scenario be realized, that would require cutthroat trout to migrate to the tributaries to spawn earlier in the spring to match their preferred streamflows, and it also would require them to return to Yellowstone Lake earlier in the summer to avoid low flows in the tributaries. Such a hypothetical change in the spawning schedule of cutthroat trout also would require a change in the time during which grizzly bears frequent the spawning streams. Young (2001) speculated that warmer water temperatures may be harmful to cutthroat trout, as evidenced by the failure of some warmer river reaches, such as the lower Tongue River, to support cutthroat populations. While some species may shift north in response to climate change, there is no evidence the introduced lake trout will be hampered by such climatic range restrictions. Despite these potential factors impacting Yellowstone cutthroat trout, a 2006 status review concluded that listing this salmonid was not warranted (71 FR 8818–8831, February 21, 2006). This status review noted that although some Yellowstone cutthroat trout populations face severe threats, overall, populations are abundant and well distributed, and that land and water management practices have significantly reduced habitat degradation.

Although the decrease in bear use of cutthroat trout corresponds temporally with cutthroat trout declines, this may not have a significant effect on the grizzly bear population because adult grizzlies that fish in spawning streams only consume, on average, between 8 and 55 trout per year (Felicetti *et al.* 2004, p. 499). The results of Felicetti *et al.* (2004, p. 499) indicate a lower dependence on this food source than previously believed (Reinhart and Mattson 1990, pp. 345–349; Mattson and Reinhart 1995, pp. 2078–2079). Of particular importance is the finding that male grizzly bear consumption of spawning cutthroat trout was five times more than average female consumption of this food (Felicetti *et al.* 2004, p. 499) and there was minimal use of cutthroat trout by female grizzly bears. Haroldson *et al.* (2005, p. 175) found that a small proportion of the Yellowstone grizzly bear population was using cutthroat trout. The number of bears using trout varied from 15 to 33 per year from 1997 to 2000 (Haroldson *et al.* 2005, p. 175). This low reliance on cutthroat trout by the grizzly bear population in general, and female bears specifically, has implications for population dynamics, and means that potential declines in this food resource are not currently, nor are they likely to become, a threat in the foreseeable future in all or a significant portion of the Yellowstone DPS's range, even if changing climate conditions cause a reduction in Yellowstone cutthroat trout abundance.

Regarding Whitebark Pine, two noteworthy factors in North America warrant consideration here, including mountain pine beetle infestation and the introduction of exotic species (Tomback *et al.* 2001, p. 13). Fire suppression and exclusion throughout most of the western United States during the twentieth century has allowed shade tolerant tree species to dominate some whitebark pine communities, thereby inhibiting natural regeneration by whitebark pine (Arno 1986, p. 93; Tomback *et al.* 2001, p. 5). These later successional whitebark pine communities are more susceptible to infestations of the native mountain pine beetle (*Dendroctonus ponderosae*) (Tomback *et al.* 2001, pp. 14–15). Their larvae feed on the inner bark, which can eventually girdle and kill trees on a landscape scale (Amman and Cole 1983, p. 12).

During the last 2 to 4 years, there has been an epidemic of mountain pine beetles in whitebark pine in the GYA (Gibson 2006, p. 1). Using aerial detection survey data, Gibson (2006, pp. 1, 3) estimated that 16 percent of the total area of whitebark pine found in the GYA (693 sq km / 4,308 sq km (268 sq mi / 1663 sq mi)) has experienced some level of mortality due to mountain pine beetles. Similarly, the Greater Yellowstone Whitebark Pine Monitoring Working Group (2006, p. 77) reported that 22 percent of their transects showed presence of mountain pine beetles. Between 2004 and 2005 they surveyed a total of 3,889 trees and found 1.4 percent of the trees (56 trees) sampled showed signs of mountain pine beetle attack (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006, p. 77).

The introduction of white pine blister rust from Europe in the early 1900s also contributes to whitebark pine declines (Kendall and Arno 1990, pp. 269–270; Tomback *et al.* 2001, pp. 15–16). While there is evidence of blister rust in whitebark pines in the GYA, the blister

rust has been present for more than 50 years (McDonald and Hoff 2001, p. 210), and infection rates are still relatively low when compared to whitebark pine communities further north. The Greater Yellowstone Whitebark Pine Monitoring Working Group (2006, p. 76) estimated that after more than 50 years of presence of the pathogen in the ecosystem, roughly 25 percent of all whitebark pine trees in the GYA are currently infected to some level with the blister rust. Evidence of infection does not necessarily mean immediate mortality. Eighty percent of the rust cankers on 2,425 infected live trees were on branches as opposed to the bole of the tree. Trees with branch cankers only are less impacted than trees with bole cankers (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006, p. 76) and usually produce normal cone crops. This proportion of infected trees in the Yellowstone ecosystem is much lower than in whitebark pine communities found in the nearby Bob Marshall Wilderness (83 percent) or in communities of other 5-needled pines in Colorado, in which 50 percent of pines exposed to the fungus are infected (McDonald and Hoff 2001, p. 211).

Climate change is predicted to affect several aspects of the ecology of whitebark pine, including an increase in the length of the growing season (Cayan *et al.* 2001, p. 410–411), an increase in fire frequency and severity (McKenzie *et al.* 2004, p. 893; Westerling *et al.* 2006, pp. 942–943), spatial shifts in the distribution of suitable growing sites (Bartlein *et al.* 1997, p. 788), and an increase in both mountain pine beetle (Logan and Powell 2001, pp. 165–170; Williams and Liebhold 2002, p. 95) and white pine blister rust (Koteen 2002, pp. 352–364) outbreaks. However, the ultimate impacts of climate change on whitebark pine communities, and therefore impact to the GYA bears' use of whitebark pine seeds as a primary food source, are uncertain (Kendall and Keane 2001, p. 236).

While an increased growing season may result in increased cone crops for several decades, accelerated growth of competitive species such as *Abies lasiocarpa* (subalpine fir) could eventually lead to them out competing and replacing whitebark pine (Mattson *et al.* 2001, pp. 132–133). Additionally, a changing climate may shift the overall distribution of whitebark pine north and higher in elevation, resulting in local extinction and reduced overall distribution in the GYA (Romme and Turner 1991, p. 382). Fire frequency and severity may increase with late summer droughts predicted under climate change scenarios for the GYA. These fires may be advantageous to whitebark pine through elimination of smaller, shade-tolerant competitive tree species such as subalpine fir and the creation of open sites that will be used by Clark's nutcracker (*Nucifraga columbiana*) for seed caches, the primary dispersal agent for whitebark pine (Tomback *et al.* 2001, p. 17). However, the intensity of the fire is a key factor. Low intensity fires may eliminate smaller, shade-tolerant competitive tree species such as subalpine fir, while high intensity fires may result in direct mortality of many mature whitebark pine trees (Mattson *et al.* 2001, pp. 131–132; Koteen 2002, pp. 390–396).

The most substantial way in which changing climate conditions may affect whitebark pine is through outbreaks of native mountain pine beetles that might not continue to be regulated by extremely cold winters, and an increased prevalence of white pine blister rust. As recently as 2001, Kendall and Keane (2001, p. 136), addressing primarily the effects of white pine blister rust, concluded that ''the impact of climate change on whitebark pine is inconclusive,'' even though they felt it unlikely that any whitebark pine stand would be safe from damage by blister rust under projected climate conditions. Subsequent research (Logan and Powell in review, p. 13) suggests that recent ''unprecedented outbreaks'' of bark beetles in high elevation pines have been made possible by global climate change, and other investigators have predicted that mortality caused by blister rust also will increase with warmer, wetter conditions as predicted by global climate models (Koteen 2002, pp. 379–384). The current outbreak (Gibson 2006, pp. 1–3) and past outbreaks (Logan and Powell in review, p. 4) have been associated with unusually warm temperatures which allow mountain pine beetles to complete their life cycles in one season (Logan and Powell 2001, p. 161), suggesting that predicted milder winters will result in increased loss of whitebark pine to beetle-caused mortality.

