U.S. FISH AND WILDLIFE SERVICE
5-YEAR STATUS REVIEW for
GRIZZLY BEARS IN THE LOWER-48 STATES
(*Ursus arctos horribilis*)

Species Reviewed: Grizzly bear (*Ursus arctos horribilis*)

Federal Register Notice of Listing Determination: July 28, 1975. Amendment Listing the Grizzly Bear of the 48 Conterminous States as a Threatened Species (40 FR 31734).

Federal Register Notice Announcing Initiation of this Review: January 14, 2020. Initiation of 5-Year Status Review of Grizzly Bear (*Ursus arctos horribilis*) in the conterminous United States; request for information (85 FR 2143).

Lead Region: Region 6, Grizzly Bear Recovery Office, Hilary Cooley, Grizzly Bear Recovery Program, 406–243–4903.

Classification: Threatened

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year status review is to assess each threatened species and endangered species to determine whether its status has changed and it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) recently evaluated the biology and status of the grizzly bear in the lower-48 States as part of a Species Status Assessment (SSA) to inform this 5-year status review. Our SSA report for grizzly bear was independently reviewed by peer reviewers and State and Federal agency partners. The SSA report represents our evaluation of the best available scientific information, including the resource needs and the current and future condition of the listed entity. We developed five future scenarios of land and species management conditions to portray a range of possible future conditions for grizzly bears in the lower-48 States. The SSA report is the scientific basis for this 5-year status review decision-making process.

Additionally, we solicited data for this review from interested parties through a January 14, 2020, Federal Register Notice announcing this review (85 FR 2143). Information we received from this data call included: summaries of conservation actions by the U.S. Forest Service (USFS), Idaho Department of Lands, and Washington Department of Fish and Wildlife (WDFW); monitoring information from Idaho's Office of Species Conservation, Idaho Department of Fish and Game (IDFG), and WDFW; and information on potential threats from non-governmental organizations (NGOs) and interested citizens. We also received comments that were not relevant to the five-year status review and thus were not used in development of this review.

REVIEW ANALYSIS

Updated Information and Current Species Status

Biology and Habitat:

Our SSA report (Service 2020) provides a detailed analysis of the biology, habitats, and current and future condition for the grizzly bear in the lower-48 States, which we summarize below. The grizzly bear is listed as threatened under the Act in the lower-48 States, and this listed entity is the subject of the SSA report. As such, unless specified otherwise, we use the term "species" to refer to the listed entity and the term "ecosystem" to refer to the populations of this listed entity.

The grizzly bear is a large, long-lived mammal that occurs in a variety of habitat types in portions of Idaho, Montana, Washington, and Wyoming in the lower-48 States. Grizzly bears hibernate in the winter, typically in dens, feed on a wide variety of foods, weigh up to 363 kilograms (800 pounds), and live more than 25 years in the wild. Grizzly bears are light brown to nearly black and are so named for their "grizzled" coats with silver or golden tips. Grizzly bears (*Ursus arctos horribilis*) are 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). Grizzly bears have three life stages: dependent young, subadults, and adults.

Historically, the grizzly bear occurred throughout much of the western half of the contiguous United States, central Mexico, western Canada, and most of Alaska. An estimated 50,000 to 100,000 grizzly bears were distributed in one large contiguous area throughout all or portions of 18 western States (i.e., Washington, Oregon, California, Idaho, Montana, Wyoming, Nevada, Colorado, Utah, New Mexico, Arizona, North Dakota, South Dakota, Minnesota, Nebraska, Kansas, Oklahoma, and Texas). Populations declined in the late 1800s with the arrival of European settlers, government-funded bounty programs, and the conversion of habitats to agricultural uses. Grizzly bears were reduced to less than two percent of their former range in the lower-48 States by the time grizzly bear was listed as threatened under the Act in 1975; at the time, the estimated population in the lower-48 States was 700 to 800 individuals. Only five areas in mountainous regions, national parks, and wilderness areas contained populations, including the Northern Continental Divide in northwest Montana; the Greater Yellowstone area in northwest Wyoming, eastern Idaho, and southwest Montana; the Cabinet-Yaak Mountains in northeast Idaho and northwest Montana; the Selkirk Mountains in northwest Idaho and northeast Washington; and the North Cascades range in northcentral Washington. The Northern Continental Divide, Selkirk, and Cabinet-Yaak populations extend into Canada to varying degrees. Although there is currently no known population in the North Cascades, it constitutes a large block of contiguous habitat that spans the international border. Grizzly bears were also known to have existed in the recent past in two additional areas, the Bitterroot Mountains in central Idaho and western Montana, and the San Juan Mountains in Colorado. The Grizzly Bear Recovery Plan refers to these areas as grizzly bear ecosystems (Service 1993, p. 10). In 1993, the Service designated six of these areas as recovery areas, and recommended further evaluation of the seventh, the San Juan Mountains, to determine recovery potential (Service 1993, p. 121).

Grizzly bear populations in the lower-48 States have significantly expanded since the time of listing in 1975 and now occupy approximately 6 percent of their historical range in the lower-48 States (Haroldson *et al.* 2020a, *in press*). Currently, grizzly bears primarily exist in four ecosystems: the Northern Continental Divide (NCDE), Greater Yellowstone (GYE), Cabinet-Yaak (CYE), and Selkirk (SE) ecosystems (see Figure 1 in Service 2020, p.). There are no known populations in the North Cascades and Bitterroot (BE) ecosystems and no known populations outside these defined ecosystems, although we have documented bears, primarily solitary, between these ecosystems. It is estimated that there are at least 1,913 individuals in the lower-48 States (1,068 in the NCDE, 737 in the GYE DMA, 55–60 in the CYE, and a minimum of 53 in the U.S. portion of the SE, although some bears have home ranges that crossed the international border) (see Table 7 in Service 2020, p.) (Costello 2020, *in litt.*; Haroldson *et al.* 2020b, p. 13; Kasworm *et al.* 2020a, p. 40; Kasworm *et al*. 2020b, p 19).

For the purposes of our SSA, we refer to populations of the grizzly bear in the lower-48 States as ecosystems. As described in our recovery planning documents, ecosystems are areas that have the potential to provide adequate space and habitat to maintain the grizzly bear as a viable and self-sustaining species (Service 1993, p. 33). Ecosystems are generally considered to be the larger area surrounding the recovery zones in which grizzly bears may be anticipated to occur as part of the same population. For this assessment, we evaluated resiliency, redundancy, and representation at the scale of the six ecosystems identified in the 1993 Recovery Plan (Service 1993) (see Figure 9 in Service 2020, p.):

Summary of Needs

In general, a grizzly bear's individual habitat needs and daily movements are driven by the search for food, water, mates, cover, security, or den sites. All life stages need large intact blocks of land to breed, feed, shelter and disperse; cover to shelter; high-caloric foods to feed and breed; and dens as winter shelter. In order to be resilient, grizzly bear populations need sufficient abundance for genetic and demographic health; high adult female survival, adequate survival of all other life stages, fecundity and recruitment that translate to into stable to increasing population trends; and genetic diversity. Grizzly bears in the lower-48 States need multiple, resilient ecosystems distributed across a broad geographic range in order to be redundant and withstand catastrophic eventsAdditionally, grizzly bears in the lower-48 States need genetic and ecological diversity in order to preserve variation and the ability to adapt to changing conditions (see Figure 2, Service 2020, p.).

