Grizzly Bear Recovery Plan

Supplement: Habitat-based Recovery Criteria for the Northern Continental Divide Ecosystem

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Date

Habitat-based Recovery Criteria for the Grizzly Bear Population in the Northern Continental Divide Ecosystem

Background

Restoring an endangered or threatened animal or plant to the point where it is again a secure member of its ecosystem is a primary goal of our endangered species program. Recovery plans help guide recovery efforts by describing actions we consider necessary for the conservation of the species, establishing criteria for downlisting and delisting listed species, and estimating time and cost for implementing the measures needed for recovery measures. Under the provisions of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), we approved the first Grizzly Bear Recovery Plan on January 29, 1982 (USFWS 1982). In 1993, we approved a revision to the Grizzly Bear Recovery Plan (USFWS 1993), which included additional tasks and new information that increased the focus and effectiveness of recovery efforts. Supplements to the Recovery Plan were approved in 1996 and 1997 (USFWS 1996, 1997).

Due to a settlement agreement regarding the 1993 Recovery Plan, we are required to publish habitat-based recovery criteria for the Northern Continental Divide Ecosystem (NCDE). As part of the settlement agreement, we also agreed to hold a workshop for the public to provide input. We held workshops on July 7, 2016 (81 FR 29295, May 11, 2016) and January 3, 2018 (82 FR 58444) and opened a 45-day public comment period beginning December 12, 2017 (82 FR 58444) to seek the best available information to inform our habitat-based recovery criteria. In total we received over 275 written and oral comments on the draft habitat-based recovery criteria (Appendix A). In addition, the Service sought and received peer reviews from three reviewers.

Considerations for Establishing Habitat-Based Recovery Criteria for the NCDE Recovery Zone

This recovery plan supplement delineates objective, measurable habitat-based criteria that we believe will help determine when an endangered or threatened species has recovered to the point that the protections afforded by the Act are no longer necessary and the grizzly bear may be delisted. At this point, recovery criteria no longer apply. Therefore, the Recovery Plan, which includes the criteria, no longer applies. However, our partner agencies in the NCDE have committed to maintaining these standards after delisting. Further details of the HBRC and commitments made by our conservation partners are outlined in the Conservation Strategy (NCDE Subcommittee 2018).

Grizzly bear density and the number of grizzly bears that can live in an ecosystem depends on overall habitat productivity, availability and quality of food sources, and the levels and types of human activities. There is no published method to deductively calculate minimum habitat values required for a healthy and recovered population. Grizzly bears are long-lived, opportunistic omnivores whose food and space requirements vary depending on a multitude of environmental

and behavioral factors and on variation in the experience and knowledge of each individual bear. Grizzly bear home ranges overlap and change seasonally, annually, and with reproductive status. While these factors make the development of habitat criteria difficult, we can establish criteria by assessing what habitat factors in the past were compatible with a stable to increasing grizzly bear population, and then use these habitat conditions as threshold values that if maintained, can help ensure a healthy population, as suggested by Nielsen *et al.* (2006, p. 227).

Previous research has shown that secure core and motorized access density can strongly influence grizzly bear population growth through effects on habitat use and mortality rates (Mace *et al.* 1996; Mace *et al.* 1999; McLellan *et al.* 1999). During the period 2004–2011, the estimated growth rate for the NCDE grizzly bear population was approximately 2–3 percent annually, with more than 95 percent certainty that the population did not decline (Mace *et al.* 2012; Costello *et al.* 2016). During the same period (2004–2011) when the grizzly bear population was increasing, motorized route density was declining and the percentage of secure core was increasing. Thus, conditions relative to motorized access were the most favorable for grizzly bears at the end of this time period. The levels of the other management activities (developed recreation sites, livestock allotments, vegetation management, and mining and oil and gas development) did not change much over the same period. Therefore, we chose to use habitat condition as of December 31, 2011, as a reasonable and conservative baseline that would be likely to support a robust, stable to increasing grizzly bear population.

We recognize that the three selected habitat conditions and management activities (secure core and motorized route density, developed recreation sites, and livestock allotments) do not capture all the environmental factors that can influence grizzly bear population growth. Many of the environmental, social, and economic factors influencing grizzly bear population status are outside the control of land management agencies, but we can set criteria on Federal lands for those three important such that it does not negatively affect the grizzly bear population. We acknowledge that there is uncertainty as to whether the habitat management direction will be sufficient in the face of future ecological challenges such as private land development and climate change. For this reason, regular monitoring of habitat conditions on Federal, State and Tribal lands, as well as development such as residential subdivision on private lands, will be conducted and evaluated over time as outlined in the Conservation Strategy. Our partners have committed to monitor and report on these recovery criteria every other year in order to help ensure the continued conservation of grizzly bears in the NCDE (NCDE Subcommittee 2018, Chapter 3). The draft Conservation Strategy also outlines the monitoring methods and additional strategies, standards, and guidelines that our partners have committed to use to manage habitat to help ensure success. Furthermore, changes in multiple demographic rates will be monitored, not simply population size, as recommended by Doak (1995). The population and habitat monitoring data will be compiled per the established schedules to assure that the desired results are being achieved, and that appropriate management adjustments are identified and recommended if needed (NCDE Subcommittee 2018, Chapter 5).

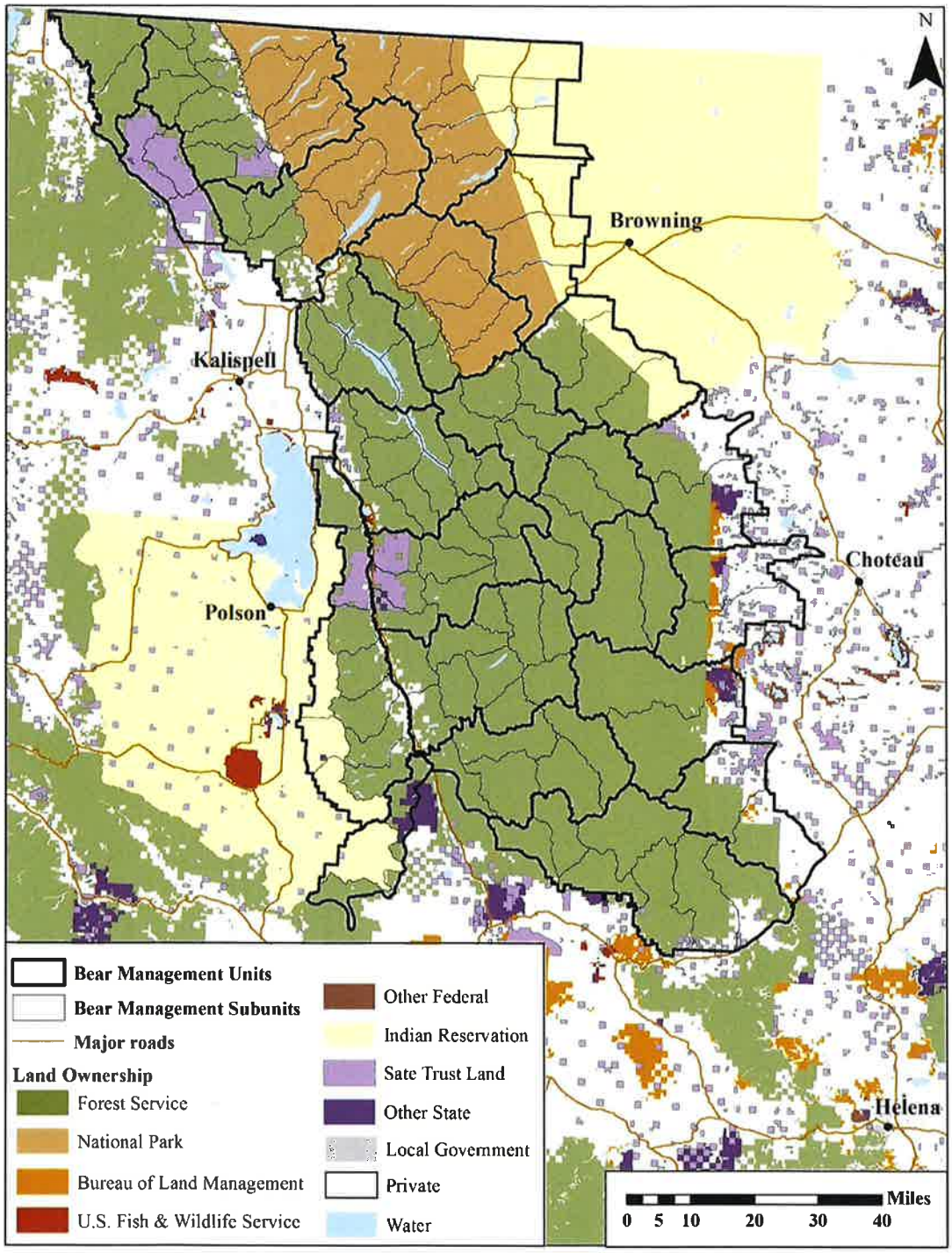

Figure 1. The NCDE Recovery Zone, bear management units, bear management subunits, and land ownership.