Both Gibson (2006, p. 5) and Logan *et al.* (2003, p. 136) temper their comments about the speed of spread of mountain pine beetle infestations. Logan *et al.* (2003, p. 136) caution that reporting bias (the tendency to report massive outbreaks and to disregard minor or receding infestations) may affect perceptions of the problem. Gibson (2006, p. 5) cites Furniss and Renkin (2003, p. 207), quoting from a National Park Service report on the mountain pine beetle outbreak in Yellowstone in the 1930s. The report, issued 70 years ago, stated that ''practically every stand of whitebark pine is heavily infested'' and that ''it seems inevitable that much of the park will be denuded.'' This 1930s prediction was incorrect, demonstrating the uncertainty of predicting the impacts of such pine beetle infestations.

It is not anticipated that whitebark pine will disappear entirely from the GYA in the foreseeable future. Modeling efforts have predicted that whitebark pine will remain at lower risk for mountain pine beetle attack in many high elevation habitats in the eastern portion of the GYA (Logan 2006, p. 3). Many of these high elevation mountain areas where whitebark is expected to persist (Logan 2006, p. 3) are designated Wilderness Areas where human developments are prohibited. For example, the Wind River mountain range (see Figure 1), where mountain pine beetle impacts are expected to be minimal (Logan 2006, p. 3), is within the Bridger, Popo Agie, and Fitzpatrick Wilderness Areas. This area includes of 2,948 sq km (1,138 sq mi) of protected habitat. Similarly, the eastern half of the PCA consists of the North Absaroka, Teton, and Washakie Wilderness Areas, where whitebark pine is anticipated to be at lower risk of mountain pine beetle attack in the foreseeable future (Logan 2006, p. 3). These areas should provide a large reserve area that will be minimally impacted by mountain pine beetle infestation and have only negligible human impacts for the foreseeable future.

While we remain concerned that there will be future changes in whitebark pine abundance, we believe that the specific amount of decline in whitebark pine distribution and the rate of this decline are difficult to predict with certainty. The specific response of grizzly bears to declines in whitebark cone production is even more uncertain due to the fact that bears are used to feeding on alternative foods during the regularly occurring years when whitebark cone production is minimal (Mattson *et al.* 1991a, p. 1626; Felicetti *et al.* 2003, p. 767). We believe any changes in whitebark pine production (positive or negative), either individually or in combination with other factors, are not likely to impact the Yellowstone DPS to the point where the DPS is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. While studies suggest a decrease in whitebark pine can change both grizzly bear spatial distribution and the number of bear/human conflicts (Mattson *et al.* 1992, p. 436; Knight and Blanchard 1995, p. 23; Gunther *et al.* 1997, pp. 9–

11; Gunther *et al.* 2004, p. 18), grizzly bears are opportunistic omnivores that will make behavioral adaptations regarding food acquisition (Weaver *et al.* 1996, p. 970). The wide current and projected (Logan 2006, p. 3) distribution of whitebark pine, primarily in high-elevation Wilderness Areas in the eastern part of the GYA where human development actions are prohibited, provides biologically significant habitat to grizzly bears throughout suitable habitat and increases the resiliency of the Yellowstone DPS to future changes in whitebark pine availability.

In contrast to annually available coastal salmon runs used by other grizzly bear populations, whitebark pine nut production is not an annually predictable food source. Yellowstone DPS bears commonly have high diet diversity (Mattson *et al.* 1991a, p. 1626) and use alternate foods in years of low whitebark pine nut production. During years of poor pine nut availability, 72 percent of GYA grizzly bears make minimal use of pine nuts while consuming more ungulate meat (Felicetti *et al.* 2003, p. 767) and other natural foods. Grizzly bears in the GYA are accustomed to successfully finding alternative natural foods in years when whitebark pine nuts are not available. However, because pine nuts are an important food and because they vary naturally from year to year as well as in response to insect and disease, the Study Team has been monitoring cone abundance throughout the GYA since 1980. This cone monitoring in combination with monitoring tree mortality and beetle and disease infestation rates will continue under the Strategy (U.S. Fish and Wildlife Service 2007, p 43–56, 60). We believe that this intensive, annual monitoring of foods, grizzly bear/human conflicts, survival rates for young, reproductive rates, and the causes and locations of grizzly bear mortality, as detailed in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 43–56, 60), will provide the Strategy's signatory agencies with a strong, and biologically defensible, foundation from which to implement the adaptive management (Holling 1978, pp. 11–16) actions necessary to respond to ecological changes that may impact the future of the GYA grizzly bear DPS. These management changes may involve increased habitat management and/or protection, increased mortality management, and/or a status review and emergency relisting of the population if management is unable to successfully address the problems.

In response to concerns about threats to whitebark pine in the GYA, the Coordinating Committee, a group of managers from the USDA Forest Service, National Park Service, and the Service, formed the Whitebark Pine Subcommittee in 1998 (USDA Forest Service 2006a, p. 148). The Whitebark Pine Subcommittee coordinates the implementation of restoration techniques, management responses, and the gathering of information on the status of this tree. Current work on whitebark pine includes planting in several areas, cone collection from healthy trees, silvicultural treatments to improve growth and establishment, prescribed burning to encourage natural whitebark pine seedling establishment, and surveys for healthy trees that may possess blister rust resistant genes.

In 2003 and 2004, the Whitebark Pine Subcommittee formed the Greater Yellowstone Whitebark Pine Monitoring Working Group. This is an interagency team of resource managers, statisticians, and researchers established to assess the status of whitebark pine, its threats, and restoration options in the GYA. The Whitebark Pine Monitoring Working Group monitors transects throughout the GYA annually for white pine blister rust infection, mountain pine beetle infestation, and whitebark pine survival.

Currently, there are 19 whitebark pine cone production transects within the PCA, 9 of which the Study Team has monitored on an annual basis since 1980 (Haroldson and Podruzny 2006, pp. 44–45). Additionally, the Whitebark Pine Monitoring Working Group has established more than 70 transects outside the PCA and works closely with statisticians to ensure a representative sample and strong inference (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006, p. 76). Under the Strategy, the Study Team will continue monitoring whitebark pine cone production, the prevalence of white pine blister rust, and whitebark pine mortality using current methods.

Regarding impacts to ungulates, potential impacts to elk and bison (the most important ungulates to grizzlies) warrant consideration here. Grizzlies primarily consume ungulates as winter-killed carrion in the early spring, but also kill elk and bison calves opportunistically and sometimes prey upon adults weakened during the fall breeding season. Potential threats to the availability of these ungulates include brucellosis (*Brucella abortus*) and resulting management practices, chronic wasting disease (CWD), competition with other top predators for ungulates, and decreasing winter severity.

