GRIZZLY BEAR IN THE LOWER-48 STATES

(*Ursus arctos horribilis*)

5-Year Status Review:
Summary and Evaluation

Photo Credit: Jennifer Fortin-Noreus, USFWS

U.S. Fish and Wildlife Service
Upper Colorado Region
Denver, Colorado

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

Species Reviewed: Grizzly bear (*Ursus arctos horribilis*) in the conterminous United States (lower 48-States)

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: Legacy Region 6, Interior Regions 5 and 7, Grizzly Bear Recovery Office, Hilary Cooley, Grizzly Bear Recovery Coordinator, 406–243–4903; hilary_cooley@fws.gov.

Classification: Threatened

Methodology used to complete this review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973 (16 U.S.C Section 1531 *et seq.*), as amended (Act), the purpose of a 5-year status review is to assess each threatened 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. Status reviews are to be completed in accordance with Sections 4(a) and 4(b) of the Act (16 U.S.C. Section 1533(c)). We solicited data for this 5-year status review, and the associated Species Status Assessment (SSA) report, from interested parties through a January 14, 2020, *Federal Register* notice announcing this review (85 FR 2143). We reviewed all information that we received and incorporated information relevant to our analysis in our SSA report (Service 2021, entire). Information that we received from this data call relevant to our analyses 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 from non-governmental organizations (NGOs) and other interested parties on potential threats. We did not consider or incorporate comments that were outside the scope of our SSA or 5-year status review, such as comments related to our authorities under the Act.

The grizzly bear is listed as threatened under the Act in the conterminous United States, which comprises the lower-48 States, and this listed entity is the subject of our SSA report and this 5-year status review. Unless specified otherwise, throughout this document, we use the term "the grizzly bear in the lower-48 States" to refer to the entity currently listed as a threatened species under the Act. In other words, we use the term "lower-48 States" synonymously with "conterminous United States." Additionally, we use the term "ecosystem" to refer to individual populations of this listed entity; these two terms are synonymous.

REVIEW ANALYSIS

Overview of the Species Status Assessment Process

The SSA report provides the U.S. Fish and Wildlife Service's (Service's) comprehensive biological status review for the grizzly bears in the lower-48 States, including a thorough account of the grizzly bear in the lower-48 States' current and future viability, or the "ability of a species to sustain populations in the wild over time" (Service 2016, p. 21; Service 2021, entire). Scientific experts contributed to our analysis, and the draft SSA report was independently peer reviewed and reviewed by partners, including those from State wildlife agencies, Federal agencies, and Tribal wildlife agencies. The results of the independent peer review of the draft SSA report are available online on the Service's Science Peer Review webpage (*https://www.fws.gov/mountain-prairie/science/peerreview.php*). We incorporated the results of the peer and partner review into our SSA report. The SSA report is available online on the Service's grizzly bear webpage (*https://www.fws.gov/mountain-prairie/es/grizzlybear.php*) or at *https://ecos.fws.gov/ecp/species/7642*. For informational purposes, the SSA report also provides a summary of recovery planning and recovery progress for the grizzly bear in the lower-48 States (Service 2021, pp. 73–94).

The SSA report provides the best available biological information to inform our recommendation on the status of the grizzly bear in the lower-48 States under this 5-year status review. This includes resource needs and current and future conditions, which we describe in terms of the conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 307–310; Wolf *et al.* 2015, entire; Smith *et al.* 2018, entire; Service 2021, pp. 31–33). The SSA therefore provides the scientific analysis for the 5-year status review. The following discussion presents a summary of the results and conclusions of the SSA report (Service 2021, entire).

For this SSA, we defined viability as the ability of the grizzly bear in the lower-48 States to sustain populations in natural ecosystems over a biologically meaningful timeframe, which, in this case, we defined as the middle of the 21st century (2050 to 2065), or 30 to 45 years into the future. This timeframe is a period that captures approximately two to three grizzly bear generation intervals (10 to 15 years each), a period of time over which the effects of any stressors on the population would be detectable.(Service 2021, p. 228). This timeframe is also a period that allows us to reasonably project conservation efforts, actions, and the potential effects of various stressors (Service 2021, p. 228).

To assess the viability of the grizzly bear in the lower-48 States, we used the three conservation biology principles of resiliency, redundancy, and representation, collectively known as the 3Rs (Shaffer and Stein 2000, pp. 307–310; Wolf *et al.* 2015, entire; Smith *et al.* 2018, entire; Service 2021, pp. 31–33). In short:

- Resiliency is the ability for populations to persist in the face of stochastic events, or for populations to recover from years with low reproduction or reduced survival, and is associated with population size, growth rate, and the quality and quantity of habitats;

- Redundancy is the ability for the species to withstand catastrophic events, for which adaptation is unlikely, and is associated with the number and distribution of populations; and
- Representation is the ability of a species to adapt to changes in the environment and is associated with its diversity, whether ecological, genetic, behavioral, or morphological.

For our analysis, we identified the grizzly bear in the lower-48 States' ecological requirements for survival and reproduction at the individual, population, and lower-48 States levels, and described the factors, both positive and negative, that influence the viability of the grizzly bear in the lower-48 States, currently and into the future. We then evaluated the listed entity's current levels of resiliency, redundancy, and representation, and projected plausible changes to these 3Rs into the future; considered together, the current and future levels of resiliency, redundancy, and representation characterize the viability of the grizzly bear in the lower-48 States (Service 2021, pp. 31–33).

Summary of Species Status Assessment for Grizzly Bears in the Lower-48 States

Summary of Life History, Ecology, Range, and Distribution from the SSA

Our SSA report provides our full account of the life history, ecology, range, and historical and current distribution for the grizzly bear in the lower-48 States (Service 2021, pp. 40–72), which we summarize here. 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. 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 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, and is the subspecies that occurs in the lower-48 States (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 U.S., central Mexico, western Canada, and most of Alaska. An estimated 50,000 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) (Servheen 1990, pp. 1–2; Servheen 1999, pp. 50–51). Populations declined in the late 1800s with the arrival of European settlers, government-funded bounty programs, and the conversion of habitats to agricultural uses. When the Service listed the grizzly bear in the lower-48 States as threatened under the Act in 1975, grizzly bears had been reduced to less than two percent of their former range in the lower-48 States; at the time, the estimated population in the lower-48 States was 700 to 800 individuals. In 1975, only five areas in mountainous regions, national parks, and wilderness areas contained populations. These five areas were 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. At the time of listing, grizzly bears were believed to also exist in two additional areas: the Bitterroot Mountains in central Idaho and western Montana, and the San Juan Mountains in Colorado (Service 2021, pp. 52–54). 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 expanded considerably, both in terms of size and range, 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 below). Current populations in the NCDE, CYE, and SE 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 with Canada. There is also no known population in the Bitterroot (BE), nor are there known populations outside the six defined ecosystems, although we have documented bears, primarily solitary, between the six ecosystems. As illustrated in Table 1 below, current estimates, as of 2019, suggest there are at least 1,913 individuals in the lower-48 States (737 in the GYE Demographic Monitoring Area (DMA), 1,068 in the NCDE, 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) (Service 2021, p. 63; Costello 2020, *in litt.*; Haroldson *et al.* 2020b, p. 13; Kasworm *et al.* 2020a, p. 40; Kasworm *et al*. 2020b, p 19).