Habitat-based Recovery Criteria

On Federal lands inside the Recovery Zone, the overall habitat goal is to maintain habitat conditions at or improved upon baseline conditions, as measured within each bear management subunit (Figure 1). Of the 23,119 square kilometers (km^2) (8,926 square miles (mi^2)) within the Recovery Zone, 61 percent is managed by four National Forests (the Flathead, Kootenai, Helena-Lewis and Clark, and Lolo National Forests) and 17 percent is managed by Glacier National Park (GNP). Of the remaining federal land ownership, collectively, the Bureau of Land Management (BLM), Bureau of Reclamation, and the Service manage only 0.5 percent of lands within the Recovery Zone. Thus, we propose the following three habitat-based recovery criteria that apply to Federal lands.

We summarize below three specific habitat-based recovery criteria that will help meet recovery goals in the NCDE (further details outlined in the Conservation Strategy (NCDE Subcommittee 2018)). Each of these habitat-based criteria are associated with a stable to increasing grizzly bear population with specific values to be maintained, at or improved upon, baseline levels (see Glossary):

1. Secure Core Habitat and Motorized Access Management Criterion

The percent/amount of secure core habitat and open and total motorized route densities on Federal lands within each bear management subunit and the Recovery Zone is maintained at or improved upon baseline levels that existed in 2011 (a time period during which the bear population had been growing or stable (Appendix B, Table 1)).

This criterion includes open motorized route densities (OMRD), total motorized route densities (TMRD), and secure core habitat (see Glossary). Temporary and permanent changes may occur under specific conditions, as summarized below.

Application Rules

- Temporary changes to baseline values for OMRD, TMRD, and secure core habitat are allowed for projects (see Glossary) if the 10-year running averages for these parameters in each subunit do not exceed the following limits:
    - 5 percent temporary increase in OMRD in each BMU subunit (i.e., OMRD baseline plus 5 percent);
    - 3 percent temporary increase in TMRD in each BMU subunit (i.e., TMRD baseline plus 3 percent);
    - 2 percent temporary decrease in secure core habitat in each BMU subunit (i.e., secure core habitat baseline minus 2 percent).
- If temporary changes to the baseline occur within these limits, this criterion will be met. Additionally, the conservation partners will restore temporary changes to secure core habitat and motorized route density values within one year after a project is completed

(i.e., when the road is no longer being used for project implementation beyond administrative levels) and would not exceed 5 years in a 10-year period to reduce the duration of grizzly bear disturbance or displacement due to project-related activities. This criterion does not apply to emergency situations as defined by 36 CFR 218.21 or to actions where valid existing rights preclude or restrict agency discretion (e.g., certain contracts, permits, leases, etc.).

- Permanent changes in OMRD, TMRD, and secure core habitat numbers may occur due to ownership changes, improved data, unforeseen circumstances and natural events. If any of these potential changes occur through agency actions, the action agency will analyze and document any potential detrimental and positive impacts. The conservation partners will update the baseline to reflect any permanent changes. If there is a permanent change to baseline, the criteria for allowable temporary changes will apply to the new baseline.
- A restricted road outside of secure core may be temporarily opened for public motorized use to allow authorized uses (such as firewood gathering), provided the period of use does not exceed 30 consecutive days during one non-denning season and occurs outside of any bear hunting season.

Monitoring of Motorized Access and Secure Core Habitat in the PCA

Percent secure core, OMRD greater than 1 mi/mi^2 (1.6 km/2.6 km^2), and TMRD greater than 2 mi/mi^2 (3.2 km/2.6 km^2) within each BMU subunit will be monitored using each individual land management agency's Geographic Information System (GIS) database of motorized access routes. The respective land management agencies will be responsible for maintaining their motorized routes GIS database. The data for OMRD, TMRD, and secure core will be compiled and analyzed, including comparison to the baseline, in odd-numbered years beginning in 2011. The results will be available the year thereafter in the NCDE Monitoring Team's annual report.

2. Developed Recreation Site Criterion

*The number and capacity of overnight developed recreation sites on Federal lands within each bear management unit in the Recovery Zone is maintained at or below the levels that existed in 2011 (a time period during which the bear population had been growing or stable (*Appendix B, Table 2)), *with allowance for limited expansion.*

Capacity is measured as the number of campground sites, beds, rooms, cabins, or bunkhouses on Federal lands that are designed and managed for overnight public use during the non-denning season. The number or capacity of these sites can increase no more than once (e.g., one campground may be added or expanded) in each BMU every 10 years. This was chosen as a threshold because similar levels of increases have occurred while the population of grizzly bears in the NCDE has continued to increase. If this increase in capacity is proposed, the conservation partners will evaluate projects and rely on assessments by the action agencies to analyze and document any proposed increases, expansions or changes in the use of developed recreation sites

including potentially detrimental or positive impacts to the grizzly bear from the project. If the conservation partners anticipate permanent increases, they have agreed to evaluate mitigation measures in consultation with the Service. As part of this agreement, mitigation measures would be in place before projects are initiated or the measures would be included as an integral component of the project design.

Exceptions to this criterion include:

- Maintenance to existing developed recreation sites can proceed without review.
- The conservation partners will not count increases in the number and capacity of developed recreation sites that are only operational during the denning season against this criterion.
- Temporary work camps for major projects or wildland firefighting are exempt from human capacity mitigation if other viable alternatives are not available. Food storage facilities or attractant management plans must be in place and other factors resulting in potential detrimental impacts to grizzly bears will be mitigated.
- Because they are not commonly associated with public use or grizzly bear attractants, public community infrastructure sites, such as electronic sites, radio towers, gravel pits, utility corridors, and treatment plants are exempt from this developed recreation site criterion. The U.S. Forest Service (USFS) and its Permittees will increase capacity at existing electronic sites before constructing new electronic sites, unless new sites are necessary for emergency purposes.

Monitoring of Developed Recreation Sites in the PCA

Developed recreation sites will be tracked in each land management agency's existing GIS databases and reported in six broad categories: (1) recreational residences; (2) campgrounds; (3) other sites with overnight use; and (4) administrative sites. Developed recreation sites available for human use only during the denning season are not subject to the limitations but the number of such sites will be tracked. Changes in the number and/or capacity of developed recreation sites designed and managed for overnight use and required mitigation measures associated with developed recreation sites on Federal lands will be tracked and maintained in a database to facilitate coordination across the multiple Federal jurisdictions in the PCA (four National Forests, GNP, and BLM). Monitoring data will be compiled, analyzed and compared to the baseline every two years, in the even-numbered years. The results will be included in the NCDE Monitoring Team's annual report the year thereafter.

3. Livestock Allotment Criterion

The number of commercial livestock (cattle and sheep) allotments, and the number and capacity (number of animal unit months (AUMs)) of sheep allotments within each bear management subunit should not exceed that which existed in 2011 (a time period during which the bear population had been growing or stable (Appendix B, Table 3)).

The following criteria for livestock allotments apply inside the Recovery Zone:

- The conservation partners will monitor, evaluate, and phase out any existing sheep allotments as the opportunity arises with willing permittees.
- The conservation partners have agreed that permits for existing livestock allotments will include requirements to report livestock carcasses within 24 hours of discovery. If a carcass is found, the permittee will work with the appropriate agencies to remove it, and establish boneyards in areas that will minimize the risk of habituating grizzly bears to human presence. The conservation partners have agreed that boneyards will not be established on Federal lands.