Brucellosis is a bacterial disease that causes abortion during the first pregnancy after infection in many species of mammals, including elk, bison, domestic cattle (Berger and Cain 1999, pp. 358–359), and humans (Wyoming Brucellosis Coordination Team 2005, p. 8). The disease is usually fatal to the fetus, but usually causes no lasting harm to adults, who are thereafter immune to its effects and capable of reproducing successfully. Animals are infected by eating material contaminated with the bacteria in aborted fetuses or vaginal discharges (Smith 2005, p. 7). Brucellosis is not known to negatively affect grizzly bears or any other carnivore (Reinhart *et al.* 2001, pp. 280–281). Existing vaccines were developed specifically for domestic cattle, and are not effective in preventing infection or abortion in bison or elk. Brucellosis was most likely introduced to North America in domestic cattle imported from Europe (Meagher and Meyer 1994, p. 650).

The effect of the disease itself on bison and elk populations is minimal, but the possibility of transmission from infected wildlife to domestic cattle causes economic concern for livestock producers. Removal of bison, but not elk, to control the spread of the disease to domestic cattle is currently practiced north of Yellowstone near Gardiner, Montana, and west of Yellowstone near West Yellowstone, Montana. While these removals have the potential to deprive grizzly bears of a carrion source in the spring, since many of the bison removed would have died over winter (Meagher 1973, p. 73), brucellosis is not a population-level issue for wild ungulates. The presence of brucellosis in wild populations of ungulates does not threaten this food source of grizzly bears. The potential threat to grizzly bears is created by the removal of wild bison that wander outside of Yellowstone National Park. The purpose of the Interagency Bison Management Plan, under which bison that wander outside the boundaries of Yellowstone National Park into Montana are managed, is to ''maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the State of Montana'' (U.S. Department of the Interior's National Park Service and USDA Animal and Plant Health Inspection Service 2000, p. 22). In light of this goal, we do not foresee management of Yellowstone bison as a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range in the foreseeable future.

CWD is a member of a group of diseases called transmissible spongiform encephalopathies, caused by non-living proteins called prions (Peterson 2005, p. 1). The disease is

known to occur in only 4 species within the deer family including white-tailed and mule deer, elk, and moose. CWD is invariably fatal in deer and elk once they develop clinical signs, but the period between contracting the disease and death of the animal is usually 2 to 4 years (Peterson 2005, p. 3). There is no immune response and no immunization for CWD. The disease-causing prions are shed in feces and the decomposing carcasses of infected deer and elk. Prions persist in the ground for at least 2 years and infect deer and elk that eat them while foraging on low-growing vegetation or human-provided hay or hay pellets. As is the case for brucellosis, CWD transmission is facilitated by locally high densities of animals, such as those occurring at winter feed grounds (Smith 2005, p. 16). CWD has not been detected in the GYA, but recent cases have been confirmed in mule deer from Worland and Thermopolis, Wyoming, on the eastern edge of the GYA.

The prospective threat that CWD poses to grizzly bears is the potential reduction or elimination of deer and elk in the GYA. Unlike brucellosis, CWD is an emerging disease, so little empirical data exist concerning the magnitude of its effects on wild populations. In the absence of such data, modeling of the effects of the disease can generate predictions about future population sizes of deer and elk. The two modeling exercises that have been conducted so far have arrived at very different predictions. Gross and Miller (2001, p. 213) created their model assuming that transmission of CWD was frequency dependent (i.e., that the transmission rate is constant and independent of density) and predicted that the disease would drive infected populations to local extinction. Schauber and Woolf (2003, pp. 611–612) noted that all frequency dependent models, as a consequence of their assumptions, inevitably drive their populations to extinction. They felt that modeling transmission as density dependent instead (i.e., transmission rates are low when population density is low and high when density is high) was a more realistic assumption. We concur with this assumption. Under the assumption of density dependent transmission, CWD would not result in local extinction of deer or elk populations.

Overall, we do not anticipate that either of these diseases will significantly impact the availability of ungulate carcasses to grizzly bears or impact the Yellowstone DPS such that it is likely to become endangered within the foreseeable future in all or a significant portion of its range. The Strategy requires that all signatories cooperate to monitor historic ungulate carcass transects each spring. In this way, the Study Team can compare current counts of ungulate carcasses to previous years. Through monitoring of habitat features and grizzly bear population statistics, our adaptive management (Holling 1978, pp. 11–16) approach will respond to significant shortages in spring ungulate carrion, should they occur in the future.

Gray wolves (*Canis lupus*) were reintroduced to the GYA in 1995 and, since then, have flourished. Competition between grizzlies and wolves for carrion, particularly elk carcasses, in late winter and spring occurs occasionally. Servheen and Knight (1993, p. 136) reviewed the literature on wolf/grizzly competition and interviewed biologists and managers familiar with wolf/grizzly interactions in North America and Eurasia. They concluded that there was no documentation of negative influence of grizzlies on wolves or of wolves on grizzlies at the population level. However, they also concluded that the most severe competition would be likely to occur in the spring, when bears began to compete with wolves for carrion. Several investigators (Hornbeck and Horejsi 1986, p. 259; Kuzyk *et al.* 2001, pp. 75–76; Gunther and Smith 2004, pp. 233–236) have reported grizzly bears displacing wolves from carcasses and wolves displacing grizzlies from carcasses. In all but a few cases, those interactions did not result in any injury to either bears or wolves.

Wilmers and his colleagues, in a series of papers (Wilmers *et al.* 2003a pp. 914–915; Wilmers *et al.* 2003b, pp. 999–1002; Wilmers and Getz 2004, pp. 205–205; Wilmers and Getz 2005, p. 574; Wilmers and Post 2006, pp. 405–409) presented the results of modeling exercises examining the effects of wolf reintroduction on winter carrion availability to several scavenger species, including grizzly bears. The models predicted that the effect of wolves on carrion availability would be to spread carrion availability over the winter. The expected distribution of carrion in the absence of wolves would be concentrated in the months of March and April, when it was of most value to grizzlies.

One potential consequence of climate change could be a reduction in the number of elk and bison dying over-winter, thus decreasing the amount of carrion available to bears when they emerge from hibernation. Wilmers and Getz (2005, p. 574) and Wilmers and Post (2006, p. 405) predicted that impending global climate change could reduce the availability of carrion by decreasing winter severity and length. However, in ecosystems such as Yellowstone, where wolves are present, these top predators may buffer climatic change impacts to scavengers. This may occur because the remains of wolf-killed ungulates would provide a food resource to scavengers. Furthermore, increased over-winter survival would likely result in overall increases in ungulate populations, thereby providing an alternative food source to grizzly bears during poor whitebark pine years (Felicetti *et al.* 2003, p. 767).

The northern Yellowstone elk herd occupies the northern reaches of Yellowstone National Park and some adjacent USDA Forest Service and private lands in the Yellowstone River and Lamar River valleys. The size of the northern elk herd has declined from about 17,000 elk in 1995 to about 8,000 in 2004 (Vucetich *et al.* 2005, p. 261). The onset of the decline was coincident with the reintroduction of wolves, but a modeling exercise conducted by Vucetich *et al.* (2005, p. 260) attributed the decline to weather and hunting harvests, rather than wolf predation. However, Tom Lemke, a wildlife biologist for MTFWP (as cited by McMillion 2005, p. 1), felt that the existing age distribution within the herd, in which very few young animals and many old ones are present, indicated that predation on elk calves was responsible for the decline. He pointed to the decline in hunting permits for the Gardiner winter hunt, from 2,880 permits in 2000 to 100 permits in 2006, as providing a test of the hypothesis that hunting harvests were responsible for the decline of the northern herd. Radio-telemetry studies of calf mortality suggest that grizzly bears and black bears are the major predators of elk calves, rather than wolves (Barber *et al.* 2005, pp. 41–43). Whatever the cause of the decline, reduced elk numbers may have led to minor reductions in the availability of carrion to grizzly bears.