Summary of Stressors and Conservation Efforts

We evaluated sources, stressors, and other activities that can positively (conservation actions) or negatively (stressors) affect grizzly bears at the individual, ecosystem, or lower-48 States levels, either currently or into the future (Service 2020, Chapter 5). We also evaluated the potential cumulative effects of stressors that may act together in concert to influence ecosystem resiliency (Service 2020, entire). A stressor is defined as the potential change in demographics, such as an increase in human-caused mortality, or the habitat resources needed by the species, such as a decrease in high-caloric foods that causes a demographic response such as a decrease in abundance. We evaluated the potential effects of three categories of stressors on the grizzly

bear: those with habitat-related effects; sources of human-caused mortality; and other stressors. These stressors are interrelated to varying degrees (e.g., habitat stressors around motorized access are related to both habitat and human-caused mortality). Stressors with potential habitat-related effects include: motorized access and its management; developed sites; livestock allotments; mineral and energy development; recreation; vegetation management; habitat fragmentation; development on private lands; and activities that may disturb dens. Sources of human-caused mortality that we evaluated include: management removals; accidental killings (e.g., train and vehicular strikes); mistaken identity kills; illegal killings; and defense of life kills. We also evaluated other stressors including: natural mortality; lack of connectivity and low genetic health; changes in food resources; effects of climate change; and catastrophic events, such as earthquakes and volcanic eruptions. There are a variety of conservation efforts and mechanisms across the six ecosystems that either reduce or ameliorate stressors, or improve the condition of habitats or demographics, such that the stressor does not individually or cumulatively effect the resiliency of an ecosystem. These conservation efforts or mechanisms include: Federal land protections, such as the Wilderness Act and Inventoried Roadless Areas (IRAs); State and private forestlands with motorized restrictions; habitat improvements/vegetation management; attractant removal and community sanitation measures, such as food storage orders; conservation easements; information and education (I&E) programs; effective law enforcement; and augmentation or translocation programs.

Current Condition

To evaluate resiliency for each ecosystem, we developed a categorical model, called a condition category table, to calibrate resiliency based on a range of conditions for two habitat factors (natural, high-caloric foods and large intact blocks of land) and six demographic factors (adult female survival, abundance as measured by population targets and number of bears, population trend, fecundity, inter-ecosystem connectivity, and genetic diversity) (Service 2020, Chapter 6). We selected these habitat and demographic factors based on their importance to resiliency and because we had information to evaluate them relatively consistently across all six ecosystems. We then used the condition category table like a key to evaluate resiliency for each ecosystem by systematically evaluating the condition for each habitat and demographic factor. To calculate an overall score for resiliency, we assigned weighted values to the resiliency categories and then calculated a weighted average of the habitat and demographic factor ranking (Service 2020, p.). Populations in higher resiliency categories are at less risk from potential stochastic events, such as extreme weather events, than populations in lower resiliency categories (Service 2020, p.).

Table 1 summarizes our evaluation of current resiliency for each ecosystem. Currently, the NCDE and GYE have high resiliency. Resiliency of the NCDE and GYE is currently high due to the generally high and moderate conditions for the habitat and demographic factors that influence resiliency (Table 1). A variety of land protections, particularly those that have reduced motorized access, and the availability and diversity of natural foods contribute to the high conditions for habitat factors in these two ecosystems. Large population size and conservation measures to reduce human-caused mortality have contributed to the high condition for most of the demographic factors in these two ecosystems. In the GYE, the demographic factors of genetic diversity and inter-ecosystem connectivity could improve if natural immigration into the GYE occurs in the future.

The CYE currently has low resiliency (Table 1). Despite high population trends and high and moderate adult female survival, the CYE currently has a very low numbers of bears, although this factor could improve as bears reproduce and expand in the future (Table 1). The CYE is a smaller ecosystem that is still slowly recovering from being close to historical extirpation, particularly in the Cabinets portion of the ecosystem. This portion of the CYE has recently benefitted from an augmentation program (Kasworm *et al*. 2020a, pp. 24–25; Service 2020, p. 175). Recent data also suggests that the number of grizzly bears in the Cabinet portion of the CYE has increased from fewer than 15 individuals to 22–24 bears (Kendall *et al.* 2016, p. 314), almost exclusively through the augmentation effort and reproduction from those individuals (Kasworm *et al.* 2020a, p. 31). This ecosystem also has a less diverse assortment of foods, though body fat levels indicate that natural, high-caloric foods are not limiting. Large intact blocks of land are also somewhat limiting in the CYE. Although there are large protected areas within the CYE recovery zone (with 44 percent designated as Wilderness or IRAs), additional protections outside the recovery zone, and recent conservation efforts on private lands, motorized route densities have not yet met habitat standards established for the CYE recovery zone.

The SE currently has moderate resiliency. Despite high population trends and high and moderate adult female survival, the SE currently has a very low numbers of bears, although this factor could improve as bears reproduce and expand in the future (Table 1). This ecosystem also has a less diverse assortment of foods, though body fat levels indicate that individuals are relatively healthy. The SE contains a limited amount of protected areas inside the recovery zone (3 percent designated or recommended Wilderness) and motorized route densities do not yet meet applicable habitat standards, although they are close. There have been recent conservation efforts on private lands in Canada and there are some regulations that manage motorized access outside the recovery zone. However, motorized access standards have not been fully implemented, and motorized route densities somewhat limit the availability of large intact blocks of land in the SE.

Despite the moderate condition of habitats, due in part to considerable amounts of protected areas, without known populations, the ~~BE~~ and North Cascades are currently in functionally extirpated condition, and therefore have no resiliency. As a result, these two ecosystems also do not currently contribute to redundancy and representation.

Table 1. Current condition for six ecosystems for grizzly bear in the lower-48 States, evaluated used the condition category table for resiliency. We calculated an overall score for resiliency as the weighted average of all factors, with "number of bears" weighted three times due to its importance to resiliency. High=4, Moderate = 3, Low=2, Very Low=1, and Functionally Extirpated (X) = 0, with score thresholds as Moderate= 2.4–3.19, Low= 1.6–2.39, Very Low=0.8–1.59= Very Low Condition; and less than 0.79 = Functionally Extirpated (X) Condition. An X in number of bears results in an overall condition of X, regardless of the other factors. In general, ecosystems with higher resiliency have a greater probability of persistence over the next 30 to 45 years, based on their ability to withstand stochastic events, than ecosystems with lower resiliency.