Monitoring of Livestock Grazing in the PCA

The numbers of commercial livestock (cattle and sheep) grazing allotments and numbers of sheep AUMs within the PCA will be monitored and reported every two years by the permitting agencies. The number of grizzly bear-livestock conflicts on Federal lands within the PCA will also be compiled and reported every two years. The data will be compiled in even-numbered years and included in the NCDE Monitoring Team's annual report the year thereafter.

Glossary

The following terms and definitions apply within the NCDE for grizzly bears:

Administrative site: locations or facilities constructed for use primarily by government employees to facilitate the management of public lands. Examples include, but are not limited to, ranger stations, dwellings, warehouses, guard stations, and Park entrances.

Administrative use: a general term for authorized agency activity. Specifically, in the portion of the NCDE mapped as the primary conservation area for grizzly bears, administrative use is defined as motorized use by agency personnel or others authorized by agency officials to perform specified duties, of roads closed to the public

Baseline: the baseline for the NCDE is defined as conditions as of December 31, 2011, as modified by changes in numbers that were evaluated and found to be acceptable through the Endangered Species Act section 7 consultation with the Service while the grizzly bear was listed as Threatened. The baseline can also be updated to reflect changes allowed under the application rules, such as those caused by ownership changes or improved data.

Bear management subunit: an area of a bear management unit, in the portion of the NCDE for grizzly bears mapped as the Recovery Zone, representing the approximate size of an average annual female grizzly bear home range (e.g., 31–68 mi^2) (Mace and Roberts 2012).

Bear management unit (BMU): an area about 400 mi^2, in the portion of the NCDE for grizzly bears mapped as the Recovery Zone that meets yearlong habitat needs of both male and female grizzly bears.

Boneyard: a site that is used for disposing of multiple animal carcasses.

Capacity (of developed recreation sites within the Recovery Zone): the number of sites available in a campground; or the number of rooms available for lodging (as a commercial rental); or the number of cabins, bunkhouses or recreation residences available for overnight use (managed under a special use permit).

Den emergence time period: the spring-time period when a grizzly bear emerges from its den and remains in the vicinity before moving to lower elevations. The den emergence time period occurs at the beginning of the non-denning season. Females with cubs usually emerge later and spend more time (a few days to a few weeks) near the den after emergence, than do male bears.

Denning season: the typical time period, during the winter months, in which most grizzly bears are hibernating in dens.

Developed recreation site: a defined, public recreation area on public Federal lands that has agency improvements with features that are intended to accommodate public use and recreation. Examples include, but are not limited to: ski areas, campgrounds, trailheads, lodges, sites with cabins, recreation residences, and visitor centers.

Emergency situation: a circumstance on Federal lands for which immediate implementation of all or part of a decision is necessary for relief from hazards threatening human health and safety or natural resources on those National Forest System or adjacent lands; or that would result in substantial loss of economic value to the Federal Government if implementation of the decision were delayed. (36 CFR 218.21)

Grazing allotment: a designated area of land that is available for livestock grazing and is represented on a map. A grazing allotment can include Federal and non-Federal lands. Permits are issued for the use of allotments or portions of allotments. Allotments may be:

- Active: Livestock grazing allotments that are in use, including pack and saddle stock allotments.
- Closed: Areas having suitable livestock range that have been closed to livestock grazing by administrative decision or action.
- Combined: An allotment that has been combined into another allotment and therefore, no longer exists as an independent allotment.
- Vacant: An allotment that does not have a current grazing permit issued.

Grazing permit in non-use status: a grazing permit that is not being used. Non-use of a term grazing permit, in whole or in part, must be approved by a Forest Supervisor and is allowed for permittee convenience, resource protection or development, or range research.

Grazing permit in inactive status: all permitted uses have expired, been cancelled, or been waived.

Human-grizzly bear conflict: an interaction between a grizzly bear and human in which bears either do, or attempt to, damage property, kill or injure livestock, damage beehives, injure people, or obtain anthropogenic foods, attractants, or agricultural crops.

Motorized route: a road or trail that is designated for motorized use by the management agency.

Moving window analysis: a geographic information system procedure that quantifies the density of roads and trails by incrementally moving a template across a digital map.

Non-denning season: the time period when grizzly bears typically are not hibernating from early spring to late fall.

Open motorized route density (OMRD): a moving window analysis calculation that applies to the NCDE Recovery Zone and includes Federal, State, and Tribal roads and motorized trails that

are open to wheeled motor vehicle use by the public for any part of the non-denning season. *Note*: Motorized routes closed only by sign, gate, or order are considered to be open for purposes of this calculation. See also moving window analysis.

Project: Any temporary activity on Federal lands requiring construction of new roads, temporary roads, reconstruction or opening of restricted roads during the non-denning season, if such use exceeds administrative use levels (see administrative use). Activities involving recurring helicopter use (see recurring helicopter use) are also considered to be a project.

Recurring helicopter use: a type of helicopter flight that involves multiple trips/passes each day consisting of low-altitude (< 500 m above-ground-level) flights that continues for a duration longer than 48 consecutive hours.

Road: a motor vehicle route more than 50 inches wide, unless identified and managed as a trail. (36 CFR 212.1, FSM 7705). A road may be:

- Decommissioned: The stabilization and restoration of an unneeded road to a more natural state (36 CFR 212.1). Decommissioned roads do not count towards Total Motorized Route Density as long as they meet the definition of impassable.
- Forest road or trail: A route wholly or partly within or adjacent to and serving the USFS that is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR 212.1 – Definitions)
- Impassable: A road that has been treated in such a manner that the road is blocked and there is little resource risk if road maintenance is not performed on a regular basis (self-maintaining).These roads are not counted in the total motorized route density as long as the road (generally the first 50 to 300 feet) has been treated to make it inaccessible to wheeled motorized vehicles during the non-denning season. Roads may become impassable as a result of a variety of means, including but not limited to one or more of the following: natural vegetation growth, road entrance obliteration, scarified ground, fallen trees, boulders, culvert or bridge removal, etc. Impassable roads may remain on the inventoried road system if use of the road is anticipated at some point in the future. Some, but not all, roads placed in intermittent stored service may be impassable. (NCDE Subcommittee 2018, Glossary)
- Intermittent stored service/intermittent service road, closed to traffic: The road is in a condition that there is little resource risk if maintenance is not performed.
- Temporary: A road necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road and that is not included in a forest transportation atlas (36 CFR 212.1). In the NCDE Recovery Zone, temporary roads will meet the definition of impassable when no longer needed. (NCDE Subcommittee 2018, Glossary)

Running average: a method for computing the average of a stream of numbers for a specified period. For example, a 6-year running average computes the mean for the values in the current

year plus the previous 5 years. A running average is commonly used with time series data to smooth out short-term fluctuations and highlight longer-term trends or cycles.

Secure core habitat: an area inside the NCDE Recovery Zone that is more than 500 m (0.31 mi) from a route open to wheeled motorized use during the grizzly bear non-denning season, or a gated route, and that is greater than or equal to 10.12 km^2 (3.91 mi^2) in size. Roads restricted with physical barriers (not gates), decommissioned roads, impassable roads, temporary roads, over-the-snow motorized routes/areas, and non-motorized trails are allowed within secure core habitat, unless otherwise restricted (e.g., by other national forest plan direction).

Total motorized route density (TMRD): a moving window analysis calculation that applies to the NCDE Recovery Zone and includes Federal, State, and Tribal roads and motorized trails that do not meet the definition of an impassable route. See also moving window analysis.

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APPENDIX A: Summary of and Responses to Peer Review and Public Comment

We published a draft Supplement to the Grizzly Bear Recovery Plan: Habitat-Based Recovery Criteria (HBRC) for the Northern Continental Divide Ecosystem (NCDE) on December 12, 2017. In the Notice of Availability (82 FR 58444), we requested that all interested parties submit written comments on the draft supplement by January 26, 2018. We also contacted appropriate Federal and State agencies, Tribes, scientific experts and organizations, and other interested parties and invited them to comment on the draft supplement. We published a newspaper notice inviting the general public comment and announcing the workshop in the Missoulian on December 10, 2017, the Flathead Beacon on December 8, 2017, and the Great Falls Tribune on December 12, 2017. We held a public workshop in Missoula, Montana on January 3, 2018. In addition, we sought peer review from three experts, and their reviews were available to the public during the comment period.