Table 1. Current population estimates of grizzly bears in the six ecosystems in the lower-48 States (NCDE = Northern Continental Divide Ecosystem; GYE = Greater Yellowstone Ecosystem; CYE = Cabinet-Yaak Ecosystem; SE = Selkirk Ecosystem; and BE = Bitterroot Ecosystem).

Ecosystem	Estimated Number of Bears	Citation
GYE (as measured in the Demographic Monitoring Area)	737	Haroldson *et al.* 2020b, p. 13
NCDE	1,068	Costello 2020, *in litt.*
CYE	55-60	Kasworm *et al.* 2020a, p.40
SE	Minimum of 53 in U.S. portion, B.C. estimate in progress	Kasworm *et al.* 2020b, p. 19
BE	No known population	
North Cascades	No known population	

For the purposes of our SSA, we refer to populations of the grizzly bears using the names of their respective ecosystems in the lower-48 States (Service 2021, pp. 34–37). As described in our recovery planning documents for grizzly bears, 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). The Service has not defined ecosystem boundaries for any of the ecosystems across the lower-48 States but, for the purposes of our analysis, ecosystems are

generally the larger area surrounding the recovery zone in which grizzly bears may be anticipated to occur as part of the same population (Figure 1). For the GYE and NCDE, the ecosystems also include the DMAs outlined in Figure 1 below. For our SSA, we evaluated resiliency, redundancy, and representation at the scale of the six ecosystems identified in the 1993 Recovery Plan (Service 1993) and illustrated in Figure 1 below. Our SSA report provides additional detail regarding these recovery areas and summarizes recovery planning and recovery progress for the grizzly bear in the lower-48 States (Service 2021, pp. 73–94).

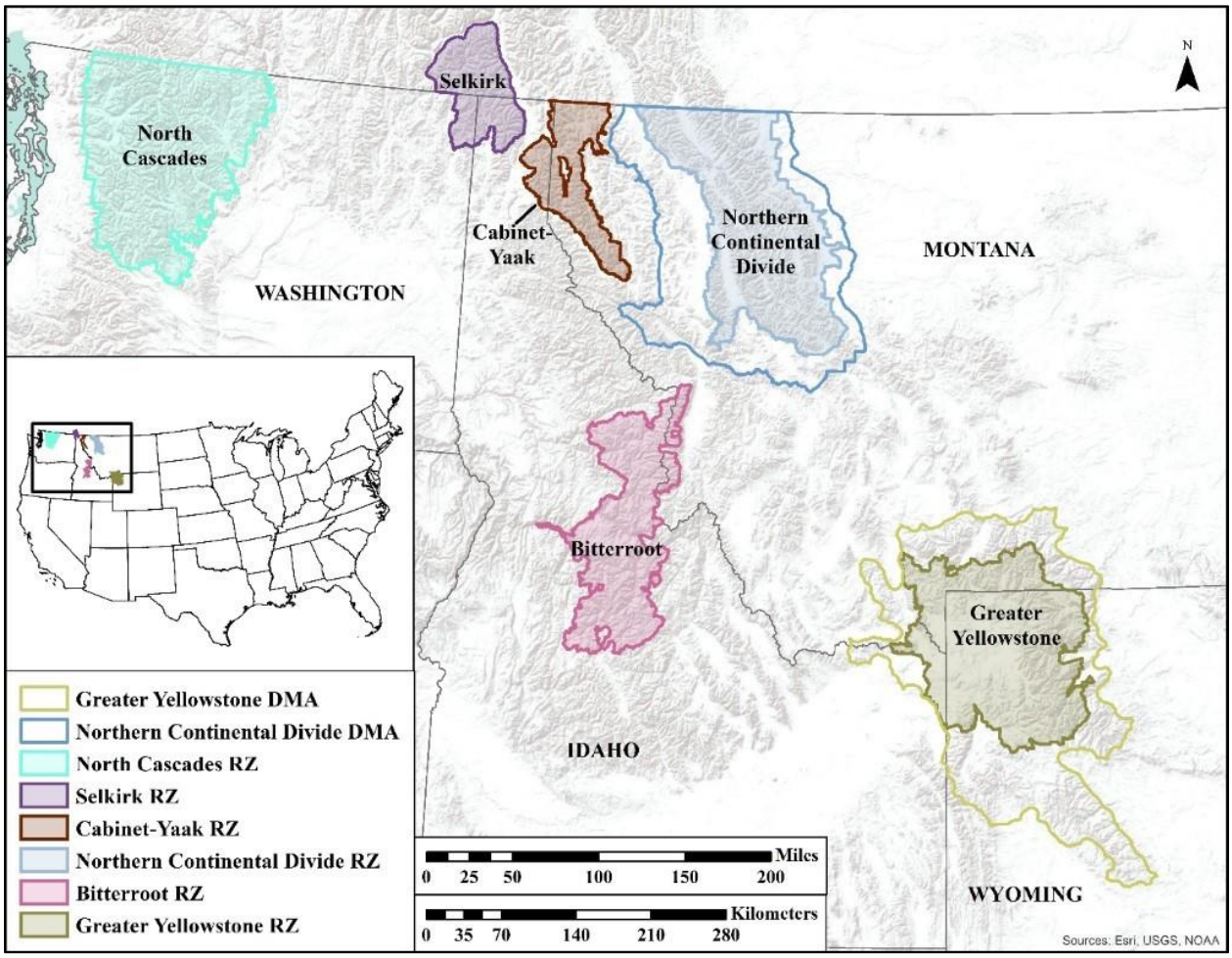

Figure 1. Recovery zones (RZ) and demographic monitoring areas (DMA), where applicable, for the six ecosystems identified in the Recovery Plan: the Northern Continental Divide (NCDE), Greater Yellowstone (GYE), Cabinet-Yaak (CYE), Selkirk (SE), Bitterroot (BE), and North Cascades ecosystems. DMAs surround and include the recovery zones in the GYE and NCDE. The SE recovery zone includes part of Canada because the habitat in the U.S. portion was thought to not be of sufficient size to support a minimum population (Service 1993, p. 12) and the biological population (comprised of contiguous occupied habitat) extends into Canada up to B.C. Highways 3 and 3A (Proctor et al. 2005, p. 2410; Proctor et al. 2012, p. 14).