CURRENT CONDITION										
Ecosystem	Habitat Factors		Demographic Factors							RESILIENCY
	Natural, High-Caloric Foods	Large, intact blocks of land	Adult Female Survival	Abundance		Population Trend	Fecundity	Inter-Ecosystem Connectivity	Genetic Diversity	
				Population Target	Number of Bears (3x)					
NCDE	High	High	High	High	High	High	Moderate	High	High	**High**
GYE	High	High	High	High	Moderate	High	High	X	Moderate	**High**
CYE	Moderate	Moderate	High	Low	Very Low	High	Low	Moderate	Low	**Low**
SE	Moderate	Moderate	Moderate	Moderate	Very Low	High	Moderate	Moderate	Moderate	**Moderate**
BE	Moderate	Moderate	X	X	X	X	X	Very Low	X	**X**
North Casca-des	Moderate	Moderate	X	X	X	X	X	X	X	**X**

Redundancy describes the number and distribution of ecosystems, such that the greater the number and the wider the distribution of the ecosystems, the better grizzly bears in the lower-48 States can withstand catastrophic events. Grizzly bears in the lower-48 States currently occupy four ecosystems, two with high resiliency, one with moderate resiliency, and one with low

resiliency. Two ecosystems are currently functionally extirpated, with no resiliency, so do not contribute to redundancy. The four ecosystems are currently distributed from north to south and east to west as illustrated in Figure 1. Representation is currently captured by ecological diversity inherent within the four resilient ecosystems (Figure 1). For example, the GYE, contained in the Middle Rockies ecoregion, is dominated by forested, mountainous habitat, and dry sagebrush to the east and south, and includes hydrothermal features and other unique geologic features. The NCDE includes parts of the Great Plains, Middle Rockies, and Northern Rockies ecoregions, and habitat varies from wet forested lands west of Glacier Park to much drier habitat to the east, including prairie grasslands. The CYE and SE are both contained within the Rocky Mountains, and are characterized by wet, forested mountains. The BE is primarily contained in the Idaho Batholith ecoregion, and contains mountainous regions, canyons, dry, partly wooded mountains, grasslands, high glacial valleys, and hot dry canyons. The North Cascades is composed of high, rugged mountains, and has a high concentration of active glaciers.

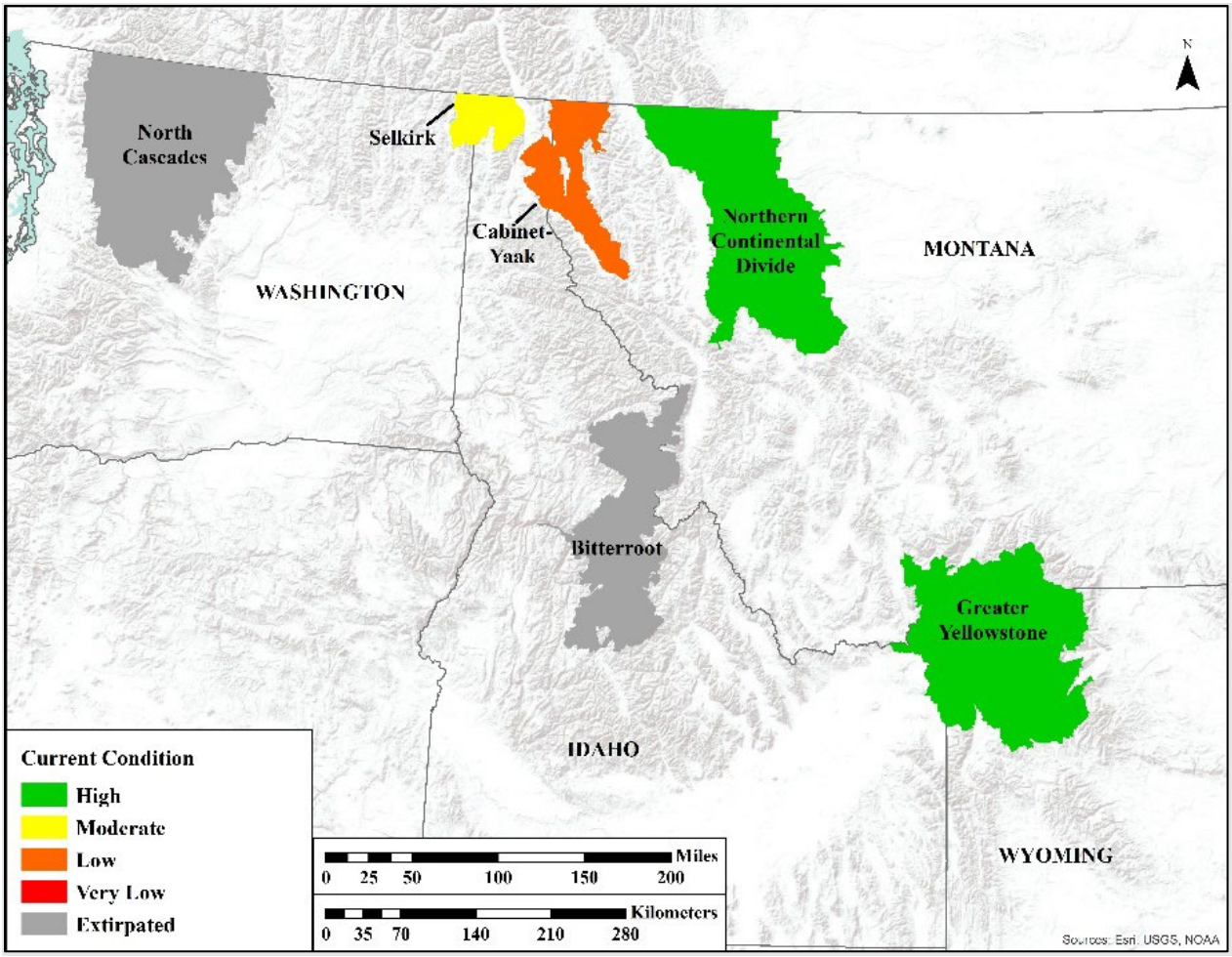

Figure 1. Map of the overall current condition for the six grizzly bear ecosystems in the lower-48 States, in terms of resiliency, redundancy, and representation. Colors represent the current resiliency for each ecosystem, based on the current condition of two habitat factors and six demographic factors for each ecosystem. Ecosystems with higher levels of resiliency are at less risk from environmental and demographic stochasticity. Currently, the Greater Yellowstone (GYE) and Northern Continental Divide (NCDE) ecosystems have high resiliency, the Selkirk ecosystem (SE) has moderate resiliency, and the Cabinet-Yaak ecosystem (CYE) has low resiliency. The North Cascades and Bitterroot (BE) ecosystems are in an extirpated condition currently, so have no resiliency. Four ecosystems (GYE, NCDE, SE, and CYE) distributed as illustrated on the map contribute to redundancy and these ecosystems feature a diversity of ecological types used by the grizzly bear for representation.

Future Condition

We projected a range of plausible future conditions for the grizzly bear in the lower-48 States, 30 to 45 years into the future, a biologically meaningful timeframe that captures approximately two to three generation intervals for grizzly bear. A generation interval is defined for grizzly bears as the approximate time that it takes a female to replace herself in the population. For female grizzly bears, average generation intervals range from 10 to 15 years. Given the longevity of grizzly bears, up to 30 years in the wild, 2 to 3 generation intervals represent a time period during which a complete turnover of the population would have occurred and any positive or adverse changes in the demographics of the population would be detectable. This timeframe also considers the possibility that conservation measures that reduce and regulate potential stressors, such as land management plans, could be revised by applicable land management agencies at least once.