Several commenters submitted comments on topics related to other issues not specific to the draft supplement. These issues include: (1) opposition or support to delist the NCDE grizzly bear population, (2) support for state management of grizzly bears, including a hunting season, (3) support for public education efforts, (4) recommendations to establish grizzly bear populations in other areas that contain suitable habitat (i.e., Rattlesnake Wilderness Area, Tobacco Root mountains, Anaconda-Pintler Wilderness Area, Selway-Bitterroot Wilderness, Colorado, and Utah), (5) that the draft Conservation Strategy has yet to be revised based on public comments made in 2013, (6) failure by the Service to conduct government-to-government consultation; and (7) suggested requirements to carry bear spray in grizzly bear habitat. Reasons for opposing the delisting of the NCDE grizzly bear population included: (1) the Service has not acted consistently with the *Humane Society of the United States, et al.* v. *Zinke et al.* court opinion, (2) there is insufficient connectivity and genetic exchange between all grizzly bear populations in the lower 48 States, and (3) opposition to hunting. In addition the Service received many comments on the adequacy of existing regulations and/or plans, including Forest Plans, Montana Department of Natural Resources and Conservation, BLM Resource Management Plans, the Swan Valley Agreement, and Montana State Codes. Lastly, some comments stated that the Service failed to follow through on a promise to make a draft conservation strategy available for public comment following the incorporation of public comments from the HBRC workshop in 2016.

Issue 1: Public comment process: Several comments pertained to the public involvement and processes associated with development of the HBRC. Commenters expressed concern with the Service holding the July 7, 2016 workshop prior to release of draft HBRC and thought it difficult to determine what the HBRC actually were because they were referred to the draft Conservation Strategy and the USFS draft EIS, which did not actually label the HBRC as HBRC. Some commenters stated that both "workshops" were not in the previously promised format under the settlement agreement but were rather formal hearings with no exchange of ideas between the Service and the participants. One commenter requested a 30-day extension to the comment period because of the overlap with the holidays and the numerous concurrent comment periods.

Response: Although not titled "habitat-based recovery criteria," Chapter 3 of the draft Conservation Strategy contains the basis of these criteria under the section "Habitat management in the PCA." To address concerns that the draft HBRC were not released prior to the July 7, 2016 workshop, the Service held a second workshop on January 3, 2018 during the public comment period on the draft Recovery Plan Supplement: Habitat-based Recovery Criteria for the NCDE. We appreciate the time and thought put into comments on the draft HBRC for the NCDE. Collectively, we believe the public had ample opportunity for input. We followed Service practice and policy in managing the public comment process. We provided multiple opportunities and avenues for public involvement. Notifications of comment periods and workshops were provided in the Notice of Availability in the Federal Register and publicized in newspapers. These postings were compliant with the requirements of Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794(d)). We also provided access information for persons using a telecommunications device. The 1997 Settlement Agreement, *The Fund for Animals, et al.* v. *Babbitt, et al.* (case no. 94-1021 (consolidated) (D. D.C.)) states that "A principal purpose of the workshop will be to allow non-IGBC scientists to present their views and ideas on the grizzly bear's habitat-based recovery needs." We complied with the settlement agreement by holding two public workshops to receive input on the habitat-based recovery criteria.

Issue 2: General: A number of respondents provided general comments or recommendations regarding the habitat-based recovery criteria (HBRC) and their application in the context of grizzly bear management. A few commenters expressed support for what they termed the Service's "science-based recovery plan." Commenters stated that HBRC should be set well in advance of any consideration of a grizzly bear population or ecosystem being deemed recovered in order to provide an incentive for land managers to meet the standards and to serve as a measure of habitat quality, security and overall recovery. A few commenters stated that the HBRC is not habitat based, is not based on objective and measurable criteria, and does not present objective measurable criteria of the physical and biological features, described on a site-by-site basis. They contend that the HBRC does not provide an appropriate level of specificity and is not based upon the best scientific data available.

Other commenters stated that HBRC should be related to grizzly bear demography and should not be based strictly on behavioral responses of grizzly bears to habitat features. Commenters contend that HBRC based strictly on behavioral responses of grizzly bears to habitat features are inherently uncertain due to potentially subjective interpretations of demographic impacts as a result of uncertainty in methods for monitoring grizzly bear populations and uncertainty in empirically described relationships between habitat and demography. Commenters also cautioned that uncertainty regarding future habitat conditions and constraints on management options require a precautionary approach to establishing HBRC with a rigorous examination of trends and projections for key habitat features and realistic consideration of the extent of future management options.

Response: Although the HBRC are only now being added to the Recovery Plan as a supplement, the land managers in the NCDE have been actively working towards improving habitat conditions in the NCDE since the 1994 IGBC Guidelines were published. These ongoing efforts have contributed to an increasing grizzly bear population in the NCDE. We disagree that the habitat measures are not objective and measureable. Great variability in grizzly bear diets has been found between individuals, seasons, and years. Because of this wide variation, it is infeasible to maintain on-the-ground monitoring of availability and use of individual food sources. Instead, the Conservation Strategy proposes to monitor the habitat objectives in combination with the ratio of stable isotopes to assess any changes in the overall assimilated diet and the physiological condition of animals through bioelectrical impedance values. These data will provide insights into possible changes in food availability and nutritional condition of bears over time.

The negative effects of humans on grizzly bear survival and habitat use are well documented (Harding and Nagy 1980, p. 278; McLellan and Shackleton 1988, pp. 458–459; Aune and Kasworm 1989, pp. 83–103; McLellan 1989, pp. 1862–1864; McLellan and Shackleton 1989, pp. 377–378; Mattson 1990, pp. 41–44; Mattson and Knight 1991, pp. 9–11; Mattson *et al.* 1992, pp. 436–438; Mace *et al.* 1996, p. 1403; McLellan *et al.* 1999, pp. 914–916; White *et al.* 1999, p. 150; Woodroffe 2000, pp. 166–168; Boyce *et al.* 2001, p. 34; Johnson *et al.* 2004, p. 976; Schwartz *et al.* 2010, p. 661). In light of this, the importance of secure habitat, simply defined as a function of distance from roads, is indisputable. We agree that it is difficult to measure behavioral responses, and therefore base our approach on population level impacts, such as mortality and population trend.

Issue 3: Legality: Some of the comments we received pertained to perceptions regarding the Service's compliance with Federal laws and court settlements, including that the HBRC: are arbitrary and capricious; are contrary to the Service's policy direction on habitat designations under the Act (81 FR 7414, February 11, 2016); should be developed and recovery measured against these criteria prior to a Conservation Strategy; and must apply to the entire Northern Rockies Ecosystem because there is no legal basis for treating the Northern Continental Divide subpopulation as a distinct population segment (DPS). One commenter suggested that the justification for the 2011 baseline "repeats the Service's mistake of 1995, where Judge Friedman warned that numbers and distribution did not tell you "how much habitat and of what quality is necessary for recovery." Another commenter said that development of HBRC is a mandatory responsibility of the Service and that responsibility cannot be handed off to the USFS. Lastly, one commenter stated that the budget for conservation related actions within the NCDE, as set forth in the draft 2013 Conservation Strategy for all signatories, reveals that the Service has no intention to comply with the Federal Court's directive that HBRC must demonstrate the quantity and quality of actual habitat needed to reach recovery.

Response: The 1993 Recovery Plan established Recovery Zones for six ecosystems, including the NCDE. Each Recovery Zone encompasses an area large enough and of sufficient habitat quality to support a recovered grizzly bear population (USFWS 1993, p. 17). The Service will

assess the validity of the NCDE as a DPS in any future proposed rule. The Federal Register notice to which commenters referred (81 FR 7414, February 11, 2016) addresses designation of critical habitat. Critical habitat has not been designated for the grizzly bear in the lower-48 States and is not being address in this recovery plan supplement.