In contrast to the northern Yellowstone elk herd, some other elk herds in the GYA where wolves exist are stable to increasing. For instance, the Jackson elk herd has remained around 15,000 animals since the early 1990s (Lubow and Smith 2004, pp. 826–828) and several herds to the west of the northern Yellowstone elk herd in the Gallatin and Madison River drainages are stable to increasing (Garrott *et al.* 2005). 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 that the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range within the foreseeable future due to a decrease in ungulate numbers.

The fourth important food source considered here is army cutworm moths. Army cutworm moths range from Alberta to New Mexico and from California to Kansas. Moths begin mating at high elevations, like the GYA, and then deposit their eggs at low elevations, such as the agricultural areas where they are exposed to pesticides. The magnitude of future pesticide use to control moths and the potential effects of pesticides on moth populations cannot be predicted, but the potential effects of pesticides on grizzly bears are better documented. Robison *et al.* (2006, pp. 1708–1710) screened samples of army cutworm moths for 32 pesticides and found either trace concentrations or undetectable concentrations that would not be harmful to grizzly bears consuming them. The populations Robison (2006, p. 86) examined were panmictic (randomly mating), which indicates that army cutworm moth populations are more likely to persist through time than similarly-sized populations that are locally genetically more distinct (Robison 2006, p. 86). Robison *et al.* (2006, p. 86) predicted that this type of genetic structure will act to maintain army cutworm moth migration patterns into the future by increasing population resiliency to local weather patterns, pesticide use, and habitat alteration.

Grizzly bears foraging at army cutworm moth aggregation sites are potentially vulnerable to disturbance by backcountry visitors. Moth aggregations are located on remote, high-elevation talus slopes, where the predominant human visitors are rock climbers and hikers. In a study of Glacier National Park grizzly bears, White *et al.* (1999, p. 150) reported that foraging bears that were disturbed by climbers spent 53 percent less time foraging on moths during observation periods. They recommended that these northern Montana climbing routes be moved to avoid displacing foraging bears. The Study Team and the WGFD will cooperate to monitor currently known moth sites, identify new moth feeding sites so that their location is known to land managers, and take appropriate management actions as necessary.

Climate change may affect army cutworm moths by changing the distribution of plants that the moths feed on or the flowering times of those plants due to an increased growing season (Woiwod 1997, pp. 152–153). Food plant distribution could be affected by shifting the range and distribution of alpine plant communities, upon which army cutworm moths feed. There is a possibility that high elevation alpine plant communities might disappear entirely in the GYA, as they have been predicted to do in Britain (Thomas and Morris 1994, pp. 50–51). However, plant communities in the GYA have a much greater elevational range in which to move than do alpine plants in Britain. Romme and Turner (1991, p. 382) predicted that alpine vegetation communities in the GYA would be reduced in overall area but not disappear entirely. Changes in the distribution of alpine plants may not affect army cutworm moths adversely since they display foraging plasticity (Burton *et al.* 1980, pp. 12–13). During years of high snow pack when talus slopes (where moths are normally found) are covered with snow all summer, the moths must be feeding on flowers in alternative lower elevation, snow-free areas. Because moths have a one year life cycle, they must be feeding and reproducing in habitats other than alpine areas in high snow pack years because they are observed in alpine areas in subsequent years when snow pack is not a limiting factor. Even under climate change scenarios in which alpine plants disappear entirely, it is likely that the lower elevation plants that support moths in high snow pack years would still be present.

Some have suggested potentially warmer temperatures and increased winter precipitation that may result from climate change could positively affect lepidopteran (i.e., the moth and butterfly order) populations (Roy *et al.* 2001, p. 214). Migratory generalist species, such as army cutworm moths, are more likely to respond positively to climate warming than sedentary habitat specialists (Warren *et al.* 2001, p. 66). However, a study of lepidopteran species in Britain, which may be similar to the highly mobile army cutworm moths in the GYA, found that human caused habitat loss (unrelated to climate change) outweighed the positive responses to longer and more productive growing seasons (Warren *et al.* 2001, p. 67).

In summary, the best scientific and commercial data available regarding grizzly bear responses to food losses suggest this issue is not a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range, nor is it likely to become one in the foreseeable future. Grizzly bears are notoriously resourceful omnivores that will make behavioral adaptations regarding food acquisition (Weaver *et al.* 1996, p. 970). Diets of grizzly bears vary among individuals, seasons, and years (Mattson *et al.* 1991a, pp. 1625–1626; Felicetti *et al.* 2003, p. 767; Felicetti *et al.* 2004, p. 499; Koel *et al.* 2005, p. 14), reflecting their flexibility in finding adequate food resources as necessary. Mattson *et al.* (1991a, p. 1625) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have alternative options in years when preferred foods are scarce. In other areas such as the NCDE, where grizzly bears historically relied heavily on whitebark pine seeds, distributions and sighting records on the periphery of this ecosystem indicate that the population, at least in those areas, has continued to increase and thrive since the 1980s despite severe declines in whitebark pine communities in the last 50 years (Kendall and Keane 2001, p. 30). Similarly, although whitebark pine seed production and grizzly bear use of cutthroat trout varied dramatically in the GYA over the last three decades due to both natural and human-introduced causes (Reinhart and Mattson 1990, pp. 345–349; Felicetti *et al.* 2004, p. 499; Haroldson and Podruzny 2006, p. 45), the Yellowstone grizzly bear population has continued to increase and expand during this time period (Schwartz *et al.* 2006b, p. 66).

Because of the life history strategy of whitebark pine, which naturally exhibits extreme annual variability in cone production, grizzly bears have always had to cope with a high degree of uncertainty regarding this food resource. The potential threat from decreases in whitebark pine cone production to grizzly bears is not one of starvation, but one of larger home range size and movements in years of low or no whitebark cone production. These movement patterns may result in increased conflicts with humans and increased mortality, as well as lower reproductive success the following year as females produce smaller litters. Bear/human conflicts can be reduced through management responses and intensified I & E efforts. Possible lowered reproductive success will be detected through monitoring and mitigated in the short term by reduced mortality limits and efforts to reduce nuisance bear removals, and in the long-term by continued whitebark pine restoration and habitat management enhancing secure habitat availability in specific areas outside the PCA where healthy whitebark pine may be available.

Although numerous alternative foods are available to GYA grizzly bears such

as corms, insects, fungi, and forbs; in terms of calories or nutrition, these are inferior to the four major foods discussed above and previously in the ''Behavior'' section. In light of the potential threats to several of these important, high-energy grizzly bear foods, especially whitebark pine which has been linked to grizzly bear survival and reproduction (Mattson *et al.* 1992, p. 436; Gunther *et al.* 1997, p. 38; Gunther *et al.* 2004, p. 15; Mattson 2000, p. 120), we believe the best approach is one of adaptive management (Holling 1978, pp. 11–16). The Study Team, working with the USDA Forest Service and National Park Service will continue to monitor the abundance and distribution of major grizzly bear foods such that any decline in the grizzly bear population as a result of these declines is detected in a sufficient time and addressed through adaptive management (Holling 1978, pp. 11–16) actions by the Coordinating Committee. Because of this flexible and responsive management framework, we do not anticipate that the Yellowstone DPS is likely to become endangered in all or a significant portion of its range in the foreseeable future due to changes in its food sources.