We used future scenario planning to describe plausible futures for the grizzly bear and to capture uncertainty associated with the future. We developed two pessimistic future scenarios, two optimistic future scenarios, and one continuation future scenario. These future scenarios that we used to project the condition for the grizzly bear in the lower-48 States are:

- **Future Scenario 1 – Significantly Decreased Conservation**: Under this scenario, conservation actions decrease significantly, largely through the termination or non-renewal of plans or regulations, and rate of private land development increases dramatically;
- **Future Scenario 2** – **Decreased Conservation**: Under this scenario, conservation actions decrease, but not as significantly as Scenario 1, due to decreased effectiveness and implementation of conservation actions and mechanisms, and rate of private land development increases;
- **Future Scenario 3 – Continuation of Conservation:** Under this scenario, conservation actions continue at their same rate, magnitude, and effectiveness as current condition, and rate of private land development remains the same;
- **Future Scenario 4 – Increased Conservation:** Under this scenario, conservation actions increase or improve, and rate of private land development decreases, and rate of private land development decreases;
- **Future Scenario 5 – Significantly Increased Conservation:** Under this scenario, conservation actions increase significantly, and rate of private land development decreases dramatically.

Although there may be different probabilities associated with our future scenarios, all five of our scenarios are equally plausible for the purposes of our SSA analysis (Service 2020, p.). We then used the same methodology that we used to evaluate current condition to project the resiliency for the six ecosystems 30 to 45 years into the future. We projected the future condition for the two habitat factors and six demographic factors for each of the five future scenarios and then calculated an overall resiliency score for each ecosystem under each scenario using the same weighted average as our current condition evaluation. After evaluating resiliency, we then evaluated redundancy and representation for each future scenario.

With a significant decrease in conservation under Scenario 1, there are subsequent decreases in resiliency across the habitat and demographic factors over the next 30 to 45 years (Table 2). Both the NCDE and GYE decrease in overall resiliency from high to moderate, the SE declines from moderate to very low, and the CYE declines from low to very low. Although resiliency decreases, redundancy and representation remain the same under Scenario 1, with four ecosystems distributed similarly to current condition within their ecological types (see Figure 6, Service 2020).

With a decrease in conservation efforts under Scenario 2, potential decreases in overall resiliency are less severe than under Scenario 1. Under Scenario 2, both the NCDE and GYE remain in high overall resiliency, the CYE remains in low resiliency, but the SE drops from moderate to low overall resiliency (Table 2). Although resiliency decreases, redundancy and representation remain the same under Scenario 2, with four ecosystems distributed similarly to current condition within their ecological types (see Figure 6, Service 2020).

Under Scenario 3, the continuation scenario, all stressors and conservation efforts continue at their same rate and magnitude 30 to 45 years into the future. The current levels of funding, effectiveness, and implementation of conservation actions and mechanisms stay the same under this scenario. As a result, the NCDE and GYE remain in high resiliency, the SE stays moderate resiliency, but the CYE improves in overall resiliency from low to moderate (Table 2). The BE and North Cascades ecosystems remain in a functionally extirpated condition, with no resiliency under the continuation scenario (Table 2). Redundancy and representation stay the same as current conditions under this scenario (see Figure 6, Service 2020).

With an increase in conservation under Scenario 4, redundancy and representation improve, as both the BE and North Cascades shift from functionally extirpated condition with no resiliency to low resiliency. The NCDE and GYE remain in high resiliency, the SE remains moderate, and the CYE improves from low to moderate resiliency (Table 2). Risk from potential catastrophic events is now spread across six instead of four ecosystems (redundancy) with additional ecological diversity gained at the northwestern and central extents of the overall range (representation) (see Figure 6, Service 2020).

Future Scenario 5 is an optimistic scenario under which conservation increases significantly. As a result, resiliency, redundancy, and representation for the grizzly bear improve. Under this scenario, the NCDE and GYE stay in high resiliency, but the CYE and SE improve to high resiliency. The BE and North Cascades shift from functionally extirpated condition with no resiliency to low resiliency under this scenario (Table 2). Four ecosystems have high resiliency under this scenario, and catastrophic risk is spread across six ecosystems (redundancy) with additional ecological diversity gained at the northwestern and central extents of the overall range (representation) (see Figure 6, Service 2020).

Table 2. Current and future conditions in terms of overall resiliency for six ecosystems for the grizzly bear in the lower-48 States. NCDE= Northern Continental Divide Ecosystem, GYE= Greater Yellowstone Ecosystem, CYE= Cabinet-Yaak Ecosystem, SE= Selkirk Ecosystem, BE=Bitterroot Ecosystem. Future projections are 30 to 45 years into the future under five

plausible future scenarios: Scenario 1= conservation decreases significantly, Scenario 2=conservation decreases, Scenario 3 = conservation stays the same, Scenario 4 = conservation increases, and Scenario 5 =conservation increases significantly.

CURRENT AND FUTURE RESILIENCY						
	Current Condition	***Future Scenario 1*** ↓↓ ***Conservation***	***Future Scenario 2*** ↓ ***Conservation***	***Future Scenario 3*** ***Continuation Conservation***	***Future Scenario 4*** ↑ ***Conservation***	***Future Scenario 5*** ↑↑ ***Conservation***
NCDE	High	Moderate	High	High	High	High
GYE	High	Moderate	High	High	High	High
CYE	Low	V Low	Low	Moderate	Moderate	High
SE	Moderate	V Low	Low	Moderate	Moderate	High
BE	X	X	X	X	Low	Low
North Cascades	X	X	X	X	Low	Low

Summary of Viability

Currently, redundancy for the grizzly bear is described as four ecosystems, the NCDE, GYE, CYE, and SE, as they are distributed from north to south and east to west across the lower-48 States. Catastrophic risk is spread across these four ecosystems and their ecological diversity contributes to representation. Two ecosystems, the BE and North Cascades have no populations, are not resilient, so do not currently contribute to redundancy or representation. In 30 to 45 years, redundancy is maintained across the future scenarios and never falls below the four, currently resilient ecosystems as they are distributed. Although redundancy stays the same from now to the future, if conservation efforts decrease, as under Scenarios 1 and 2, resiliency decreases, and the four ecosystems are at greater risk to stochastic events. But if conservation efforts increase, as under Scenarios 4 and 5, resiliency in the BE and North Cascades improves, as does redundancy, as the number and distribution of ecosystems increases from four to six ecosystems. This improvement in redundancy reduces risk to the grizzly bear from catastrophic events (Table 3). To summarize redundancy across the future scenarios, catastrophic risk to the grizzly bear stays the same if conservation efforts continue at their current rate and effectiveness, catastrophic risk decreases with increased conservation as the BE and North Cascades have low resiliency, and catastrophic risk increases if conservation efforts are reduced. Representation declines with decreases in conservation efforts, stays the same with a continuation of conservation efforts, but ecological diversity increases if conservation efforts increase primarily through improving resiliency of the BE and North Cascades ecosystems.

Our SSA characterizes the viability for the grizzly bear in the lower-48 States, or its ability to sustain populations in the wild over time, based on expert judgement and the best scientific understanding of its current and future abundance, distribution, and diversity. Based on our assessment of the 3Rs, currently and 30 to 45 years into the future, viability for the grizzly bear in the lower-48 States improves slightly if conservation efforts continue at their current rate and levels of effectiveness. If conservation efforts declines, viability also decreases. If conservation efforts increase, viability improves.

Table 3. Summary of current and future (30 to 45 years) viability, in terms of resiliency, redundancy, and representation, for the grizzly bear in the lower-48 States.