Summary of Needs from the SSA

Here we summarize what individual grizzly bears in the lower-48 States need to breed, feed, and shelter. We also summarize the results of our analysis regarding the factors that ecosystems need

to be resilient and the factors that the grizzly bear in the lower-48 States need to be redundant and representative, with greater detail provided in our SSA report (Service 2021, pp. 7, 95–98).

In general, food, water, mates, cover, security, and den sites drive a grizzly bear's habitat needs and daily movements. Grizzly bears in the lower-48 States need access to large, intact blocks of land with limited human influence that provide cover, high-caloric foods, dens, and areas for dispersal. The specific quality and quantity of these resources influence the ability of individual grizzly bears to reproduce, grow, and survive at different life stages (Service 2021, pp. 96–97). These resources support resilient ecosystems, which may be characterized generally by grizzly bear abundance, population trends, survival rates, fecundity, and connectivity levels sufficient to withstand environmental stochasticity (Service 2021, p. 97). The grizzly bear in the lower-48 States needs to occur in multiple, resilient ecosystems distributed across a broad geographic range in order to meet redundancy requirements and withstand catastrophic events (Service 2021, pp. 97–98). Specific quantities or qualities needed for each of these factors may vary by ecosystem. Additionally, the grizzly bear in the lower-48 States needs genetic and ecological diversity in order to preserve variation and the ability to adapt to changing conditions (Service 2021, p. 98).

Summary of Cause-and-Effects from SSA: Stressors and Conservation Efforts

As documented in our SSA report, we evaluated stressors and other actions that can positively or negatively affect grizzly bears at the individual, ecosystem, or lower-48 States levels, either currently or into the future (see Figure 3 in Service 2021, p. 9; Service 2021, pp. 99–211). A wide variety of stressors may influence the resiliency of the listed entity, either by directly affecting individuals or by reducing the quality and quantity of habitats. The stressors, or negative factors, we evaluated fit into three broad categories: those with habitat-related effects, sources of human-caused mortality, and other stressors. These stressors are interrelated to varying degrees; for example, motorized access influences both habitat availability and human-caused mortality. Positive actions, in the form of conservation efforts such as land protections and regulations, have reduced sources of habitat degradation and human-caused mortality. These efforts have improved resiliency from levels at the time of listing in four of the six ecosystems, and will be important to the viability of the grizzly bear in the lower-48 States in the future.

Stressors with potential habitat-related effects that we analyzed 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; connectivity and genetic health; changes in food resources; effects of climate change; and catastrophic events, such as widespread wildfires, earthquakes, and volcanic eruptions.

There are a variety of conservation efforts and mechanisms that either reduce or ameliorate stressors or improve the condition of habitats or demographics for the listed entity. 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 that provide long-term habitat protection; information and education programs; effective law enforcement; and augmentation or translocation programs. Our SSA report provides our full analysis of stressors and conservation efforts (see Figure 3 in Service 2021, p. 9; Service 2021, pp. 99–211).

Summary of Current Condition from the SSA

In our SSA report, we evaluate current condition by examining current levels of resiliency in the six grizzly bear ecosystems and their contributions to redundancy and representation to the grizzly bear in the lower-48 States. Below, we summarize our evaluation of current condition for each of the 3Rs, with additional detail regarding our analysis provided in the SSA report (Service 2021, pp. 212–227).

Summary of Current Resiliency

We describe the resiliency for each of the six ecosystems in terms of the habitat and demographic factors needed by the grizzly bear in the lower-48 States (Service 2021, pp. 37–39, 212–215). We developed a categorical model 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 2021, pp. 212–215). We selected these habitat and demographic factors based on their importance to resiliency and because we could evaluate them relatively consistently across all six ecosystems. We then used this categorical model as a key to evaluate resiliency for each ecosystem by systematically evaluating the current condition of 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 2021, p. 214). 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 2021, p. 214). Our SSA report provides additional detail regarding the methodology we used to evaluate resiliency for each of the six ecosystems (Service 2021, pp. 212–215).

Table 2 summarizes our evaluation of current resiliency for each ecosystem. Of the six ecosystems, two ecosystems currently have high resiliency, the GYE and NCDE; one ecosystem has moderate resiliency, the SE; and one ecosystem has low resiliency, the CYE (Service 2021, pp. 218–222). Two ecosystems have no resiliency, the BE and North Cascades (Service 2021, pp. 217, 222–224).

Table 2. Current condition for six ecosystems for grizzly bear in the lower-48 States, evaluated using 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; 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 greater viability 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)					
GYE	High	High	High	High	Moderate	High	High	X	Moderate	**High**
NCDE	High	High	High	High	High	High	Moderate	High	High	**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 Cascades	Moderate	Moderate	X	X	X	X	X	X	X	**X**

Currently, the GYE and NCDE are the only ecosystems that have high resiliency (Table 2, above). A variety of land protections, particularly those that have reduced motorized access, and the availability and diversity of natural foods contribute to the high ranking for habitat factors in these two ecosystems (Service 2021, pp. 217, 218–219). State, Federal, Tribal, and non-governmental organization partners have implemented conservation activities and land protections in the GYE and NCDE that help reduce human-caused mortality and contribute to large population sizes in these two ecosystems (Service 2021, pp. 218–219). 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 (Service 2021, p. 218).

The grizzly bear population in the CYE currently has low resiliency (Table 2, above). 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 2, above). 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 2021, pp. 178–179). Recent data also suggest that the number of grizzly bears in the Cabinet portion of the CYE has increased from fewer than 15 individuals to 55 to 60 bears (Kendall *et al.* 2016, p. 314; Kasworm *et al.* 2020a, p. 40), almost exclusively through the augmentation program and reproduction from those individuals (Kasworm *et al.* 2020a, p. 31). This ecosystem also has a less diverse assortment of foods, particularly in the form of ungulate protein, although body fat levels indicate that individuals are relatively healthy (Kasworm *et al.* 2020a, pp. 55–56). Large intact blocks of land are also somewhat limiting in the CYE due to its overall smaller size. Even though there are large protected areas within the CYE (with 44 percent designated as Wilderness or IRAs), as well as additional protections outside the CYE recovery zone and conservation efforts on private lands that improve security for grizzly bears, habitat standards for motorized route densities have not yet been met in the CYE recovery zone, which limits the availability of large intact blocks of land in the CYE (Service 2021, pp. 220–221).