The Study Team monitors grizzly bear mortality in relation to the abundance and distribution of all four of the major foods using measurable criteria. For instance, increases in mortality rates of radio-collared independent females are measurable criteria that could reflect decreases in food availability. Because there were no known natural mortalities of independent adult females from 1983 to 2001 (Interagency Grizzly Bear Study Team 2005, p. 35), any change in this value will be noteworthy and will be investigated thoroughly by the Study Team to determine whether it is reflective of a landscape-scale trend or simply an isolated event. Significant declines in important foods also could result in reductions in cub production and increases in cub mortality over current rates of 0.362. The Study Team not only monitors survival but also reproductive population parameters such as litter size and cub survival that are more sensitive to decreases in food quality and quantity. Because human-caused mortality, natural mortality of radio-collared bears, and numbers of cubs, and cub survival rates are all measurable criteria monitored annually by the Study Team, any biologically significant decline in important foods also would be reflected in changes in these measurable population parameters. When combined with data collected annually about the quantity and distribution of the four major foods, the Study Team will have adequate information to determine if declining food sources are affecting population trajectory.

If declines in any of the four major foods occur and, using the best available scientific data and techniques, the Study Team concludes these are related to significant increases in known and probable bear mortalities, and that such increases could threaten the grizzly population, the Study Team would recommend appropriate management responses to the Coordinating Committee, or submission of a relisting petition to us (U.S. Fish and Wildlife Service 2007, pp. 63–67). Although we believe such an outcome is unlikely, we can also relist the Yellowstone DPS independent of the petition process. This final rule and the Conservation Strategy describe a comprehensive monitoring and management system that will be in place for the Yellowstone grizzly bear DPS upon delisting. The dynamic nature of the Conservation Strategy and its regulatory framework provide us with reasonable assurance that the Yellowstone DPS is not likely to become endangered in all or a significant portion of its range in the foreseeable future.

Human Attitudes Toward Grizzly Bear Recovery and I & E Efforts to Improve these Attitudes—Public support is paramount to any successful large carnivore conservation program (Servheen 1998, p. 67). Historically, human attitudes played a primary role in grizzly bear population declines through excessive human-caused mortality. Through government-endorsed eradication programs and perceived threats to human life and economic livelihood, humans settling the West were able to effectively eliminate most known grizzly populations after only 100 years of westward expansion.

We have seen a change in public perceptions and attitudes toward the grizzly bear in the last several decades. The same government that once financially supported active extermination of the bear now uses its resources to protect the great symbol of American wildness. This change in government policy and practice is a product of changing public attitudes about the grizzly bear. Although attitudes about grizzlies vary geographically and demographically, there has been a revival of positive attitudes toward the grizzly bear and its conservation (Kellert *et al.* 1996, pp. 983–986).

Public outreach presents a unique opportunity to effectively integrate human and ecological concerns into comprehensive programs that can modify societal beliefs about, perceptions of, and behaviors toward grizzly bears. Attitudes toward wildlife are shaped by numerous factors including basic wildlife values, biological and ecological understanding of species, perceptions of individual species, and specific interactions or experiences with species (Kellert 1994, pp. 44–48; Kellert *et al.* 1996, pp. 983–986). I & E programs teach visitors and residents about grizzly bear biology, ecology, and behavior enhance appreciation for this large predator while dispelling myths about its temperament and feeding habits. Effective I & E programs have been an essential factor contributing to the recovery of the Yellowstone grizzly bear population since its listing in 1975. Being aware of specific values common to certain user groups will allow the I & E working group to disseminate appropriate materials and provide workshops that address particular values and concerns most adequately. By providing general information to visitors and targeting specific user groups about living and working in grizzly country, we believe continued coexistence between grizzly bears and humans will be accomplished.

Traditionally, residents of the GYA involved in resource extraction industries such as loggers, miners, livestock operators, and hunting guides, are the largest opponents to land-use restrictions which place the needs of the grizzly bear above human needs (Kellert 1994, p. 48; Kellert *et al.* 1996, p. 984). Surveys of these user groups have shown that they tolerate large predators when they are not seen as direct threats to their economic stability or personal freedoms (Kellert *et al.* 1996, p. 985). Delisting could increase acceptance of grizzly bears by giving local government and private citizens more discretion in decisions which affect them. Increased flexibility regarding depredating bears in areas outside of the PCA may increase tolerance for the grizzly bear by landowners and livestock operators.

Ultimately, the future of the grizzly bear will be based on the people who live, work, and recreate in grizzly habitat and the willingness and ability of these people to learn to coexist with the grizzly and to accept this animal as a cohabitant of the land. Other management strategies are unlikely to succeed without useful and innovative public I & E programs. The primary objective of the expanded public outreach program will be to proactively address grizzly/human conflicts by educating the public as to the root

causes of these conflicts and providing suggestions on how to prevent them. By increasing awareness of grizzly bear behavior and biology, we hope to enhance public involvement and appreciation of the grizzly bear.

Although many human-caused grizzly bear mortalities are unintentional (e.g., vehicle collisions, trap mortality), intentional deaths in response to grizzly bear/human conflicts are responsible for the majority of known and probable human-caused mortalities. Fortunately, this source of mortality can be reduced significantly if adequate I & E is provided to people who live, work, and recreate in occupied grizzly bear habitat. The current I & E working group has been a major component contributing to the successful recovery of the Yellowstone grizzly bear population over the last 30 years. Both Federal and State management agencies are committed to continuing to work with citizens, landowners, and visitors within the Yellowstone DPS boundaries to address the human sources of conflicts.

From 1980 through 2002, at least 36 percent (72 out of 196) of human-caused mortalities could have been avoided if adequate I & E materials had been presented, understood, and used by involved parties (Servheen *et al.* 2004, p. 15). Educating back-country and front-country users about the importance of securing potential attractants can prevent bears from becoming food conditioned and displaying subsequent unnaturally aggressive behavior. Similarly, adhering to hiking recommendations, such as making noise, hiking with other people, and hiking during daylight hours, can further reduce back-country grizzly bear mortalities by decreasing the likelihood that hikers will encounter bears.

Hunter-related mortalities may involve hunters defending their life or property because of carcasses that are left unattended or stored improperly. Grizzly bear mortalities also occur when hunters mistake grizzly bears for black bears. All of these circumstances can be further reduced with enhanced I & E programs.

Outside the PCA, State wildlife agencies recognize that the key to preventing grizzly bear/human conflicts is providing I & E to the public. State grizzly bear management plans also acknowledge that this is the most effective long-term solution to grizzly bear/human conflicts and that adequate public outreach programs are paramount to ongoing grizzly bear survival and successful coexistence with humans in the GYA so that the measures of the Act continue to not be necessary. All three States have been actively involved in I & E outreach for over a decade and their respective management plans contain chapters detailing efforts to continue current programs and expand them when possible. For example, WGFD created a formal human/grizzly bear conflict management program in July 1990 and has coordinated an extensive I & E program since then. Similarly, since 1993, the MTFWP has implemented countless public outreach efforts to minimize bear/human conflicts, and the IDFG has organized and implemented education programs and workshops focused on private and public lands on the western edge of grizzly bear habitat.