VIABILITY: CURRENT AND FUTURE 3Rs						
	Current Condition	***Future Scenario 1*** ↓↓ ***Conservation***	***Future Scenario 2*** ↓ ***Conservation***	***Future Scenario 3*** ***Continuation Conservation***	***Future Scenario 4*** ↑ ***Conservation***	***Future Scenario 5*** ↑↑ ***Conservation***
Resiliency	2 High 1 Moderate 1 Low 2 Extirpated	2 Moderate 2 Very Low 2 Extirpated	2 High 2 Low 2 Extirpated	2 High 2 Moderate 2 Extirpated	2 High 2 Moderate 2 Low	4 High 2 Low
Redundancy	4 ecosystems, as distributed	4 ecosystems, as distributed	4 ecosystems, as distributed	4 ecosystems, as distributed	6 ecosystems, as distributed	6 ecosystems, as distributed
Representation	Ecological diversity across 4 ecosystems	Ecological diversity across 4 ecosystems	Ecological diversity across 4 ecosystems	Ecological diversity across 4 ecosystems	Ecological diversity across 6 ecosystems	Ecological diversity across 6 ecosystems

[we can add a summary of new information since last 5-year review we feel important to include here, if needed]

Threats Analysis (threats, conservation measures, and regulatory mechanisms):

When we listed the grizzly bear, we identified the dramatic decreases in historical range (Factor A), certain detrimental land management practices (e.g., timber harvest, livestock grazing, and building of roads) in formerly secure grizzly bear habitat (Factor A), and excessive human-caused mortalities (Factors B and C) as the primary stressors (40 FR 31734-31736, July 28, 1975). The listing rule also discussed the lack of regulatory mechanisms to control take and protect habitat as a contributing factor to grizzly bear population declines at the time of listing (Factor D) (40 FR 31734-31736, July 28, 1975). Under Factor E, the 1975 listing identified the genetic isolation of some grizzly bear populations as a potential threat and 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).

The SSA considered these stressors and also considered several additional stressors that affect the resiliency of grizzly bear ecosystems. The additional current and future rangewide threats to the grizzly bear in the lower-48 States considered in the SSA include:

- Motorized access and its management (Factor A);
- Developed recreation sites (Factor A);
- Livestock allotments (Factor A);
- Mineral and energy development (Factor A);
- Recreation (Factor A);
- Vegetation management, such as prescribed burns and riparian area protections (Factor A);

- Habitat fragmentation (Factor A);
- Development on private lands (Factor A);
- Activities that may disturb dens (Factor A);
- Sources of human-caused mortality, including (Factors B and C);
    - Management removals;
    - Accidental killings (automobile and train collisions, drowning, poisoning, capture-related);
    - Mistaken identity kills;
    - Illegal killings;
    - Defense of life kills; and
    - Undetermined human-caused;
- Natural mortality (Factor C);
- Connectivity and genetic health (Factor E);
- Changes in food resources (Factor E);
- Effects of climate change (Factor E); and
- Catastrophic events, such as earthquakes and volcanic eruptions (Factor E).

Conservation efforts we considered in the SSA that either reduce a stressor or improve the condition of habitat or demographics include:

- Federal land protections, such as motorized restrictions, the Wilderness Act, and Inventoried Roadless Areas (IRAs) (Factor D);
- Attractant removal or storage, such as food storage orders and community sanitation measures (Factor D);
- Conservation easements and other private land trust acquisitions (Factor D);
- Information and education (I&E) programs (Factor B, Factor C, Factor D);
- Augmentation or translocation programs (Factor E);
- State and private forestlands with motorized restrictions (Factor D); and
- Effective law enforcement (Factor D).

The SSA concluded that the stressors that influence current resiliency of ecosystems include sources of human-caused mortality and motorized access. As also discussed in the SSA, a variety of conservation measures help reduce the impact of these stressors on ecosystem resiliency.

All stressors were evaluated in an analysis of rangewide threats, and were evaluated cumulatively (Service 2020, Chapter 5). Specifically, we incorporate cumulative effects into our analysis when we characterize the current and future conditions for each ecosystem. Our analysis described the ways in which anthropogenic and natural factors singly and collectively affect the habitat and/or demographics needed by individuals and populations. Because the SSA framework considers not just the presence of the factors but also the degree to which they collectively influence the species' viability, our assessment integrates cumulative impacts of stressors.

<u>Factor A:</u> The present or threatened destruction, modification, or curtailment of its habitat or range

In the SSA, we discuss a number of stressors related to Factor A that affect the resiliency of grizzly bear ecosystems, now or in the future. First, motorized access, which brings humans and their vehicles into grizzly bear habitats, may indirectly influence grizzly bears by reducing the availability of large, intact blocks of land or directly by disturbing, displacing, or killing individual bears through increased noise, activity, presence, vehicle strikes, or increasing the chances of an encounter that could result in human-caused mortality. Second, operation and maintenance of developed sites, livestock allotments, and energy and mineral development in addition to access for recreation may result in displacement of bears from habitat and food sources or mortality of grizzly bears if interactions result in activities associated with human-caused mortality or management removals. Third, vegetation management projects typically include timber harvest, thinning, prescribed fire, and salvage of burned, diseased, or insect-infested stands. Vegetation management programs can negatively affect grizzly bears by temporarily removing cover, displacing bears from habitat, and increasing the chances of an encounter that could result in human-caused mortality. Vegetation management can also result in habitat improvements that benefit grizzly bears by increasing important foods, controlling weeds, and improving riparian areas. Fourth, habitat fragmentation can cause loss of connectivity and indirectly increase human-caused mortalities. Finally, private land development can lead to habitat fragmentation, can limit connectivity between ecosystems, reduce the expansion of grizzly bear range, and hinder natural recolonization of the BE and North Cascades. A variety of conservation efforts or mechanisms, such as the Wilderness Act, IRAs, and federal land management plans, help reduce the potential effects of these habitat-related stressors on the resiliency of ecosystems.

In the GYE and NCDE, the primary factors related to past habitat destruction and modification, including motorized access, developed sites, vegetation management, energy and mineral development, and livestock allotments, have been reduced through changes in management practices that have been formally incorporated into regulatory documents (Service 2020, p.); these conservation mechanisms are expected to continue into the future. We expect many of the stressors discussed above to continue to occur at some level in these ecosystems, but, assuming that current regulatory mechanisms remain in place, these stressors are currently sufficiently reduced so that they affect only a small proportion of the population. In addition, habitat protections within the GYE and NCDE and in potential connectivity areas in the form of easements and purchases have protected additional lands.

Habitat management standards also exist in the CYE and SE recovery zones and BORZ are managed under a "no net loss" policy (in their entirety: USDA FS 2011a, 2015a, 2015b, 2018). However, motorized access remains an issue for the CYE and SE, where these habitat standards have not yet been met. Although progress has been made towards meeting the standards in the CYE and SE, additional improvements are needed. One challenge in the CYE and SE is that they have a much lower proportion of protected areas (i.e., federal lands that have wilderness protections) than the other ecosystems (Service 2020, p. 100). Habitat protections within the CYE and SE and in potential connectivity areas in the form of easements and purchases have protected additional lands.