The grizzly bear population in the SE currently has moderate resiliency (Table 2, above). Despite high population trends and high and moderate adult female survival, the SE currently has a very low number of bears, although this factor could improve as bears reproduce and expand in the future (Table 2, above). This ecosystem also has a less diverse assortment of foods, particularly in the form of ungulate protein, though body fat levels indicate that individuals are relatively healthy (Kasworm *et al.* 2020b, p. 38). 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, which limits the availability of large intact blocks of land in the SE (Service 2021, pp. 219–220).

Despite the moderate condition of habitats, due in part to considerable amounts of protected areas, the BE does not contain any known populations, so it is currently in a functionally extirpated condition and therefore has no resiliency. Approximately 98 percent of the BE recovery zone is designated Wilderness, but the condition of large intact blocks of land is moderate because motorized access standards have not been developed for the recovery zone or for adjacent areas to the north and east, where female occupancy is necessary for natural recolonization of the BE (Service 2021, pp. 222). Despite its relative isolation from other ecosystems, recent sightings suggest that inter-ecosystem connectivity is possible, although currently very low for the BE (Service 2021, p. 223).

The North Cascades ecosystem currently has moderate habitat conditions, due in part to protected areas within the ecosystem but, without a known population, the grizzly bear population is functionally extirpated, and therefore has no resiliency (Service 2021, pp. 223–224). Approximately 63 percent of the North Cascades ecosystem is designated Wilderness or IRAs.

Our SSA report provides a full account of our evaluation of resiliency for each ecosystem, including the assessment of each habitat and demographic factor for each ecosystem. Please see the SSA report for our full analysis of current resiliency (Service 2021, pp. 212–226).

Summary of Current Redundancy and Representation

Redundancy describes the number and distribution of ecosystems, such that the greater the number and the wider the distribution of the ecosystems, the better the grizzly bear in the lower-48 States can withstand catastrophic events, such as widespread wildfire. Grizzly bears in the lower-48 States currently occupy four ecosystems, two with high resiliency, one with moderate resiliency, and one with low resiliency (Table 2, above). Grizzly bears within two ecosystems are functionally extirpated, with no resiliency, so do not contribute to redundancy (Table 2, above). The four ecosystems are currently distributed from north to south and east to west as illustrated in Figure 2; this geographic distribution further characterizes the current spread of catastrophic risk, or current levels of redundancy. Representation of the grizzly bear in the lower-48 States is currently captured by the ecological diversity inherent within the four resilient ecosystems (Figure 2). 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. While currently functionally extirpated, the BE and North Cascades represents two additional ecoregion types. The BE is primarily contained in the Idaho Batholith ecoregion, and contains mountainous regions, 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 (Service 2021, pp. 226–227).

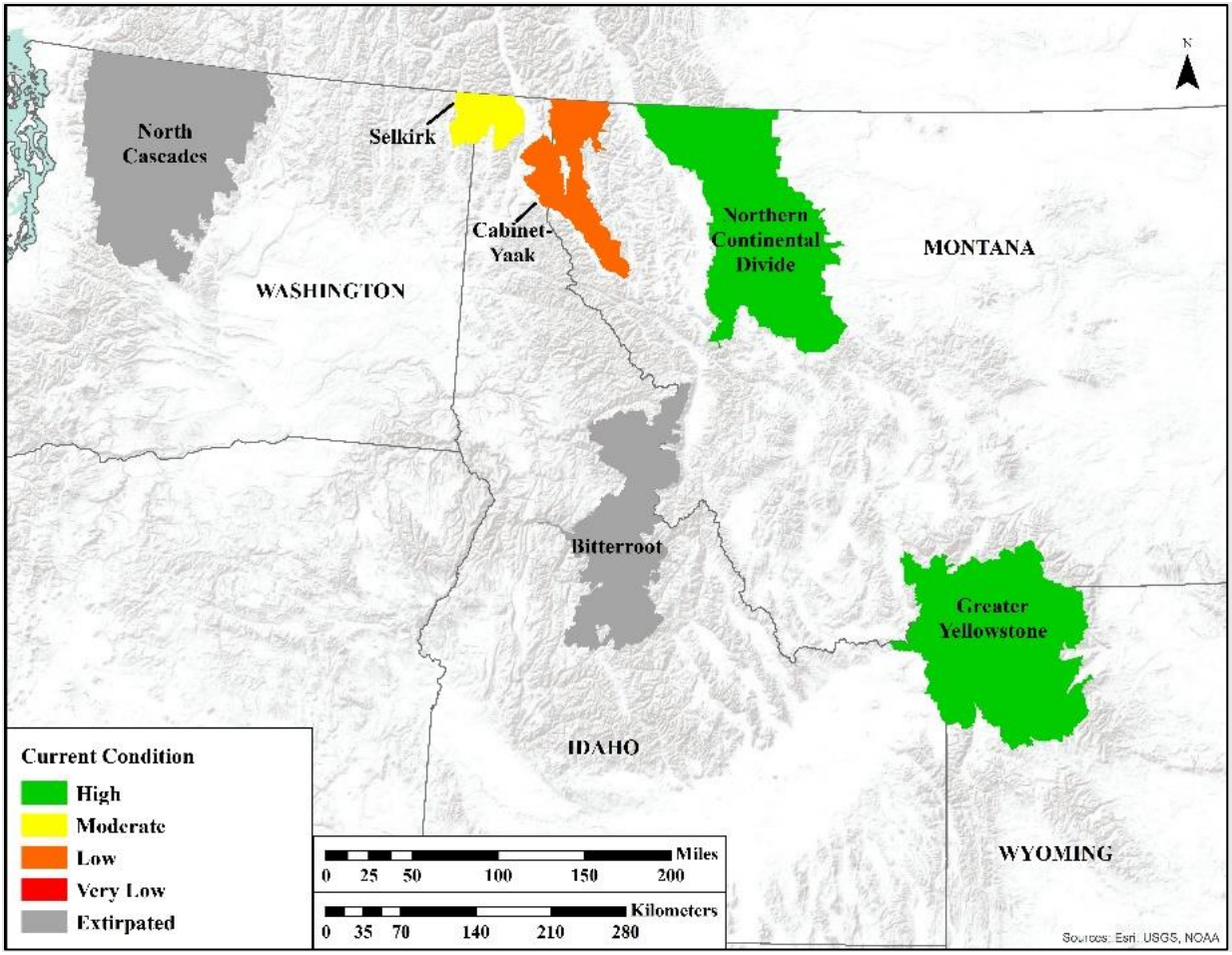

Figure 2. Map of the overall current condition for the six grizzly bear ecosystems in the lower-48 States, in terms of resiliency, redundancy, and representation. Colors represent the current resiliency for each ecosystem, based on the current condition of two habitat factors and six demographic factors 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.