The Service's Recovery Planning Guidance emphasizes the importance of developing and implementing recovery plans in cooperation with our partners (NOAA and USFWS 2010, entire). The 1993 Recovery Plan sets forth the development of an interagency Conservation Strategy as a requirement for each ecosystem prior to delisting (USFWS 1993, p. 16). In 2009, the Service and its partners, including the Montana Department of Fish, Wildlife and Parks (MFWP); the Montana Department of Natural Resources and Conservation (DNRC); the Blackfeet Nation; the Confederated Salish and Kootenai Tribes (CS&KT); GNP; the USFS; U.S. Geological Survey (USGS); and the BLM, began the cooperative development of the draft Conservation Strategy, including the habitat-based recovery criteria contained within. After the release of the draft Conservation Strategy, the five National Forests within the NCDE began their revisions and amendments to incorporate the habitat objectives set forth in it. The Conservation Strategy commits to conducting a management review if the funding necessary to monitor and implement the demographic and habitat objectives are not achieved (NCDE Subcommittee 2018, Chapter 5).

Issue 4: Tribal participation: Some commenters thought that the invitation to tribal partners to share "ecological knowledge, scientific information, and comments on the potential recovery criteria for the NCDE grizzly bear population" demonstrates a lack of cultural awareness and respect. The Service did not follow proper etiquette in its request for Tribal Ecological Knowledge and also failed to conduct pre-decisional government-to-government consultation.

Response: Habitat-Based Recovery Criteria do not apply to tribal reservation lands, however tribal cultural practices, lands, resources, or traditional areas often occur on federally managed lands, and so we communicated with tribes in several ways. We made personal phone calls to the Blackfeet and the Confederated Salish and Kootenai Tribes (CSKT) on December 8, 2017, prior to publishing the proposed criteria. We followed up with personal emails to tribes and tribal biologists. Additionally, we conducted government-to-government consultation with the CSKT in Pablo, MT, on November 28, 2017, and with the Blackfeet Nation on April 19, 2018, in Browning, MT (two prior meetings (August 22, 2017; March 6, 2018) were cancelled due to expected low attendance by council members).

Issue 5: Peer review: A few commenters had concerns about the peer review, including: (1) the narrow scope of the review, (2) the potential lack of knowledge of the peer reviewers about the NCDE, the Act, state wildlife protection laws, and the 2012 National Forest Planning Rule because all three peer reviewers were from Canada, and (3) the reviewers should have been non-agency affiliated independent scientist with peer-reviewed publications on the subject of grizzly bear habitat use and security.

Response: To ensure the quality and credibility of the scientific information we use to make decision, we follow a formal peer review process for influential scientific documents. This process follows the guidelines for Federal agencies outlined in the Office of Management and Budget (OMB) "Final Information Quality Bulletin for Peer Review" (70 FR 2664, January 14, 2005) and the Service's August 22, 2016 Peer Review Guidance. The 2005 guidelines leave selection of an appropriate peer review mechanism up to the agency's discretion, but require the process to be transparent, that reviewers possess the necessary expertise, and that the process addresses reviewers' potential conflicts of interest and independence from the agency.

A Service employee outside of the field office and that was not associated with the decision was responsible for the solicitation and coordination of the independent peer review. The independent peer reviewers were experienced senior-level ecologists, bear biologists, population modelers, or bear managers who have previously conducted similar reviews or regularly provided reviews of research and conservation articles for the scientific literature. The Service also identified potential conflicts of interest, including: employment or affiliation with the Service, the State of Montana, or the Western Governors Association; those who have offered a public opinion or a statement either for or against delisting; and those who are directly or indirectly employed by or associated in any way with any organization that has either litigated the Federal Government concerning grizzly bears or wolves or taken a position on one side or the other about recovery and delisting of grizzly bears or wolves. The Service's statement of work also included topics and questions for the reviewers to consider.

Peer reviewers are generally selected for their expertise on the particular species, closely related species, relevant threats or conservation actions, or other relevant topics (e.g., landscape ecology). Peer reviewers were asked not to provide recommendations on the species' listing determination, the Act, or other regulations; rather they were asked to comment specifically on the quality of any information and analyses used or relied on in the document; identify oversights, omissions, and inconsistencies; provide advice on reasonableness of judgments made from the scientific evidence; ensure that scientific uncertainties are clearly identified and characterized, and that potential implications of uncertainties for the technical conclusions drawn are clear; and provide advice on the overall strengths and limitations of the scientific data used in the document. The purpose of seeking independent peer review is to ensure that the best biological and scientific data were used to inform this revision process.

Issue 6: Boundaries: Several commenters were concerned with the amount of habitat protected by the HBRC, including that they: (1) apply to less than 50 percent of the current grizzly bear distribution area, and (2) do not include an evaluation of unoccupied habitat. Suggestions provided by the commenters to rectify these concerns included that A19, the 2011 baseline, or lower road densities in general should apply to the DCAs, Zone 1, Zone 2, and/or the entire NCDE. In addition, commenters suggested that more data is needed to develop an accurate baseline of road density and its current impacts in Zones 1 and 2. One suggestion was an analysis similar to that done by Schwartz *et al.* (2010) to spatially map risk and define source/sink habitats to guide resource management in Zone 2.

Some commenters suggested that the Service should develop range-wide HBRC, with allowances for differences between geographic ecosystems, rather than developing HBRC one ecosystem at a time. These commenters stated that development of HBRC without requirements for improvements to areas outside recovery zone boundaries in order to provide connectivity to other ecosystems and sub-populations will fail to protect the habitat necessary to accomplish population recovery. One commenter contends that recovery zone boundaries were delimited when the grizzly bear populations were at their lowest levels and smallest distribution. The commenter opined that research has found that the recovery zones are too small: (1) for biological recovery, (2) to support a viable population of 2,000–5,000 individuals (Metzgar and Bader 1992; Bader 2000; Allendorf and Ryman 2002), and (3) to include habitats that are sporadically occupied, but occasionally critical.

Response: "Recovery" under the Endangered Species Act (Act) is the process that stops the decline of an endangered or threatened species by removing or reducing threats. Recovery ensures the long-term survival of the species in the wild. The 1993 Recovery Plan followed this guidance when Recovery Zones are areas large enough and of sufficient habitat quality to support a recovered grizzly bear population (USFWS 1993, p. 17). The population has been growing at 2–3 percent per year since 2004 (Mace *et al.* 2012, p. 124; Costello *et al.* 2016, p. 2), the period of time during which habitat conditions were improving inside the Recovery Zone (NCDE Subcommittee 2018, Chapter 3). For example, on the Flathead National Forest, the amount of core habitat (IGBC 1998, p. 4), increased by approximately 155 mi^2 (400 km^2) from 1995 to 2004 and by another 65 mi^2 (170 km^2) from 2004 to 2011. It has long been recognized that grizzly bears will occasionally move into and even reside permanently in areas outside Recovery Zones, and they are expected to do so in many areas. However, only bears living inside the Recovery Zone are considered crucial to recovery goals (USFWS, 1993, p. 18). Therefore the habitat-based recovery criteria apply the most stringent habitat standards inside the Recovery Zone. The Conservation Strategy sets forth further goals and standards for habitat protections outside of the Recovery Zone (NCDE Subcommittee 2018, Chapter 3). The goal of Zone 1 is continued occupancy by grizzly bears, and this area will be included in population monitoring. Existing habitat protections in Zone 1 have been compatible with an increasing population and will focus on managing motorized route densities. The goal in the DCAs is to support female grizzly bear occupancy and eventual dispersal to other ecosystems. Habitat protections in the DCAs include limiting miles of open road and maintaining current roadless areas. Providing for genetic connectivity through Zone 2 does not require the stringent habitat protections of the primary conservation area (aka, the Recovery Zone), which is managed as a population source area. Both male and female grizzly bears are already known to occur in Zone 2 under current conditions. Besides being unnecessary to achieve the goal of recovery of the NCDE population, it is impractical to expect to provide the same level of habitat protections in Zone 1, the DCAs and Zone 2 as in the PCA. Federal lands make up nearly 79 percent of the Recovery Zone, but only about 25 percent of Zone 1 and about 30 percent of Zone 2. Existing Federal land management plan direction has been sufficient to enable bears to move through and occupy Zones 1 and 2. Existing protections provided by designations such as Inventoried

Roadless Areas, as well as by current travel management plans, will remain in place and additional emphasis will be given to properly securing food and attractants in Zone 2.