Habitat management standards are not yet in place in the two unoccupied recovery zones, the BE and North Cascades. We do not view the lack of standards in the BE as a threat, however, because it is 98 percent Wilderness. In the North Cascades, approximately 64 percent of the public lands are designated Wilderness or IRAs and existing regulatory mechanisms regulate the remaining Federal lands under a "no net loss" policy for secure core habitat. However, existing motorized access levels are unknown on USFS lands and we are unable to assess the adequacy of existing levels. Further monitoring of the population and cause-specific mortality will determine the success of the current "no net loss" policy in the North Cascades.

Despite potential negative impacts from vegetation management, mortality risk from vegetation management activities are and will continue to be largely mitigated through motorized access standards in the CYE and SE and the "no net loss" policy in the North Cascades. The Wilderness Act and other regulations reduce the stressors of developed sites, livestock allotments, and energy and mineral development in the North Cascades, CYE, SE, and BE. Additional data would help inform the potential effects of these stressors on grizzly bear populations in the CYE, SE, BE, and North Cascades.

Only the CYE ecosystem shows evidence of detrimental habitat fragmentation within the ecosystem, between the Yaak and Cabinet Mountains portions due to human settlement, U.S. Hwy. 2, and a busy rail line (Proctor *et al*. 2018, p. 350). Linkage corridors have been identified (Proctor *et al*. 2015, p. 11) and management to re-establish connectivity between these two areas has included non-lethal management of appropriate conflict bears, land purchases, electric fencing programs to reduce attractants conflicts, and more (Proctor *et al*. 2018, pp. 366-367). There is recent evidence that some movements are starting to take place (Kasworm *et al*. 2020a, p. 32) and functional connectivity remains a management objective.

Because habitat in the BE, CYE, North Cascades, and SE may only support relatively small grizzly bear populations, connectivity with other grizzly bear populations, including Canada, is necessary for their long-term conservation, which could involve management of motorized access and other habitat-related stressors in connectivity areas.

In the GYE, the large areas of widely distributed suitable habitat on public lands that are protected by federal legislation help to minimize risk posed by human population growth on private lands and ensure that the grizzly bear population continues to meet recovery criteria. In the areas outside of the recovery zones and in connectivity areas between ecosystems, , State and Federal agencies will continue to assist NGOs and other entities to identify and prioritize potential lands suitable for permanent conservation through easements and other means as much as possible (; NCDE Subcommittee, Chapter 3; USDA FS 2018d, p. 2; USDA FS 2018e, pp. 70, 131; USFWS 2020, p. X). To facilitate natural recolonization of the BE and the North Cascades, strategies to minimize human-caused mortality will need to be applied in the intervening linkage areas and may include access management.

Factor B: ***Overutilization for commercial or scientific purposes***

The listed entity is not currently used for commercial or scientific purposes. Legal hunting of grizzly bears (i.e., recreational purposes) was allowed in the NCDE from 1975 until 1991, under a special rule authorizing take in the 1975 listing (40 FR 331734, July 28, 1975). During this time, recreational hunting accounted for 50 percent of human-caused mortality in the NCDE (124 of 249). The special rule allowing a limited hunt in the NCDE was removed in 1992 (57 FR 37478, August 19, 1992). In the future, although the States may choose to institute carefully regulated grizzly bear hunting outside of the National Parks in the event of a delisting, it would be within scientifically determined sustainable levels to maintain the population in the long term..

***Factor C:* Disease or predation**

While there has been a positive shift in public perceptions and attitudes towards grizzly bears in the last several decades, human-caused mortalities continue to be the leading cause of grizzly bear mortalities range wide. Excessive human-caused mortality, including "indiscriminate illegal killing" and management removals, was the primary factor contributing to grizzly bear decline during the 19th and 20th 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.* 2003a, p. 571), eventually leading to their listing as a threatened species in 1975 (40 FR 31734, July 28, 1975). Human-caused mortality includes illegal kills, defense of life and property mortality, accidental mortality, and management removals (Service 2020, pp. 140-142). Despite these mortalities, the GYE, NCDE, CYE, and SE grizzly bear populations have continued to increase in size and expand their current distribution (Pyare *et al.* 2004, pp. 5–6; Schwartz *et al.* 2006a, pp. 64–66; Schwartz *et al.* 2006b, p. 48; IGBST 2012, p. 34; Bjornlie *et al.* 2014a, p. 184; Costello *et al.* 2016, pp. 2, 10; Bjornlie and Haroldson 2019, pp. 25–28; Haroldson *et al.* 2020b, p. 13; Kasworm *et al.* 2020a, p. 38–40; Kasworm *et al.* 2020b, p. 26–27). Although humans are still directly or indirectly responsible for the majority of grizzly bear deaths, this source of mortality is mitigated through science-based management, monitoring, and outreach efforts. Monitoring agencies have committed to continuing to produce annual reports that analyze the causes of known and probable grizzly bear mortalities. Mortality rates are managed consistent with recovery criteria and/or updated population objectives in the GYE, NCDE, CYE, and SE with a goal of recovering and maintaining grizzly bear populations.

There are no food storage orders within the BE recovery zone. In the North Cascades, food storage orders are in effect in North Cascades NP, but not on 75 percent of land managed by the USFS within the North Cascades recovery zone. The lack of mandatory food storage orders within the North Cascades and BE recovery zones may contribute to future grizzly bear mortality risk and inhibit restoration efforts or natural recolonization. As grizzly bear distribution expands, food storage orders in areas outside the recovery zones would likely facilitate connectivity.

Although grizzly bears have been documented with a variety of bacteria and other pathogens, parasites, and disease, fatalities from disease 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). Based on nearly 40 years of research by the IGBST and MFWP, natural mortalities in the wild due to disease have never

been documented (Craighead *et al.* 1988, pp. 24–84; IGBST 2005, pp. 34–35; Haroldson 2019c, *in litt.*; MFWP, unpublished data). Based on this absence in more than 50 years of data, we conclude that mortalities due to bacteria, pathogens, or disease are negligible components of total mortality for grizzly bears and are likely to remain an insignificant factor in population dynamics. Therefore, although disease may affect individuals, it does not significantly influence the resiliency of ecosystems. Additionally, grizzly bears are sometimes killed by other grizzly bears or other species. Overall, these types of aggressive interactions between grizzly bears and other wildlife species are rare, and although infanticide is a factor in many populations, we do not believes it significantly reduces resiliency (Service 2020, p. 161).

***Factor D:* The inadequacy of existing regulatory mechanisms**

States, National Forests, National Parks, and Tribes have implemented regulatory mechanisms that help address the stressors we identified under Factors A, B, C, and E. However, these regulatory mechanisms do not yet fully address all of the stressors identified under these factors across the species' range, including motorized access management and human-caused mortality. Many of the motorized access management approaches and mortality limits 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.

***Factor E:* Other natural or manmade factors affecting its survival**

Genetic concerns are not an immediate threat to the GYE or NCDE grizzly bear populations (Miller and Waits 2003, p. 4338; Kamath *et al.* 2015, entire; Paetkau *et al.* 1998, p. 421; Kendall *et al.* 2009, p. 12; Proctor *et al.* 2012, p. 12). We remain confident that genetic monitoring, and translocation if necessary, will address the ability of future GYE bears to adapt evolutionarily (Hedrick 1995, p. 1004; Miller and Waits 2003, p. 4338). Overall, the NCDE population is genetically and demographically well connected to Canadian populations; current levels of genetic diversity are sufficient to support healthy reproduction and survival; and the NCDE's current population size ensures genetic health.