Summary of Future Condition from the SSA

We evaluated future conditions for the grizzly bear in the lower-48 States using projections for the stressors, habitat factors, and demographic factors that influence resiliency, redundancy, and representation. To evaluate future conditions, we used the same methodology that we used to evaluate current condition, but instead considered the plausible conditions for the two habitat factors and six demographic factors projected into the future under a range of plausible future scenarios. We evaluated future conditions for the grizzly bear 30 to 45 years into the future, a timeframe that captures approximately two to three grizzly bear generation intervals. A generation interval is the approximate time that it takes a female grizzly bear to replace herself in the population. Given the longevity of grizzly bears, two to three generation intervals represent a period during which a complete turnover of the population would have occurred; any positive or adverse changes in the status of the population would be evident. Additionally, this timeframe

considers the possibility that land management plans, which may provide important conservation measures to reduce potential stressors, could go through at least one revision (Service 2021, p. 228). Below we summarize the future scenarios and our evaluation of future condition under each scenario, with our full analysis in the SSA report (Service 2021, pp. 228–243).

Summary of Future Scenarios

We used scenario planning to describe plausible futures for the grizzly bear and to capture uncertainty associated with our future projections. Future scenarios allowed us to explore a range of possible future conditions for the grizzly bear in the lower-48 States, given the uncertainty in both the stressors grizzly bears in the lower-48 States may face, their potential response to those stressors, and the potential for possible conservation efforts to influence future conditions. As described in more detail in our SSA report (Service 2021, pp. 228–231), we developed two pessimistic future scenarios, two optimistic future scenarios, and one continuation future scenario, as summarized below:

- **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 the 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 the 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 the rate of private land development remains the same;
- **Future Scenario 4 – Increased Conservation:** Under this scenario, conservation actions increase or improve, and the rate of private land development decreases;
- **Future Scenario 5 – Significantly Increased Conservation:** Under this scenario, conservation actions increase significantly, and the rate of private land development decreases dramatically.

Although there are likely different probabilities associated with our future scenarios, we considered all five scenarios to be plausible for the purposes of our SSA analysis (Service 2021, p. 228). We 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.

Summary of Future Conditions by Scenario

Table 3, below, summarizes our evaluation of future resiliency for each ecosystem; the SSA provides additional detail on this analysis (Service 2021, pp. 232–243).

Table 3. 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***
GYE	High	Moderate	High	High	High	High
NCDE	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

Future Scenario 1: 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 3). 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. The BE and North Cascades remain in a functionally extirpated condition, with no resiliency (Table 3). While the four ecosystems are still distributed similarly to current condition within their respective ecological types, the resiliency of each ecosystem has decreased under this Scenario; given this decrease in resiliency, the grizzly bear in the lower-48 States is also less able to withstand catastrophic risk and environmental change (Service 2021, pp. 16, 232–235). In other words, as resiliency declines with decreased conservation under Scenario 1, redundancy and representation decrease correspondingly.

Future Scenario 2: 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 3). The BE and North Cascades remain in a functionally extirpated condition, with no resiliency (Table 3). While the four ecosystems are still distributed similarly to current condition within their respective ecological types, the resiliency of one ecosystem decreases under this Scenario; given this decrease in resiliency, the grizzly bear in the lower-48 States is also slightly less able to withstand catastrophic risk and environmental change (Service 2021, pp. 17, 235–237). In other words, as resiliency declines with decreased conservation under Scenario 2, redundancy and representation decrease correspondingly.

Future Scenario 3: 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 3). The BE and North Cascades remain in a functionally extirpated condition, with no resiliency under the continuation scenario (Table 3). Redundancy and representation stay the same as current conditions under this scenario (Service 2021, pp. 17, 237–239).

Future Scenario 4: 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, due to human-facilitated restoration of the North Cascades and increased natural recolonization in the BE. The NCDE and GYE remain in high resiliency, the SE remains moderate, and the CYE improves from low to moderate resiliency (Table 3). 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) (Service 2021, pp. 17, 239–241).

Future Scenario 5: 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, due to human-facilitated restoration of the North Cascades and augmentation of the BE (Table 3). 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) (Service 2021, pp. 17, 241–243).

Summary of Viability from SSA

Viability is the "ability of a species to sustain populations in the wild over time" (Service 2016, p. 21). Taken together, current and future levels of resiliency, redundancy, and representation characterize the viability of the grizzly bear in the lower-48 States. Currently, there are two ecosystems with high resiliency, one ecosystem with moderate resiliency, one ecosystem with low resiliency, and two ecosystems that are functionally extirpated (Table 2, above). Within 30 to 45 years in the future, there are improvements or reductions in resiliency across the ecosystems, depending on the scenario. Under Scenario 1, the most pessimistic scenario, there are reductions in resiliency where conservation efforts decline significantly. Whereas under Scenario 5, the most optimistic scenario, there are improvements in resiliency where conservation efforts increase significantly. If conservation efforts stay the same, as under Scenario 3, the continuation scenario, the CYE improves from low to moderate resiliency. Under this continuation scenario, the GYE and NCDE stay in high resiliency and the SE retains moderate resiliency. Under the optimistic scenarios where conservation efforts increase under Scenarios 4 and 5, the BE and North Cascades improve from functionally extirpated conditions with no resiliency to low resiliency, which also represents an increase in redundancy and representation. To summarize changes in resiliency from current to future conditions, there is less risk from stochastic events if conservation efforts continue or improve, but there is greater risk from stochastic events if conservation efforts decrease (Table 3, above).