The 1993 Recovery Plan states that "grizzly bear populations may be listed, recovered, and delisted separately" and that it is the intent of the Service to delist individual populations as they achieve recovery (USFWS 1993, pp. ii, 6–7). Currently grizzly bears occupy 100 percent of the 23,119 km^2 (8,926 mi^2) NCDE Recovery Zone, which constitutes 41 percent of current occupied range (56,000 km^2 (21,612 mi^2)) (NCDE Subcommittee 2018, Chapter 2). Although connectivity is not necessary for the NCDE population to achieve recovery under the Act it is desired to serve as a source population for other ecosystems (e.g., the Cabinet-Yaak, Bitterroot, and Greater Yellowstone Ecosystems).

Issue 7: Habitat fragmentation within the NCDE: Some commenters and peer reviewers expressed concern about potential habitat fragmentation within the NCDE. Two peer reviewers suggested that existing roads and highways have the potential to cause demographic and genetic connectivity consequences (Kendall *et al.* 2009; Proctor *et al.* 2012). They suggested that we examine the subunits with relatively high and low road densities that will be maintained under the 2011 baseline to insure there is not fragmentation within the ecosystem, especially across U.S. Highway 2 and at the southern end of the NCDE. In addition, one peer reviewer suggested monitoring to assess any changes in fragmentation across U.S. Highway 2, such as monitoring changes in bear movements. One commenter questioned the potential for fragmentation between the NCDE and Canada with timber harvest, oil and gas exploration, human development, and grizzly bear hunting in Canada. Another commenter was concerned about habitat fragmentation on private lands because even though private lands are only 9 percent of the Recovery Zone, private lands tend to be oriented linearly and along roads.

Some commenters stated that the HBRC should include provisions to install wildlife overpasses and underpasses to avoid wildlife-vehicle collisions and improve connectivity. Commenters specifically mentioned establishment of these structures along Montana State Highways #93, 2, 200, and U.S. Interstate 90.

Response: Genetic sampling and radio telemetry have been used to examine movements, genetic diversity, and population structure within the NCDE (Kendall *et al.* 2008; Kendall *et al.* 2009; Mace *et al.* 2012; Proctor *et al.* 2012; Mikle *et al.* 2016; Morehouse *et al.* 2018). Heterozygosity values are a useful, relative measure of genetic diversity, which is an indicator of whether a population is isolated or connected to other populations. Measures of heterozygosity from the NCDE obtained between 1990 and 2004 are similar to those from undisturbed populations in Canada and Alaska, leading to the conclusion that the NCDE population has high genetic diversity and is sufficiently connected to other populations.

Kendall *et al.* (2009) identified six subpopulations in the NCDE based on genetic analyses. However, the genetic differentiation values observed among the different areas within the NCDE were generally low. There are few geographical barriers thought capable of creating genetic

discontinuities in the NCDE and generally the subpopulation boundaries did not coincide with natural or anthropogenic geographic features. Genetic differentiation between subpopulations decreased when genetic data from 1976–1998 was compared to data from 1999–2006, a finding consistent with demographic recovery of the population (Kendall *et al.* 2009). The only suggestion of human-caused fragmentation was on the western side of the U.S. Highway 2 / Burlington Northern Santa Fe (BNSF) rail line corridor between GNP and National Forest lands where human-caused mortality had higher mortality rates from vehicle and train collisions compared to other areas of the ecosystem. However, mortality as a result of train collisions has decreased in the last several years as a result of mitigation measures that have been implemented by BNSF. There was little genetic differentiation across the eastern portion of the corridor but at the western end where highway traffic volumes and human densities are three times higher, differentiation indicated reduced gene flow (Kendall *et al.* 2009). In recent years, connectivity within the ecosystem has mostly restored the genetic diversity across the ecosystem. Mikle *et al.* (2016) evaluated changes in genetic diversity between 2004 (data from Kendall *et al.* 2009) and 2012. Initial diversity was moderate in 3 southern regions of the NCDE (e.g., observed heterozygosity (Ho) – 0.69, 0.67, and 0.70), generally lining up with 3 of the subpopulations identified in Kendall *et al.* (2009).

While managers remain vigilant about the possible fragmenting effects of the Hwy. 2 corridor, both male and female movements were documented across this corridor and the current state of fragmentation is within levels that ensure both demographic and genetic connectivity (Miller and Waits 2003; Waller and Servheen 2005).

Connectivity in grizzly bear populations should be examined in terms of both genetic and demographic health (Proctor *et al.* 2012). While male or female movements can enhance genetic diversity and reduce genetic fragmentation (i.e., provide genetic connectivity) (Miller and Waits 2003; Proctor *et al.* 2005), female movements are necessary to enhance a small population's growth rate (i.e., provide demographic connectivity) (Proctor *et al.* 2012). Proctor *et al.* (2012) used genetic information and movement data from radio-collared grizzly bears between 1979 and 2007 to assess fragmentation in grizzly bear populations in the U.S. and Canada. Data from radio-collared bears demonstrated that both male and female grizzlies moved across the US/Canadian border on the northern edge of the NCDE. Based on 11 movements (10 males and one female) between the NCDE and areas north of Highway 3 in Canada Proctor *et al.* (2012) concluded that the NCDE population (south of the Canadian border) is connected to and functions as part of a larger grizzly bear population in the US-Canadian border region. Based on those movements and on measures of genetic diversity, they also concluded that there is currently little risk of significant reduction in the present high levels of genetic diversity. Overall, the NCDE is well connected to Canadian populations genetically and its population size ensures demographic and genetic health.

Issue 8: Connectivity between the NCDE and other ecosystems: Multiple commenters stated the HBRC lacks provisions that would apply to lands between the NCDE and other ecosystems in the Northern Rocky Mountains needed to ensure that habitat conditions in these areas will:

facilitate movement of bears, allow genetic exchange between populations, and enhance the overall recovery of a grizzly bear meta-population. Commenters also state that such provisions are necessary to facilitate natural recolonization of unoccupied habitats in areas like the Selway-Bitterroot ecosystem. Some commenters contend that not applying HBRC to lands between the NCDE and other ecosystems will result in continued isolation of populations and jeopardize the genetic health and evolutionary potential of all grizzly bear populations in the lower-48 states. Some commenters stated that the HBRC do not establish adequate criteria and standards to ensure that both genetic and demographic connectivity occur between populations. Some commenters suggested that HBRC are necessary in Zones 1 and 2 if the NDCE is going to serve as a source population (genetic and/or demographic) to other ecosystems. One commenter provided recommendations that the Service consider the contribution of gravel bed floodplains when evaluating connectivity within the NCDE and between the NCDE and other ecosystems as they are critical movement corridors to connect otherwise disconnected populations and important food sources (Hauer *et al.* 2016).

Some commenters contend that Peck *et al.* (2017) provided some potential paths between the NCDE and Greater Yellowstone Ecosystem (GYE) and made it clear that male grizzly bears will need multiple seasons to make the trip between the ecosystems, which will require them to set up home ranges within Zone 2. Commenters also suggested that other areas in Zones 1 and 2 that are critical to linkage should be included in one or more DCA. Additional habitat protections, similar to those proposed in the DCAs, are needed in Zone 2 to meet the CS goal to "maintain genetic linkage opportunities between the NCDE south toward Yellowstone with consistent grizzly bear presence in these intervening areas," as grizzly bears do not currently have a "consistent presence" in those areas. The patchwork of public and private lands in Zone 2 could result in mortality sinks on the private lands (Schwartz *et al.* 2012). A few commenters asked why sections of the Beaverhead-Deerlodge National Forest (BDNF) in Zone 2 are not involved in the USFS Grizzly Bear Amendment. They suggested that current conditions in the BDNF are not conducive to connectivity between the NCDE and the GYE. Some commenters suggested that because of the large distance covered by Zone 2, grizzly bears must occupy Zone 2 to connect the two populations. The distance is too large for even male grizzly bears to span in a seasonal movement, as exhibited by Proctor *et al.* (2004) and Peck *et al.* (2017). Suitable, secure habitat is necessary in Zone 2 to enable this connection to occur. Some commenters expressed that genetic connectivity is not a substitute for demographic connectivity. Another commenter suggested that areas of Zone 2 have the highest motorized route densities in Montana and these potential connectivity areas, as identified in several publications (Servheen *et al.* 2003; Walker and Craighead 1997; Peck *et al.* 2017), are where NCDE grizzly bears are not being detected.