However, because of the small populations sizes in the in CYE and SE, and the lack of known populations in the BE and North Cascades, isolation is still a potential future threat to the resiliency of these populations. To address this threat, interagency efforts are continuing to provide and maintain movement opportunities for grizzly bears, and to reestablish natural connectivity and gene flow among all grizzly bear populations in the lower-48 States. There is already evidence of some success of these efforts. For example, trans-boundary connectivity has been observed in the NCDE and limited demographic and genetic connectivity has been observed between Canadian populations and the SE and Yaak portion of the CYE. While gene flow has not yet been documented between the CYE and SE, movements between the CYE, SE, BE, and NCDE, and between the CYE, SE, and NCDE and Canada have increased. In addition, the estimated distribution of the NCDE grizzly bear population is within 7 km (4.3 mi) of the BE

recovery zone and there are multiple verified sightings between the GYE and NCDE distributions and the BE.

There are no indications that long-term trends in food availability, other than whitebark pine nuts, cutthroat trout, and salmon, have changed in the GYE, NCDE, CYE, SE, BE, and North Cascades in the last several decades. Although grizzly bears in the GYE have experienced a decline in the availability of whitebark pine nuts and cutthroat trout, bears are finding sufficient alternative food resources to maintain body condition (IGBST 2013, pp. 32–35; Bjornlie *et al*. 2014b, entire; Costello *et al.* 2014, entire; Gunther *et al.* 2014, entire). We anticipate that grizzly bears will be able to adapt to any future potential changes in individual food sources because of the great plasticity of grizzly bear diets and the range of available foods, as long as there are sufficiently large intact, blocks of land available (Service 2020, pp. 179-193).

Most grizzly bear biologists in the United States and Canada do not expect habitat changes predicted under climate change scenarios to directly threaten grizzly bears (Servheen and Cross 2010, p. 4). Climate change may even make some habitat more suitable and food sources more abundant (Servheen and Cross 2010, Appendix D). Timing and frequency of human-grizzly bear interactions and conflicts may change (Servheen and Cross 2010, p. 4). We expect that conservation plans and strategies and mortality limits will limit negative effects of climate change on grizzly bears (Service 2020, pp. 193-197).

In the SSA, we considered catastrophic and stochastic (random probability) events that might reasonably occur in the each of the ecosystems within the 30 to 45-year future, to the extent possible, including fire, volcanic activity, and earthquakes (Service 2020, p. 194-196). Most catastrophic events discussed in the SSA are unpredictable and unlikely to occur within the biologically meaningful timeframe for our SSA. Other events that might occur within the future would likely cause only localized and temporary impacts that would not significantly reduce the resiliency of any of the six ecosystems.

RECOMMENDATION ON SPECIES STATUS

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." In the SSA Report, we evaluated the best available scientific information regarding the current and predicted future condition of grizzly bears in the lower-48 States to describe its viability and how it may change over time. We assess the viability of grizzly bears in the lower-48 by evaluating its ability to maintain a sufficient number and distribution of viable populations to withstand environmental stochasticity (resiliency), catastrophes (redundancy), and changes in its environment (representation) into the future. Ultimately, we compare our evaluation of the listed entity's risk of extinction against the definitions of an endangered or threatened species as defined by the ESA.

After evaluating threats to the listed entity and assessing the cumulative effects of the threats under the section 4(a)(1) factors, we conclude that the listed entity (grizzly bears in the lower-48

States) is not currently in danger of extinction, but is likely to become in danger of extinction within the foreseeable future throughout all of its range. There is no change in status since the last five-year status review in 2011.

Are grizzly bears in the lower-48 States in danger of extinction throughout all of their range?

Since listing of grizzly bears as a threatened species in 1975, conditions for grizzly bears in the lower-48 States have only improved. First, threats to grizzly bears in the lower-48 States have been all or partially ameliorated in the past five decades. For example, predator control and poisoning has declined precipitously since listing, as has sheep herding in Idaho and Wyoming. Additionally, the security of grizzly bear habitat has increased due to new wilderness areas and IRAs, declines in motorized access (which benefit many different types wildlife, including game species), and more careful management of timber harvest and other development activities. Federal land management plans in most of grizzly bears' current range in the lower-48 States have been revised to include science- and research-based measures and management practices consistent with grizzly conservation, thereby greatly reducing the risk of habitat deterioration on Federal lands. As such, grizzly bears have since expanded their range and population size, growing from occupying only two percent of historic range in 1975 to six percent in 2020 and from having 700–800 bears to having over 1,900 (Costello 2020, *in litt.*; Haroldson *et al.* 2020b, p. 13; Kasworm *et al.* 2020a, p. 40; Kasworm *et al*. 2020b, p 19; Haroldson *et al.* 2020a, *in press*; see Table 7 in Service 2020, p.). In other words, grizzly bears in the lower-48 states have greatly improved resiliency since the time of listing as a threatened species.

Currently, two of the four extant grizzly bear ecosystems have high resiliency (GYE and NCDE), one has moderate resiliency (SE) and one has low resiliency (CYE) (Service 2020, p.). However, two grizzly bear ecosystems (BE and North Cascades) remain in functionally extirpated condition. We do not believe grizzly bears in the lower-48 States are currently in danger of extinction throughout all of their range because the security of the two eastern-most populations (the GYE and the NCDE) greatly lessens the probability of extinction in the lower-48 States. The high resiliency, positive growth rates, expanding range, and regulatory mechanisms in state regulations, National Forest plans, and national Park compendia for these two large populations suggests that grizzly bears are not at immediate risk of extinction in the lower-48 States. Moreover, while only four extant populations currently contribute to redundancy, we know of no imminent catastrophic threats that could likely eliminate any or all extant populations of grizzly bears in the lower-48 States (e.g., fire, volcanic activity, earthquake, disease; see Service 2020, p. 197); of note, grizzly bears in the GYE were able to bounce back from a large fire in 1988, despite having a smaller, less resilient population than exists today. Even with the lack of populations in the BE and North Cascades ecosystems, the four currently extant populations situated across the ecological diversity inherent in the NCDE, GYE, CYE, and SE provide sufficient redundancy and representation to reduce the risk of extirpation from stochastic variation, catastrophic events, and an inability to adapt to changes in the environment; these current levels of resiliency, redundancy, and representation suggest that the current risk of extinction is low and that grizzly bears in the lower-48 States are not presently in danger of extinction throughout all of their range.

In sum, given that resiliency has improved since the time of listing, that threats have been reduced, and that the GYE and NCDE demonstrate high resiliency as expanding source populations, extinction risk for grizzly bears in the lower-48 States has only decreased since the time of listing and thus grizzly bears in the lower-48 States are not in danger of extinction throughout all of their range.

Are grizzly bears in the lower-48 States likely to become in danger of extinction in the foreseeable future throughout all of their range?