Currently, redundancy for the grizzly bear is characterized by four extant ecosystems, the GYE, NCDE, CYE, and SE, as they are distributed from north to south and east to west across Idaho, Montana, Washington, and Wyoming. Catastrophic risk is spread across these four ecosystems and their ecological diversity contributes to representation. Two ecosystems, the BE and North Cascades, have no known populations, and so do not currently contribute to redundancy or representation. In 30 to 45 years, if conservation efforts decrease, as under Scenarios 1 and 2, resiliency decreases, and the four ecosystems are at greater risk from stochastic events. However, 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 4). 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 improve from functionally extirpated to low resiliency, and; catastrophic risk increases if conservation efforts are reduced. Representation declines as resiliency of the ecosystems decreases with decreased conservation efforts, and 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 (Table 4).

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 the best scientific understanding of its current and future abundance, distribution, and diversity (Service 2021, entire). 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 decline, viability also decreases. If conservation efforts increase, viability improves (Service 2021, p. 245).

Table 4. 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. Numbers for resiliency represent the number of populations in each condition category.

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

STATUS RECOMMENDATION

Standard for Review

Section 4 of the Act (16 U.S.C. Section 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a listable entity meets the definition of "endangered species" or "threatened species." The Act defines an "endangered species" as a listable entity that is "in danger of extinction throughout all or a significant portion of its range," and a "threatened species" as a listable entity that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether a listable entity meets the definition of an "endangered species" or a "threatened species" because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;
(B) Overutilization for commercial, recreational, scientific, or educational purposes;
(C) Disease or predation;
(D) The inadequacy of existing regulatory mechanisms; or
(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a listable entity's continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individual grizzly bears in the lower-48 States, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term "threat" to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a listable entity. The term "threat" includes actions or conditions that have a direct impact on individuals, as well as those that affect individuals through alteration of their habitat or required resources. The term "threat" may encompass—either together or separately—the source of the action or condition, or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the listable entity meets the Act's definition of an "endangered species" or a "threatened species." In assessing whether a listable entity meets either definition, we must evaluate all identified threats by considering the effects of the threats and the expected response of the listable entity—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and lower-48 States level. We evaluate each threat and its expected effects on the listable entity, then analyze the cumulative effect of all of the threats on the listable entity as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the listable entity—such as any existing regulatory mechanisms or conservation efforts. The Service recommends whether the listable entity meets the definition of an "endangered species" or a "threatened species" only after conducting this cumulative analysis and describing the expected effect on the listable entity now and in the foreseeable future.

In our status recommendation, we correlate the threats acting on the grizzly bear in the lower-48 States (the listed entity) to the factors in section 4(a)(1) of the Act. We summarize our 5-year status review for the grizzly bear in the lower-48 States below.

Summary of Analysis

The biological information we reviewed and analyzed as the basis for our findings is documented in the SSA report (Service 2021, entire), a summary of which is provided above. The projections for the future condition of the grizzly bear in the lower-48 States are based on our expectations of the potential stressors that may affect the listed entity. When we listed the grizzly bear as a threatened species on July 28, 1975, we identified the dramatic decreases in historical range (Factor A), certain detrimental land management practices, such as timber harvest, livestock grazing, and building of roads, in formerly secure grizzly bear habitat (Factor A), and excessive human-caused mortality (Factors B and C) as the primary threats (40 FR 31734, July 28, 1975, pp. 31734–31736). 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 (Factor D) (40 FR 31734, July 28, 1975, pp. 31734–31736). Under Factor E, the July 28, 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, p. 31734).

In our SSA report, we evaluated these stressors and additional stressors that fall broadly into three categories: those with habitat-related effects (Factor A); sources of human-caused mortality (Factors B and C); and other stressors (Factor E) (Service 2021, pp. 99–211). These stressors are interrelated to varying degrees; for example, motorized access is related to both habitat and human-caused mortality. Specifically, stressors with potential habitat-related effects (Factor A) 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 (Factors B and C) 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 sources of natural mortality (Factor C). We considered the effects of other stressors (Factor E) including: connectivity and genetic health; changes in food resources; effects of climate change; and catastrophic events, such as earthquakes and volcanic eruptions (Service 2021, pp. 8–9, 99–211). Lastly, we evaluated potential cumulative effects of these stressors (Service 2021, pp. 205–206). Our SSA report provides our full analysis of stressors on grizzly bears in the lower-48 States (Service 2021, pp. 8–9, 99–211).

We also evaluated 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 (Service 2021, pp. 99–211). These conservation efforts or mechanisms include: Federal land protections, such as the Wilderness Act and 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 programs; effective law enforcement; and augmentation or translocation programs (Service 2021, pp. 8–9, 203–205). 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 (Factor D) do not yet fully address all of the stressors identified under these factors across the grizzly bear's entire range in the lower-48 States, including motorized access management and human-caused mortality. For some ecosystems, the motorized access management standards and mortality limits have yet to be developed or formally incorporated into regulatory documents. 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.

We note that by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed individual effects of stressors on individuals, ecosystems, and the grizzly bear in the lower-48 States, as well as their potential cumulative effects (Service 2021 pp. 9, 205–206). We incorporate the cumulative effects into our analysis when we characterize the current and future condition of the grizzly bear in the lower-48 States. Our current and future condition assessment is iterative because it accumulates and evaluates the effects of all the factors that may be influencing the grizzly bear in the lower-48 States, including negative influences from stressors and positive influences from conservation efforts. We evaluate potential effects from these influences consistently across the same subset of habitat and demographic needs for the grizzly bear in the lower-48 States, both currently and into the future. Because the SSA framework considers not just the presence of the factors, but also the degree to which they collectively influence risk to the entire listed entity, our assessment integrates the cumulative effects of the five factors and replaces a standalone cumulative effects analysis.

We also consider estimates of population trend to effectively illustrate cumulative impacts to the population. Population trend captures the effects of all of the various stressors on the population and habitat, including impacts to total mortality, fecundity, changes in habitat quality, changes in population density, changes in current range, and displacement effects. Despite the various stressors that we evaluated in our SSA report, the best available data indicate that, due to ongoing conservation efforts that reduce the influence of stressors in the GYE, NCDE, CYE, and SE, grizzly bear population trends in these ecosystems are stable or increasing and range extent has continued to expand. As long as these conservation and management efforts continue into the future, we expect these four ecosystems to further grow in size and range, although stressors may continue to operate.