Several commenters suggested that the DCA boundaries should be extended to connect to the Cabinet-Yaak and Bitterroot Ecosystem boundaries. One commenter suggested that applying the PCA standards to the DCAs will more likely ensure the conservation goals within the DCAs are met.

Response: These habitat-based recovery criteria are specific to the NCDE grizzly bear population. The 1993 Recovery Plan states that "grizzly bear populations may be listed, recovered, and delisted separately" and that it is the intent of the Service to delist individual populations as they achieve recovery (USFWS 1993, pp. ii, 6–7). Currently grizzly bears occupy 100 percent of the 23,119 km^2 (8,926 mi^2) NCDE Recovery Zone, which constitutes 41 percent of current occupied range (56,000 km^2 (21,612 mi^2)) (NCDE Subcommittee 2018, Chapter 2). Although not required for recovery of the NCDE grizzly bear population because of the population's large size and connectivity with Canada, connectivity to the west and south is desired, would benefit other grizzly bear populations (e.g., the Bitterroot, Cabinet-Yaak, and Greater Yellowstone Ecosystems) in the lower 48 States, and is set forth as a goal in the NCDE Conservation Strategy (NCDE Subcommittee 2018, Chapter 1).

Issue 9: The 2011 baseline justification: Several commenters were concerned with our justification for the 2011 baseline for the HBRC. Some commenters stated that it was inappropriate to base the recovery of grizzly bears strictly upon population levels found in 2011 and that population size alone is not a sufficient criterion for evaluating habitat. In addition, commenters stated that the HBRC incorrectly presumes 2011 habitat conditions alone resulted in the positive population growth trend during this time period, rather other factors, such as the protections of the Act, may have contributed to the population growth rate. In addition, one commenter opined that using 2011 as a baseline because of the population size and trend, or numbers and distributions is not necessarily representative of habitat quantity and quality needed for recovery.

One peer reviewer expressed concern with the Service attributing the population growth from 2004 to 2011 to habitat conditions because there is a lag time between habitat improvement and the demographic response. They suggested that rather motorized route density was lowest in 2011 and conducive to an increasing grizzly bear population. Therefore, maintaining or improving upon the 2011 baseline is a rational approach to maintain population recovery. Although Mace *et al.* (2012) and Kendall *et al.* (2009) are currently the best available science, there is a need to continue evaluation of the population. In addition, a peer reviewer asked if 2011 had the lowest motorized road density of all years and requested that the HBRC contain details (e.g., where, by how much, why this reduction occurred) about the reduction of motorized road densities between 2004 and 2011.

Other commenters expressed concern with the HBRC relying on Mace *et al.* (2012) for an annual population growth rate of 3 percent for the NCDE when Costello *et al.* (2016) revised that estimate downward to 2.3 percent. Other commenters questioned what the population growth rate would be if the data set incorporated the additional time period up to 2017. Some commenters expressed that a 3 percent annual growth rate is atypical and unsustainable. Others were concerned that the 2004 population estimate of 765 (Kendall *et al.* 2009) is a one-time estimate and that there is great uncertainty, which has not been disclosed, in the trend estimates that have been applied to the estimate of 765 bears to obtain recent population estimates. Some contend that the 6-year period on which Mace *et al.* (2012) based the 3 percent annual growth

rate is anomalous as it coincided with ecosystem-wide low mortality compared to the long-term trend since 1992, and in fact the population has been stable or declining for the last 20 years. Lastly, one commenter contends that there is a dramatic source-sink structure in the population, with Glacier, the North Fork, and the Middle Fork as sources, and everywhere else, barring the Blackfoot Reservation, as sinks. This commenter states that the current estimate of growth rate is invalid because it does not take this spatial structure into account.

Several commenters were concerned with the adequacy of the 2011 baseline protections. Commenters suggested that the habitat security levels adequate to allow a 3 percent increase in the population without grizzly bear hunting are unlikely to remain adequate to sustain the population when mortality limits are relaxed to allow more mortality at the hands of wildlife managers and hunters. Other commenters stated that the data for the 2011 habitat baseline conditions for motorized access, grazing allotments and developed sites is an incomplete, inaccurate, and incorrect surrogate for determining future health and population trends of grizzly bears in the NCDE. Another commenter stated that the HBRC criteria must take into account the potential decline in carrying capacity of the NCDE and take care to avoid misinterpreting the dispersal of bears searching for food sources for an expansion in the population.

Response: The rationale for the 2011 baseline was that the grizzly bear population was increasing between 2004 and 2011, and motorized route density in the NCDE was decreasing during the same period. The 2011 year was most practical as it reflected existing developed sites, road densities, and projects at the time the Conservation Strategy was being developed, and the grizzly bear population trend was increasing at a healthy level. Selecting the 2011 date also allowed the greatest number of years and data available at that time to be included, upon which to base population trend. Thus, habitat conditions with respect to motorized route density were the most favorable for grizzly bears at the end of this period when there was an increasing population trend. Therefore, 2011 was chosen as a reasonable and conservative baseline from which to maintain habitat conditions that would be likely to support a stable to increasing grizzly bear population. There is some uncertainty as to whether maintaining baseline habitat conditions will be sufficient in the face of future habitat changes such as private land development and climate change. However, the omnivorous diet, large home range size, and behavioral flexibility of grizzly bears gives us reasonable confidence that this approach will be successful in sustaining the population.

We recognize that the selected habitat conditions and management activities (secure core and motorized route density, developed recreation sites, and livestock allotments) do not capture all the environmental factors that can influence grizzly bear population growth. Many of the environmental, social, and economic factors influencing grizzly bear population status are outside the control of land management agencies, but we do have jurisdiction over these important factors and can manage them in a manner that does not negatively affect the grizzly bear population. We acknowledge that there is uncertainty as to whether the habitat management direction will be sufficient in the face of future ecological challenges such as private land development and climate change. For this reason, regular monitoring of habitat conditions on

Federal, State and Tribal lands, as well as development such as residential subdivision on private lands, will be conducted and evaluated over time as set forth in the NCDE Conservation Strategy (NCDE Subcommittee 2018, Chapter 3). Furthermore, changes in population size, trend, and multiple demographic rates will be monitored (NCDE Subcommittee 2018, Chapter 2). The population and habitat monitoring data will be compiled per the established schedules to assure that the desired results are being achieved, and that appropriate management adjustments are identified and recommended if needed (NCDE Subcommittee 2018, Chapter 5).

The best available science shows that the NCDE grizzly bear population continues to increase at a rate of 2–3 percent annually (Mace *et al.* 2012; Costello *et al.* 2016; MFWP, unpublished data). These data spans 14 years with no indication of population decline. The population estimate in 2004 was 765 individuals (Kendall *et al.* 2009) and as of 2017 was 1,029 individuals with a 95 percent confidence interval of 884–1,190 individuals (MFWP, unpublished data). Decisions about establishing hunting seasons are outside the scope of this document. HBRC and other criteria represent a recovered NCDE grizzly bear population. Once the population is recovered and delisted, these criteria no longer apply. However, the NCDE agencies have committed to continue monitoring population size, trend, vital rates, and causes and locations of mortality as outlined in the Conservation Strategy (NCDE Subcommittee 2018, Chapter 2). In addition, the agencies have agreed to maintain limitations on mortality from all sources to maintain a recovered grizzly bear population in the NCDE (NCDE Subcommittee 2018, Chapter 2).

The 2011 baseline for secure core habitat, motorized routes, developed sites, and livestock allotments used the best available data compiled by the cooperating agencies of the NCDE subcommittee. There is no evidence that these data are inaccurate to a level that would influence grizzly bear management or survival. To date, we have no reason to believe that food resources have declined or have been limiting for grizzly bears in the NCDE. As described in the NCDE Conservation Strategy, grizzly bears use a variety of foods across many different habitats in the NCDE (NCDE Subcommittee 2018, Chapter 1).