Compensating ranchers for losses caused by grizzly bears is another approach to build support for coexistence between livestock operators and grizzly bears. In cases of grizzly bear livestock depredation that have been verified by USDA Animal and Plant Health Inspection Service Wildlife Services, IDFG, MTFWP, or WGFD, affected livestock owners are compensated. Since 1997, compensation in Montana and Idaho has been provided primarily by private organizations, principally Defenders of Wildlife. The Defenders of Wildlife's Grizzly Bear Compensation Trust has paid over $140,721 to livestock operators within the Yellowstone DPS boundaries and in the northern Rockies for confirmed and probable livestock losses to grizzly bears (Johnson 2006). In Wyoming, compensation has always been paid directly by the State. Upon delisting both Idaho and Wyoming's grizzly bear management plans provide for State funding of compensation programs (Idaho's Grizzly Bear Delisting Advisory Team 2002, p. 16; WGFD 2005, p. 30). In Idaho, compensation funds will come from the secondary depredation account, and the program will be administered by the appropriate IDFG Regional Landowner Sportsman Coordinators and Regional Supervisors (Idaho's Grizzly Bear Delisting Advisory Team 2002, p. 16). In Wyoming, the WGFD will pay for all compensable damage to agricultural products as provided by State law and regulation (WGFD 2005, p. 30). The WGFD will continue efforts to establish a long-term funding mechanism to compensate property owners for livestock and apiary losses caused by grizzly bears. The Montana State management plan does not include a funding mechanism to compensate confirmed grizzly bear livestock losses, so MTFWP will continue to rely on Defenders of Wildlife and other private groups to compensate livestock operators for losses due to grizzly bears while MTFWP focuses on preventing such conflicts. However, when Defenders of Wildlife expanded their compensation program to include the GYA, they agreed to do so while the grizzly bear was listed under the Act. Internal discussions within Defenders of Wildlife have begun to determine whether their compensation program will continue in the Montana portion of the GYA after delisting occurs (Clark 2006).

Summary of Factor E—Overall, these natural and manmade factors (genetic concerns; invasive species, disease, and other potential impacts to food supply; and human attitudes toward grizzly bear recovery and I & E efforts to improve these attitudes), have the potential to be a threat to the Yellowstone grizzly bear DPS in all or a significant portion of its range in the foreseeable future. Through careful monitoring and adaptive management (Holling 1978, pp. 11–16) practices, the Study Team and the States will be able to identify and address these concerns before they become problems for the Yellowstone grizzly bear at a population level. All of these issues have been scientifically researched and considered so that an adequate management framework is in place to respond to future concerns as they arise. Due to the large amount and wide distribution of quality suitable habitat (46,035 sq km (17,774 sq mi)), the protected status of large areas of high elevation whitebark pine stands not projected to be substantially impacted by future mountain pine beetle infestations, the maintenance of grizzly bears within the PCA as a source population for peripheral areas and potential dispersers to other grizzly bear populations, the secure nature of the PCA for potential immigrants to the GYA from other grizzly bear populations, and the commitment by the responsible agencies to the maintenance of a recovered Yellowstone grizzly bear DPS, we do not anticipate that genetic isolation, decreases in major foods, or human attitudes toward grizzly bears will substantially adversely impact the Yellowstone DPS. Therefore, these issues will not impact the Yellowstone DPS such that it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Conclusion of the 5-Factor Analysis

As demonstrated in our 5-factor analysis, threats to this population have been sufficiently minimized over the entire current and foreseeable range of the Yellowstone grizzly bear DPS

including all ''suitable habitat'' within the DPS boundaries, and there is no significant portion of the range where the DPS remains threatened or endangered.

Regarding Factor A, the habitat-based recovery criteria have been maintained inside the PCA since 1998 and they will continue to be maintained in perpetuity through implementation of the Strategy. The PCA will continue to serve as a source area for grizzly bears to expand into peripheral areas and unoccupied suitable habitat. The PCA will also be important in achieving connectivity with other grizzly bear populations as it provides potential dispersers to other ecosystems outside the DPS boundaries and functions as secure habitat for immigrants from other grizzly bear populations. Threats to suitable habitat outside the PCA also have been sufficiently minimized by the commitment of the USDA Forest Service to manage National Forest lands in the GYA such that a recovered Yellowstone grizzly bear population will be maintained (USDA Forest Service 2006b; pp. 4, 26). Outside of the PCA, grizzly bears will be allowed to expand into suitable habitat, as per direction in the State management plans. High-quality, suitable habitat is widely distributed throughout the GYA, providing ecological resilience for the Yellowstone DPS to respond to environmental changes. Therefore, sufficient habitat exists to ensure that the Yellowstone grizzly bear DPS is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Regarding Factor B and C, all demographic criteria relating to sustainable mortality have been, and will continue to be, met (Schwartz, in press). The threat of overutilization due to commercial, recreational, scientific, or education purposes has been removed through cooperation among management agencies that ensures a consistent approach to mortality management. Sustainable mortality limits, coordinated conflict management protocols, and conflict prevention programs ensure that the Yellowstone DPS is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Regarding Factor D, the USDA Forest Service finalized the Forest Plan Amendment for Grizzly Bear Habitat Conservation for the GYA National Forests and has incorporated this Amendment into the affected National Forests' Land Management Plans (USDA Forest Service 2006b, p. 4). Yellowstone and Grand Teton National Parks appended the habitat standards to their Park Superintendent's Compendiums, thereby assuring that these National Parks would manage habitat in accordance with the habitat standards (Grand Teton National Park 2006, p. 1; Yellowstone National Park 2006, p. 44). The State and Federal agencies' agreement to implement the Strategy's extensive guidelines inside the PCA, the USDA Forest Service's decision to classify the grizzly bear in the GYA as a species of concern, and the State management plans ensure that adequate regulatory mechanisms remain in place in all significant portions of the Yellowstone DPS' range and that it is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Regarding Factor E, the Service concludes other natural and manmade factors are not a current threat nor will they be in the foreseeable future due to widely distributed, high-quality suitable habitat that is protected by regulatory mechanisms. Intensive annual monitoring of multiple indices combined with the adaptive management approach will assure that isolation (i.e., genetic diversity or a lack of gene flow), threats to foods, and human attitudes will not impact the Yellowstone DPS such that it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Our current knowledge of the health and condition of the Yellowstone grizzly bear DPS illustrates that it is now a recovered population. Counts of unduplicated females with cubs-of-the-year have increased (Knight *et al.* 1995, p. 247; Haroldson and Schwartz 2002, p. 16; Haroldson 2006a), and counts of cubs have increased (Knight and Blanchard 1995, p. 9; Knight and Blanchard 1996, p. 8; Knight *et al.* 1997, p. 2; Haroldson *et al.* 1998, p. 8; Haroldson 1999, p. 10; Haroldson 2000, p. 11; Haroldson 2001, p. 14; Haroldson and Schwartz 2002, p. 16; Haroldson 2003, p. 16; Haroldson 2004, p. 11; Haroldson 2006b, p. 12). Grizzly range and distribution has expanded (Basile 1982, pp. 3–10; Blanchard *et al.* 1992, p. 92; Schwartz *et al.* 2002, p. 203; Pyare *et al.* 2004, pp. 5–6; Schwartz *et al.* 2006b, pp. 64–66). Calculations of population trajectory derived from radio-monitored female bears demonstrate an increasing population trend at a rate of 4 to 7 percent per year between 1983 and 2002 (Eberhardt *et al.* 1994, p. 362; Knight and Blanchard 1995, pp. 18–19; Harris *et al.* 2006, p. 48), due in large part to control of female mortality. In total, this population has increased from estimates ranging from 229 (Craighead *et al.* 1974, p. 16) to 234 (Cowan *et al.* 1974, pp. 32, 36) to 312 (McCullough 1981, p. 175) individuals when listed in 1975 to more than 500 animals as of 2005 (Interagency Grizzly Bear Study Team 2006, p. 15).