Application of Analysis to the Status Recommendation

The SSA describes the current and future viability of the grizzly bear in the lower-48 States in terms of the 3Rs, which characterize risk to the grizzly bear in the lower-48 states in the context of stochasticity (resiliency), catastrophes (redundancy), and long-term environmental change (representation) (Service 2021, entire). This analysis forms the basis for our recommendation under the Act. Because of uncertainties regarding the future, we evaluated future condition for five plausible future scenarios designed to capture the relevant uncertainties regarding future conservation efforts. The fundamental question before the Service is whether the projections of extinction risk, described in the SSA report in terms of the resiliency, redundancy, and representation of the grizzly bear in the lower-48 States, under a range of future scenarios, indicate that the listed entity meets the definition of an endangered or threatened species under

the Act. Theoretically, if the abundance (resiliency), distribution (redundancy), and diversity (representation) of the grizzly bear in the lower-48 States decreases, thereby decreasing overall viability, the extinction risk of the grizzly bear in the lower-48 States would correspondingly increase.

As described below, we first evaluate whether the grizzly bear in the lower-48 States is in danger of extinction throughout its range now. We then evaluate whether the grizzly bear in the lower-48 States is likely to become in danger of extinction throughout its range in the foreseeable future. We finally consider whether the grizzly bear in the lower-48 States is in danger of extinction in a significant portion of its range (SPR).

Evaluation of Status: In Danger of Extinction Throughout its Range

Under the Act, an endangered species is any listable entity that is "in danger of extinction throughout all or a significant portion of its range" (16 U.S.C. Section 1532(6)). For this 5-year status review, we evaluate the best available scientific information about the listed entity's current levels of demographic and habitat factors (these are described in the SSA report in terms of resiliency, redundancy, and representation) to describe the viability of the grizzly bear in the lower-48 States (Service 2021, entire). We compare our evaluation of the listed entity's current risk of extinction against the definition of an endangered species.

Currently, four of the six ecosystems of the grizzly bear in the lower-48 States are extant (Service 2021, pp. 60–63). Two of these ecosystems have high resiliency, one has moderate resiliency, and one has low resiliency (Service 2021, pp. 13–15, 212–227). The GYE and NCDE currently have high resiliency due to the high conditions of their habitat and demographic factors, such as widely available and protected large, intact blocks of land, positive population growth rates, expanding ranges, and high survival rates of adult females (Service 2021, pp. 12, 218–219). With high resiliency, the GYE and NCDE are currently the best able of the four extant ecosystems to withstand environmental and demographic stochasticity, followed by the SE with medium resiliency and the CYE with low resiliency. Ongoing conservation actions implemented since the time of listing, such as regulatory mechanisms that reduce habitat degradation and sources of human-caused mortality, have significantly improved the resiliency of these four ecosystems over the last several decades (Service 2021, pp. 102–106, 203–205). These levels of resiliency currently reduce extinction risk for the grizzly bear in the lower-48 States. Considered together at the lower-48 States level, the four resilient ecosystems provide ecological diversity and their longitudinal and latitudinal distribution helps reduce current catastrophic risk to the grizzly bear in the lower-48 States (Service 2021, pp. 13–15, 212–227).

The current condition of the grizzly bear in the lower-48 States represents a marked improvement from the conditions when we listed the grizzly bear as a threatened species in 1975. Over the last 45 years, threats to the grizzly bear in the lower-48 States have declined and, in some cases, have been ameliorated. With the end of government-sanctioned programs, population losses from predator control and poisoning declined, and new federally designated wilderness areas and IRAs helped secure large, intact blocks of land and reduce sources of human-caused mortalities. The management of motorized access similarly reduced stressors associated with habitat loss and human access in grizzly bear habitats. Additionally, in four out

of the six recovery zones (GYE, NCDE, CYE, and SE), Federal land managers have adopted land management plans that contain legally binding and enforceable science- and research-based measures and management practices designed specifically to conserve the grizzly bear in the lower-48 States, though these measures are not yet fully implemented in the CYE and SE. These regulatory mechanisms also help reduce threats associated with habitat loss and fragmentation on the Federal lands where they apply (Service 2021, pp. 102–106, 203–205). Due to these and many other conservation actions, the number of grizzly bears in the lower-48 States has more than doubled since the time of listing, and grizzly bears have since expanded their range and abundance, growing from occupying approximately only 2 percent of their historical range in 1975 to 6 percent in 2020 (Table 1, above; 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*; Service 2021, pp. 60-63). As a result, the 3Rs for the grizzly bear in the lower-48 States have improved since 1975.

Given the current levels of resiliency in four out of six ecosystems, the high resiliency of the GYE and NCDE, and the lack of significant, imminent stressors, we believe that the grizzly bear in the lower-48 States currently has sufficient ability to withstand stochastic and catastrophic events, and to adapt to environmental changes. Therefore, we conclude that the current risk of extinction is low, such that the grizzly bear in the lower-48 States is not currently in danger of extinction throughout all of its range.

Having found that the grizzly bear in the lower-48 States is not in danger of extinction throughout its range, we next evaluated whether the listed entity is likely to become an endangered species within the foreseeable future throughout all of its range.

Evaluation of Status: Likely to Become Endangered Throughout its Range

Under the Act, a threatened species is any listable entity that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. Section 1532(20)). The term foreseeable future extends only so far into the future as the Service can reasonably determine that both the future threats and the entity's responses to those threats are likely (50 C.F.R. 424.11(d)). The Service describes the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the listable entity's life history characteristics, threat-projection timeframes, and environmental variability (50 C.F.R. 424.11(d)). The key statutory difference between a threatened species and an endangered species is the timing of when a listable entity may be in danger of extinction, either now (endangered species) or in the foreseeable future (threatened species).

For the purposes of our analysis, we defined the foreseeable future as 30 to 45 years into the future. We chose this timeframe because it is biologically meaningful by accounting for two to three generation intervals, or the average amount of time it takes a female to breed and replace herself in the population. Given the longevity of grizzly bears, up to 37 years in the wild (Kasworm *et al.* 2020a, p. 17), two to three generation intervals represent a period during which a complete turnover of the population would have occurred and any 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 at least once by any applicable land management agencies (Service 2021, pp. 15–16, 228). Moreover, it is a timeframe during which we can reasonably project both future threats and the grizzly bears' response.