Having determined that grizzly bears in the lower-48 States are not endangered, we next compare the status of the listed entity to the definition of a threatened species. In examining whether grizzly bears in the lower-48 States are a threatened species under the Act, we considered the risk of extinction 30 to 45 years into the future—the foreseeable future. This timeframe is both biologically meaningful and a reasonable length of time over which to consider possible changes in threats or conservation. Thirty to 45 years represents approximately two to three generation intervals for a grizzly bear. Given the longevity of grizzly bears, up to 30 years in the wild, two to three generation intervals represent a time period during which a complete turnover of the population would have occurred and any positive or adverse changes in the demographics of the population would be detectable. This timeframe also considers the possibility that conservation measures that reduce and regulate potential stressors, such as land management plans, could be revised by applicable land management agencies at least once.

While grizzly bears in the lower-48 States are not currently in danger of extinction throughout all of their range, in large part due to the success of conservation efforts over the course of the past five decades, they could become so in the foreseeable future. Uncertainty about the level of conservation in the future throughout all of the range, and the sensitivity of grizzly bear resiliency, redundancy, and representation to this future conservation, suggests that grizzly bears are likely to become in danger of extinction in the foreseeable future throughout all of their range. Based on the future condition analysis in the SSA, without continued or increased conservation into the future (Scenarios 1 and 2), resiliency of extant populations could decline and the BE and North Cascades would remain functionally extirpated. Of particular concern is the potential for continued human population expansion in the West in the future, which could put new pressure on recovering grizzly bear populations due to additional private land use in some areas that would be incompatible with grizzly bear conservation; this is especially relevant considering that human-bear conflicts are now more common on private lands than public lands (Cooley *et al.* 2018, entire). This expansion of human presence and development could negatively impact grizzly bear survival. In short, without continued conservation efforts and threat management, it is less likely that the CYE, SE, BE, and North Cascades ecosystems will recover, given the Low, Very Low, or Functionally Extirpated condition of these ecosystems under Scenarios 1 and 2 in the SSA. Under Scenarios 1 and 2, grizzly bear populations are thus at greater risk from stochastic events (have lower resiliency), have higher catastrophic risk (have lower redundancy), and have less ability to adapt to changing future conditions due to occupying a less diverse set of ecological conditions (have lower representation).

Without the protections of the Act, it is unclear whether all current conservation, especially in the CYE and SE, would continue and whether, consequently, threats could increase (Scenarios 3,

4, and 5). Only under the two more optimistic future scenarios, Scenarios 4 and 5 would resiliency, redundancy, and representation increase, primarily through improving resiliency of the BE and North Cascades ecosystems. The range of possible future conditions lends uncertainty to whether resiliency, representation, or redundancy would decrease or increase in the foreseeable future. This uncertainty suggests that grizzly bears in the lower-48 States may not have sufficient resiliency, redundancy, and representation in the foreseeable future to reduce the possibility of extirpation from stochastic events, catastrophic events, or lost adaptive capacity and that they are likely to become in danger of extinction in the foreseeable future throughout all of their range.

Are grizzly bears in the lower-48 States in danger of extinction throughout a significant portion of their range?

Under the Act, our implementing regulations, and a recent court decision (Center for Biological Diversity v. Everson, 2020 WL 437289, D.D.C. Jan. 28, 2020), species may also warrant classification as endangered if they are in danger of extinction throughout a significant portion of their range.

Therefore, in order to fully consider the appropriate status for grizzly bears in the lower-48 States, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and, (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the "significance" question or the "status" question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

For grizzly bears in the lower-48 States, we considered whether threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale, such that those portions could be considered in danger of extinction. We examined the stressors of motorized access, other habitat-related stressors that can reduce security of habitat for grizzly bears, and human-caused mortality.

We found that there may be a geographic concentration of threats in connectivity areas, those areas that provide corridors for grizzly bears to move between ecosystems. These connectivity areas do not have the same habitat protections and standards as the recovery zones. They lack the motorized access standards and food storage orders that can provide security for grizzly bears. Additionally, in connectivity areas in Idaho, hunters can bait black bears, which provides additional risk of human conflict with grizzly bears. Finally, mistaken identity killings can be more common in these areas.

However, despite the potentially elevated threats in these connectivity areas, we do not consider these connectivity areas to be "significant" , given their currently minimal contribution to the overall viability of the listed entity. These connectivity areas lack any known populations, since we define a population as two or more reproductive females or one female reproducing during two separate years (Service 2000, pp. 3-14–15). As such, these areas do not currently contribute

meaningfully to resiliency, redundancy, and representation, given that there are known populations and so few bears present overall.

We also examined whether there might be a geographic concentration of threats in the CYE and SE. However, we found no concentration of threats in these ecosystems. We examined rates of human-caused mortality in these ecosystems and, though human-caused mortality from various sources still occurs in these ecosystems, it occurs at a similar rate to the other extant ecosystems. Specifically, from 2002 to 2019, 76 percent of the 38 known and probable grizzly bear mortalities in the CYE and 80 percent of the 15 known and probable grizzly bear mortalities in the U.S. portion of the SE recovery zone were human-caused (Kasworm *et al.* 2020a, p. 33; Kasworm *et al.* 2020b, p. 23). In comparison, the GYE and NCDE had a higher proportion of known and probably human-caused mortalities than the CYE and SE between 2002 and 2019 (83 percent and 91 percent, respectively) (Servheen *et al.* 2004, p. 21; van Manen 2002, *in litt.*; MFWP, unpublished data). Moreover, despite these rates of human-caused mortality, all four ecosystems have an increasing population trend, suggesting that these mortalities are not preventing any of these populations from increasing in number and range. Thus, the threat of human-caused mortality is not concentrated in the CYE and SE and grizzly bears in the CYE and SE do not have a different status from grizzly bears' rangewide status.

In conclusion, we do not find that any portions of the listed entity's range have a geographic concentration of threats at a biologically meaningful scale. Therefore, no portion of the listed entity's range provides a basis for recommending that the listed entity is currently in danger of extinction in a significant portion of its range, and we recommend that the listed entity is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Synthesis

Our review of new information, as documented in our SSA report (Service 2020) and summarized in this five-year review, does not change our evaluation of the listed entity's status and the threats affecting the listed entity under the factors in 4(a)(1) of the Act from our last and most recent review of the listed entity (Service 2011, entire). Specifically, the uncertainty regarding whether resiliency, redundancy, and representation could decline in the future support our previous evaluation that grizzly bears in the lower-48 States continue to meet the definition of threatened under the Act. Therefore, we recommend no change in status to the listed entity at this time.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
GRIZZLY BEARS IN THE LOWER-48 STATES
(*Ursus arctos horribilis*)

CURRENT CLASSIFICATION: Threatened

RECOMMENDATION RESULTING FROM THE 5-YEAR REVIEW:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist:
____ Extinction
____ Recovery
____ Original data for classification in error
_X_ No change is needed

APPROPRIATE LISTING/RECLASSIFICATION PRIORITY NUMBER, IF APPLICABLE: NA

RECOMMENDATIONS FOR FUTURE ACTIONS:

- COMPLETE AFTER JANUARY 15 MEETING

REGIONAL OFFICE APPROVAL:

Approve: _____ Date: _____

Noreen Walsh
U.S. Fish and Wildlife Service
Regional Director
Interior Regions 5 and 7

The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.

REFERENCES CITED

CITE SSA and 2011 FIVE-YEAR REVIEW