At the end of 2006, the number of unduplicated females with cubs-of-the-year over a 6-year average both inside the Recovery Zone and within a 16-km (10-mi) area immediately surrounding the Recovery Zone was 41, more than 2.7 times the Recovery Plan target of 15. The Recovery Plan target for the number of unduplicated females with cubs-of-the-year (15) has been exceeded since 1988. In 2006, the 1-year total of unduplicated females with cubs-of-the-year within the entire GYA was 47 (Haroldson 2006a).

Within the Recovery Zone, the distribution of females with young, based on the most recent six years of observations in the ecosystem, was 18 out of 18 bear management units at the end of 2004. The range of this population also has increased dramatically, as evidenced by the 48 percent increase in occupied habitat since the 1970s (Schwartz *et al.* 2002, p. 203; Pyare *et al.* 2004, p. 5–6; Schwartz *et al.* 2006b, pp. 64–66). Furthermore, the Yellowstone grizzly bear population continues to expand its range and distribution today. Currently, roughly 84 to 90 percent of the sightings of females with cubs are within the PCA and about 10 to 16 percent of females with cubs have expanded out beyond the PCA within the DPS (Schwartz *et al.* 2006b, pp. 64–66). Grizzly bears now occupy 68 percent of suitable habitat within the DPS and will likely occupy the remainder of the suitable habitat within the DPS within the foreseeable future. The Yellowstone DPS now has sufficient numbers and distribution of reproductive individuals to ensure that it is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Applying the current mortality limits (Interagency Grizzly Bear Study Team 2005, pp. 6–9) to the 1999 to 2006 period, the sustainable mortality limits have not been exceeded for 3 consecutive years for males, for 3 consecutive years for dependent young, or for 2 consecutive years for independent females (Schwartz, in press). The main threat of human predation has been addressed through carefully monitored and controlled mortality limits established in the Strategy (U.S. Fish and Wildlife Service 2007, p. 126) and annually monitored and reported by the Study Team (Interagency Grizzly Bear Study Team 2005, pp. 6–9). In addition, I & E is a

main component of the program to reduce grizzly bear/human conflicts. The Yellowstone DPS now has sufficient control of mortality to ensure that it is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

The Act defines a threatened species as one that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. The Act defines an endangered species as one that is likely to become extinct in the foreseeable future throughout all or a significant portion of its range. Based on the best scientific and commercial information available, we have determined that the Yellowstone grizzly bear DPS is recovered and no longer meets the Act's definition of threatened or endangered. Therefore, we are hereby delisting the Yellowstone grizzly bear DPS.

Petition Finding

Additionally, we announce a 90-day finding on a petition (submitted during the public comment period for the proposed rule) to list the Yellowstone grizzly bear population as endangered on the Federal List of Endangered and Threatened Wildlife under the Act and to designate critical habitat. We reviewed the petition to list the Yellowstone DPS of grizzly bears and the literature cited in the petition, and evaluated that information in relation to other pertinent literature and information available to us. All assertions of this petition are addressed either in the Summary of Public Comments and in the 5-factor analysis sections of this final rule, or in the Reassessing Methods Document's issues and responses summary. After this review and evaluation, we find that the petition and additional information in our files did not present substantial information indicating that listing the Yellowstone grizzly bear population as endangered may be warranted. Therefore, we are not initiating a status review in response to this petition.

Effects of the Rule

Promulgation of this final rule will affect the protections afforded to the Yellowstone grizzly bear DPS under the Act. Taking, interstate commerce, import, and export of grizzly bears from the Yellowstone DPS are no longer prohibited under the Act. Other State and Federal laws will still regulate take. In addition, with the removal of the Yellowstone grizzly bear DPS from the List of Endangered and Threatened Wildlife, Federal agencies are no longer required to consult with us under section 7 of the Act to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the species' continued existence. However, actions within the PCA will still be regulated by over 70 State and Federal laws, regulations, and policies ensuring enforcement of the Strategy. Delisting the Yellowstone grizzly bear DPS is expected to have positive effects in terms of management flexibility to the States and local governments.

However, the full protections of the Act will still continue to apply to grizzly bear in other portions of the lower 48-States outside the Yellowstone DPS. Those grizzly bears will remain fully protected by the Act. There is no designated critical habitat for this species.

Post-Delisting Monitoring Plan

Section 4(g)(1) of the Act requires us, in cooperation with the States, to implement a monitoring program for not less than 5 years for all species that have been recovered and delisted. The purpose of this requirement is to develop a program that detects the failure of any delisted species to sustain itself without the protective measures provided by the Act. If, at any time during the monitoring period, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing.

To further ensure the long-term conservation of adequate grizzly bear habitat and continued recovery of the Yellowstone grizzly bear population, several monitoring programs and protocols have been developed and integrated into land management agency planning documents. The Strategy and appended State grizzly bear management plans effectively satisfy the requirements for having a Post-Delisting Monitoring Plan for the Yellowstone DPS. Monitoring programs, which we anticipate will be continued in perpetuity, will focus on assessing whether demographic standards and habitat criteria described in the Strategy are being achieved. A suite of indices will be monitored simultaneously to provide a highly sensitive system to monitor the health of the population and its habitat and to provide a sound scientific basis to respond to any changes or needs with adaptive management actions (Holling 1978, pp. 11–16). More specifically, monitoring efforts will document population trends, distribution, survival and birth rates, and the presence of alleles from grizzly populations outside the Yellowstone DPS boundaries to document gene flow into the population. Throughout the DPS boundaries, locations of grizzly bear mortalities on private lands will be provided to the Study Team for incorporation into their Annual Report. Full implementation of the Strategy by State and Federal agencies will allow for a sustainable population by managing all suitable habitat.

Within the Primary Conservation Area—As discussed in previous sections, habitat criteria established for the Yellowstone grizzly bear population will be monitored carefully and any deviations from these will be reported annually. The number and levels of secure habitat, developed sites, and livestock allotments will not be allowed to deviate from 1998 baseline measures in accordance with the implementation protocols in the Strategy.

The Study Team will prepare Annual Reports summarizing the habitat criteria and population statistics. The Study Team will be responsible for counting the number of unduplicated females with cubs-of-the-year and monitoring mortality, distribution, and the presence of alleles from grizzly populations outside the Yellowstone DPS boundaries to document gene flow into the population (U.S. Fish and Wildlife Service 2007, pp. 155–156, Appendix I). To examine reproductive rates, survival rates, causes of death, and overall population trends, the Study Team will strive to radio collar and monitor a minimum of 25 adult female grizzly bears at all times. These bears will be spatially distributed throughout the ecosystem as determined by the Study Team.

The Study Team, with participation from Yellowstone National Park, the USDA Forest Service, and State wildlife agencies, also will monitor grizzly bear habitats, foods, and impacts of humans. Documenting the abundance and distribution of the major foods will be an integral component of monitoring within the PCA as it allows managers some degree of predictive power to anticipate and avoid grizzly bear/human conflicts related to a shortage of one or more foods. Major foods, habitat value, and habitat effectiveness will be monitored according to Appendices E and I in the Strategy, and as described in Factor A of this final rule.