To assist us in evaluating the status of the grizzly bear in the lower-48 States in the foreseeable future over the next 30 to 45 years, we evaluated the future condition for the six grizzly bear ecosystems in the lower-48 States under five plausible future scenarios: a continuation scenario, two pessimistic scenarios, and two optimistic scenarios (Service 2021, pp. 228–231), as described above. Over the next 30 to 45 years, we anticipate a range of future conditions for the grizzly bear in the lower-48 States, with nearly the same level of the 3Rs as current condition under one future scenario, improved conditions of the 3Rs under two future scenarios, and decreased conditions of the 3Rs under two future scenarios (Service 2021, pp. 15–19, 232–243). In four out of the five future scenarios, the GYE and NCDE remain in high resiliency, including under the continuation scenario. However, if conservation decreases significantly, resiliency declines from high to moderate in both the GYE and NCDE (Service 2021, p. 232–235), which lends increased risk to the grizzly bear in the lower-48 States as a whole. Resiliency in the CYE and SE also decreases as conservation decreases (Service 2021, p. 244), which further represents greater risk to the grizzly bear in the lower-48 States. Into the foreseeable future, the CYE and SE have moderate to very low levels of resiliency, and only achieve high resiliency with the significantly improved conservation under Scenario 5 (Service 2021, p. 244). As a result, the CYE and SE only contribute moderate, to low, to very low levels of resiliency under four out of the five future scenarios (Service 2021, p. 244). Finally, the BE and North Cascades only begin to contribute to the 3Rs if conservation improves under the two optimistic scenarios (Service 2021, p. 244).

Additionally, human populations continue to expand across all six ecosystems, and humans may engage with grizzly bears and their habitats in increasingly unpredictable ways. Scenarios 1 and 2 project that growing human populations could lead to increased private land development, increased recreation, additional habitat loss, and more human-bear conflicts over the next 30 to 45 years. The uncertainty associated with the stressors of human-bear conflicts, human population growth, and potential reductions in connectivity further represent a possible reduction in overall viability of the grizzly bear in the lower-48 States in the foreseeable future.

Given these future projections of the 3Rs 30 to 45 years into the future, the grizzly bear in the lower-48 States could experience increased risk of extinction under two out of the five future scenarios. While the GYE and NCDE populations remain relatively resilient under all but one future scenario, viability for the grizzly bear in the lower-48 States as a whole only increases under the two optimistic future scenarios, which rely on increases in conservation efforts such that the BE and North Cascades support resilient populations. Although these are plausible future outcomes for the grizzly bear in the lower-48 States, there is enough future uncertainty associated with conservation efforts, such that the grizzly bear in the lower-48 States remains likely to become in danger of extinction within the foreseeable future throughout all of its range.

To summarize, under the plausible future conditions discussed in the SSA, the grizzly bear in the lower-48 States as a whole would be less likely to withstand plausible stochastic events, catastrophic events, or retain sufficient adaptive capacity to withstand environmental change 30

to 45 years into the future. Therefore, after assessing the best available information, we conclude that the grizzly bear in the lower-48 States is not currently in danger of extinction throughout all of its range, but is likely to become so in the foreseeable future.

Evaluation of Status Throughout a Significant Portion of its Range

Having determined that the grizzly bear in the lower-48 States is not in danger of extinction, but is likely to become so in the foreseeable future throughout all of its range, we now consider whether the listed entity may be in danger of extinction in a significant portion of its range—that is, whether there is any portion of the listed entity's range for which it is true that both (1) the portion is significant; and, (2) the listed entity is in danger of extinction now in that portion. We can choose to address either question 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 listed entity's range.

In undertaking this analysis for the grizzly bear in the lower-48 States, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the listed entity and the threats that the listed entity faces to identify any portions of the range where the grizzly bear in the lower-48 States may be endangered.

For the grizzly bear in the lower-48 States, we considered whether threats are geographically concentrated in any portion of the listed entity's range at a biologically meaningful scale. As summarized above and documented in our SSA report (Service 2021, pp. 99–211), we evaluated a variety of stressors associated with habitat destruction and modification, human-caused mortality, natural mortality, effects due to genetic health, effects due to changes in food resources, effects due to climate change, and cumulative effects (Service 2021, pp. 99–211). Overall, we did not identify any concentrations of threats across the six ecosystems.

We first examined whether there might be a geographic concentration of threats in the CYE and SE, given their lower levels of current resiliency documented in the SSA report. However, rates of human-caused mortality in the CYE and SE are similar to those in the GYE and NCDE (Kasworm *et al.* 2020a, p. 33; Kasworm *et al.* 2020b, p. 23; Servheen *et al.* 2004, p. 21; van Manen 2020, *in litt.*; MFWP, unpublished data). Additionally, the GYE, NCDE, CYE, and SE have all experienced positive population growth rates (Service 2021, p. 216), which suggests that no concentration of threats is influencing resiliency in any portion of these ecosystems that would lead them to have a different status than the entire entity.

We also explored the possibility of a concentration of threats in the areas between the six ecosystems. The areas between the ecosystems can provide for individual grizzly bear movement between ecosystems and these areas can support grizzly bears at lower densities than in the core of the ecosystems. The areas between ecosystems generally lack the same habitat protections, motorized access standards, and food storage orders that help reduce stressors within the six ecosystems. However, even if threats were concentrated in these areas, they lack known populations of grizzly bears (Service 2000, pp. 3-14–15; Service 2021, p. 60), so would not be considered significant for the purposes of our analysis. Effects of stressors in the areas between ecosystems would only impact individual bears and could not have any impacts at the level of a

population or the entire entity. Therefore, the areas between ecosystems do not represent significant portions of the range. Similarly, the North Cascades and BE cannot qualify as a significant portion of the range due to the lack of known populations in these ecosystems.

Based on this analysis, we found no concentration of threats in any portion of the grizzly bear's range in the lower-48 States at a biologically meaningful scale. Therefore, no portion of the grizzly bear's range in the lower-48 States can provide a basis for determining that the listed entity is in danger of extinction now in a significant portion of its range, and we find that the grizzly bear in the lower-48 States is not in danger of extinction now in any significant portion of its range. This is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, 336 F.Supp.3d 1131 (N.D. Cal. Aug. 24, 2018) and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946 (D. Ariz. 2017).

Summary of Evaluation and Recommendation

Our review of the best available scientific and commercial information indicates that the grizzly bear in the lower-48 States does not meet the definition of an endangered species, but does meet the definition of a threatened species in accordance with Section 3(6) and 3(20) of the Act. Therefore, with this 5-year status review, we recommend that the grizzly bear in the lower-48 States retain its status as a threatened species under the Act.

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

CURRENT CLASSIFICATION: Threatened

RECOMMENDATION RESULTING FROM THIS 5-YEAR STATUS REVIEW:

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

REGIONAL OFFICE APPROVAL:

Approved by: MATTHEW HOGAN Digitally signed by MATTHEW HOGAN Date: 2021.03.30 10:50:13 -06'00' Date: _____

Matt Hogan
U.S. Fish and Wildlife Service
Deputy Regional Director
Interior Regions 5 and 7

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