Outside of the Primary Conservation Area—Although State management plans are the guiding documents for management of the Yellowstone grizzly bear DPS outside of the PCA upon delisting, habitat management will primarily be the responsibility of the GYA National Forests. State wildlife agencies will be responsible for monitoring population parameters in areas outside of the PCA. The GYA

National Forests will be responsible for monitoring agreed-upon habitat parameters in suitable habitat outside the PCA, as defined by State management plans, and will calculate secure habitat values outside of the PCA every two years and submit these data for inclusion in the Study Team's annual report (USDA Forest Service 2006b, p. 6). The GYA National Forests also will monitor and evaluate livestock allotments for recurring conflicts with grizzly bears in suitable habitat outside the PCA as defined in the State plans (USDA Forest Service 2006b, p. 6). The GYA National Forests will be responsible for monitoring whitebark pine occurrence, productivity, and health in suitable habitat outside the PCA (USDA Forest Service 2006b, p. 7). All three States will document sightings of females with cubs and provide this information to the Study Team. Finally, State wildlife agencies will provide known mortality information to the Study Team, which will annually summarize this data with respect to location, type, date of incident, and the sex and age of the bear for the DPS area.

In Idaho, the IDFG will be responsible for monitoring population trends and habitat parameters. Outside of the PCA, the IDFG will establish data analysis units to facilitate monitoring of grizzly bear distribution, abundance, and mortality. Habitat criteria will be monitored within each unit but will not be established strictly for grizzly bears. Instead, habitat standards will be incorporated into current management plans for other game species. However, the IDFG will monitor food sources for grizzly bears including elk, deer, moose, Kokanee salmon, and cutthroat trout. The IDFG also will encourage and work with other land management agencies on public lands to monitor wetland and riparian habitats, whitebark pine production, important berry-producing plants, and changes in motorized access route density. On private lands, the IDFG will work with citizens, counties, and other agencies to monitor development activities and identify important spring habitat for grizzly bears, then work with landowners to minimize impacts to bears.

In Montana, the MTFWP will monitor populations using data from research, distribution changes, DNA samples, confirmed sightings, and known mortalities. The MTFWP will collect and analyze habitat data and monitor habitat changes pertaining to key grizzly bear foods, road densities, road construction and improvements, and coal bed methane activities. In addition, the MTFWP will continue to use statewide habitat programs to conserve key wildlife habitats in southwestern Montana, working closely with private landowners to conserve private lands via lease, conservation easements, or fee title acquisition.

In Wyoming, the WGFD will establish grizzly bear management units to collect and analyze demographic and distributional data. Habitat standards will be monitored in a manner consistent with those already in place for other wildlife and will not focus specifically on the habitat needs of grizzly bears. The WGFD will evaluate the effects of existing and proposed human activities in important wildlife habitat and work with land management and transportation agencies to ensure that projects do not adversely affect the grizzly bear population. Specifically, the WGFD will—(1) identify and evaluate the site-specific and cumulative effects of proposed projects; (2) monitor and recommend changes, if justified, in human activities on seasonally important wildlife habitats; (3) minimize road and site construction impacts on wildlife habitat; (4) encourage the use of native vegetation in rehabilitation projects; (5) encourage land management agencies to manage for open road densities of no more than 1.6 km/2.6 sq km (1 mi/sq mi) which benefit a suite of wildlife species; (6) recommend seasonal road closures when warranted; (7) encourage the USDA Forest Service and BLM to enforce off road/trail motorized use restrictions; and (8) focus on improving habitat quality in areas of habitually high human-caused grizzly bear mortality (WGFD 2005, pp. 22–25). In addition, the WGFD will work with the USDA Forest Service to monitor bear use of army cutworm moths and the overall status and health of whitebark pine (WGFD 2005, p. 22).

Monitoring systems in the Strategy allow for adaptive management (Holling 1978, pp. 11–16) as environmental issues change. The agencies have committed in the Strategy to be responsive to the needs of the grizzly bear through adaptive management (Holling 1978, pp. 11–16) actions based on the results of detailed annual population and habitat monitoring. These monitoring efforts would reflect the best scientific and commercial data and any new information that has become available since this delisting determination. The entire process would be dynamic so that when new science becomes available it will be incorporated into the management planning and monitoring systems outlined in the Strategy (U.S. Fish and Wildlife Service 2007, pp. 5–6). The results of this extensive monitoring would allow wildlife and land managers to identify and address potential threats preemptively thereby, allowing those managers and us to be certain that the Yellowstone grizzly bear population remains a recovered population.

Paperwork Reduction Act

This rule does not contain any new collections of information other than those already approved under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*) and assigned Office of Management and Budget (OMB) control number 1018–0094, which expires on September 30, 2007. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. For additional information concerning permit and associated requirements for endangered species, see 50 CFR 17.21 and 17.22.

National Environmental Policy Act

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

Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As this final 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.

References Cited

A complete list of all references cited herein is available upon request from the Grizzly Bear Recovery Coordinator (see **ADDRESSES** above).

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

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

PART 17—[AMENDED]

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

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

■ 2. Amend § 17.11(h) by revising the listing for ''Bear, grizzly'' under ''MAMMALS'' in the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
MAMMALS							
*	*	*	*	*	*		*
Bear, grizzly	*Ursus arctos horribilis*.	North America	U.S.A., conterminous (lower 48) States, except—(1) where listed as an experimental population; and (2) that portion of Idaho that is east of Interstate Highway 15 and north of U.S. Highway 30; that portion of Montana that is east of Interstate Highway 15 and south of Interstate Highway 90; that portion of Wyoming south of Interstate Highway 90, west of Interstate Highway 25, Wyoming State Highway 220, and U.S. Highway 287 south of Three Forks (at the 220 and 287 intersection), and north of Interstate Highway 80 and U.S. Highway 30.	T	1, 2D, 9, 759	NA	17.40(b)
Do	....do	....do	U.S.A. (portions of ID and MT, see 17.84(l)).	XN	706	NA	17.84(l)
*	*	*	*	*	*		*

Dated: March 20, 2007.

H. Dale Hall,

Director, Fish and Wildlife Service.

[FR Doc. 07–1474 Filed 3–23–07; 8:45 am]

BILLING CODE 4310–55–P

Appendix B
List of Acronyms & Abbreviations

ACRONYMS

B.C. – British Columbia
BE – Bitterroot Ecosystem
BMU – Bear Management Unit
BNSF – Burlington Northern Santa Fe
CI – Confidence Interval
CYE – Cabinet-Yaak Ecosystem
MDNRC – Montana Department of Natural Resources and Conservation
DPS – Distinct Population Segment
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FR – Federal Register
FWS – U.S. Fish and Wildlife Service
GBRT – Grizzly Bear Recovery Team
GYA – Greater Yellowstone Area Ecosystem
HCP – Habitat Conservation Plan
I&E – Information and Education
IDFG – Idaho Department of Fish and Game
IGBC – Interagency Grizzly Bear Committee
IGBST – Interagency Grizzly Bear Study Team
LRMP – Land and Resource Management Plan
MDNRC – Montana Department of Natural Resources and Conservation
MFWP – Montana Fish Wildlife and Parks
NCDE – Northern Continental Divide Ecosystem
NEPA – National Environmental Policy Act
NPS – National Park Service
OMRD – Open Motorized Route Density
ROD – Record of Decision
SE – Selkirk Ecosystem
SRA – Canadian Species at Risk Act
TMRD – Total Motorized Route Density
U.S. – United States
USDA – U.S. Department of Agriculture
USFS – U.S. Forest Service
WDFW – Washington Department of Fish and Wildlife
WGFD – Wyoming Game and Fish Department

ABBREVIATIONS

ac - acre
ft – feet
ha - hectare
km – kilometer
m – meter
mi – mile
sq km – square kilometers
sq mi – square miles