Issue 10: Adequacy of secure core habitat and TMRD/OMRD criteria: Some commenters state that the 2011 baseline levels of secure core habitat in parts of the NCDE do not provide grizzly bears sufficient protection from disturbance and potential mortality associated with motorized road and trail access. Commenters contend the HBRC baseline locks in road densities in many BMUs at levels that may not be conducive to occupancy by reproducing female bears, displace bears, and may lead to higher levels of mortality (Lamb *et al.* 2018). Commenters also state that 58 percent of the roaded sub-watersheds in the NCDE have road densities in excess of 2 miles per square mile (mi/mi^2) (3.2 kilometers per 2.6 square kilometer (km/km^2)) which can significantly displace grizzly bear from otherwise preferred habitats. They also recommended that Criterion 1 be revised to reflect appropriate standards for levels of secure core habitats and open road densities with road access within the Recovery Zone. Some commenters objected to adopting the less protective 2011 baseline rather than keeping the Amendment 19 habitat security standards (i.e., at least 68 percent security core, no more than 19 percent open motorized access > $1mi/mi^2$, and no more than 19 percent open motorized access > $2mi/mi^2$ in each BMU)

that the Service found its Biological Opinion to be necessary to avoid jeopardy to the NCDE grizzly bear population (USFWS 1995a). One commenter noted that under the 2011 baseline 31 of 54 BMU subunits on the Flathead NF, 1 of 3 BMU subunits on the Helena NF, 2 of 2 BMU subunits on the Kootenai, and 8 of 8 BMU subunits on the DNRC would violate A19 standards. Only the Lewis and Clark National Forest would meet A19 standards on all BMU subunits. Some commenters contended that OMRD and TMRD levels are inconsistent with grizzly bear survival on some public lands in the NCDE and protections need to be extended outside of the PCA. One peer reviewer suggested that road use (i.e., the number of people or vehicles) needs to be considered in addition to road density as traffic volume affects displacement and the risk of mortality. Some commenters contend that bears near roads are exposed to elevated risks of human-caused mortality (Kasworm and Manley 1990; Mace and Waller 1997; McLellan and Shackleton 1989). The trend data showed that the population grew faster outside GNP than inside GNP from 2004–2011 (CS Appendix 2, p. 21), possibly because of the increased limits on motorized vehicles outside of GNP. The commenter suggests that this data indicates that "we" are doing something right outside GNP and this progress should not be stopped. The NCDE National Forests should be cautious about opening up roads and allowing temporary projects given the research in the Cabinet-Yaak where recovery has been inhibited by high road densities and competing activities (Kendall *et al.* 2016).

Several commenters opined on the adequacy of the road measures in the HBRC. A few commenters state that additional criteria should be established to protect all current roadless areas from intrusion by roads. One commenter stated that the amount of roadless areas in 1975 should be determined and the HBRC should require restoration of roadless areas to that level or greater. Other commenters suggested that roadless areas on Federal lands should be expanded. Another commenter stated that the extent of roads on the Flathead National Forest: "The USFS does not have complete knowledge of its old road system or the status of all roads on adjacent private lands" but it can update this information through aerial images as data become available (DEIS: 401). This commenter states that this information must be updated and made public as soon as possible so that comment regarding the actual extent of harm caused to the NCDE may be solicited.

Several commenters state that the HBRC criteria for secure core are inadequate. Commenters contend that 3.8 square miles minimum patch size identified is too small an area to provide protection from disturbance, especially if temporary roads and logging are allowed. Commenters cite work by Mattson (1993) that identified microscale secure areas for female/cub groups as 10.93 square miles. Commenters also state that although females in the NCDE subpopulation have smaller home ranges compared to those in Mattson's study from Yellowstone, 3.8 square miles only encompasses a small portion of their 46.3–61.8 square mile home range. Some commenters suggested that the highest quality habitat for bears may occur in heavily roaded areas whereas the secure core areas may contain poor habitat; therefore, habitat value must be incorporated into considerations of road closures. One commenter also suggested that secure core should not only include size but shape and juxtaposition of secure core. Another commenter suggested that a TMRD of no more than approximately 0.25 mi/mi^2 (0.4 km/km^2) is

similar multiple publications (Mattson 1993; Craighead *et al.* 1995; Metzgar 1998; BC Auditor General Report 2017). Commenters also suggested that habitat should be at least 290 hectares in size and approximately 2 to 4 km from the nearest road or human facility (Mattson 1993).

On the other hand, some commenters contend that the relationship between road density and the displacement of grizzly bears is overstated and not supported by available science. They suggest that: (1) further motorized access closures are unnecessary, (2) motorized trails have less impact and should not be considered the same as roads, (3) bears are not killed or harmed by motorized trail use, (4) further studies should be done in any proposed plan to demonstrate a significant impact to bears as a result of motorized trails, (5) closing additional roads will not increase the population because grizzly bears already occupy all grizzly bear habitat, and that (6) the number of motorized roads and trails should be expanded. In addition, they suggest alternatives, such as closing motorized routes during the hunting season and other potentially important times and leaving them open for summer recreation.

Response: The Act states that "recovery plans shall incorporate objective, measurable criteria which, when met, would result in a determination…that the species be removed from the list." The NCDE grizzly bear population was known to be increasing in 2011, and we believe it had also met the demographic recovery criteria (USFWS 1993). The best available information led us to believe that these HBRC, in combination with the demographic recovery criteria, would ensure the long-term survival of the species in the wild. Additional and more protective criteria, while beneficial for grizzly bears, are not necessary to ensure long-term survival.

Amendment 19 is a management strategy that was based on the best available science at the time. In the 23 years since the 1995 Biological Opinion was issued, a substantial body of new information, including peer-reviewed published research about the NCDE grizzly bear population, has become available. Both the status of the NCDE population and our understanding about grizzly bear responses to human activities and management have improved and is summarized in the Conservation Strategy (NCDE Subcommittee 2018, Chapters 1–3). The USFS recently completed Section 7 consultation with the Service on the effects of incorporating grizzly bear habitat management direction that was informed by the draft NCDE Conservation Strategy into the forest plans. The 2017 Biological Opinions concluded that the forest plan amendments and the Flathead's revised forest plan are not likely to jeopardize the continued existence of the grizzly bear. The Service further noted that several elements of the proposed action will be beneficial to the grizzly bear population (USFWS 2017, entire).

Significant efforts made by the USFS over the past 20+ years have led to the majority of BMU subunits in the NCDE now meeting the Amendment 19 objectives. The NCDE grizzly bear population has been monitored and results show that the number of bears now substantially exceeds the minimum population size goal stated in the 1993 Recovery Plan, the population is well distributed throughout the Recovery Zone, and the population has expanded its geographic distribution well beyond the Recovery Zone boundary (Kendall *et al.* 2009, Mace *et al.* 2012, Costello et al., 2016), even though not every BMU subunit meets the 19-19-68 percentage

objective of Amendment 19. Between 1995 and 2016, about 730 miles of road have been decommissioned across the Flathead National Forest. The BMU subunits in the Swan Valley are likely to be of high priority for future road decommissioning to improve habitat for bull trout and grizzly bears or to meet other resource objectives.

The 2,500 acre minimum size for secure core is based on the 1994 IGBC Guidelines that state minimum size will be recovery zone specific and that "the minimum size for the core area(s) be that area necessary to support a female grizzly bear for 24 hours of foraging." Information and research specific to the NCDE indicated that 83 percent of documented locations of radio-collared females were in habitat that did not have motorized access that were usually at least 2,200 acres in size (USFWS 1997). If we enlarged the minimum size of secure habitat as recommended by commenters, thousands of acres of secure habitat would no longer be considered secure and would, therefore, not be subject to the "no net loss" standard (i.e., new roads would be allowed in these areas). By using a smaller minimum acreage requirement, we are not excluding any of the larger blocks of secure habitat.

In response to comments that the relationship between road density and the displacement of grizzly bears is overstated and not supported by available science, the negative effect of humans on grizzly bear survival and habitat use are well documented (Harding and Nagy 1980, p. 278; McLellan and Shackleton 1988, pp. 458–459; Aune and Kasworm 1989, pp. 83–103; McLellan 1989, pp. 1862–1864; McLellan and Shackleton 1989, pp. 377–378; Mattson 1990, pp. 41–44; Mattson and Knight 1991, pp. 9–11; Mattson *et al.* 1992, pp. 436–438; Mace *et al.* 1996, p. 1403; McLellan *et al.* 1999, pp. 914–916; White *et al.* 1999, p. 150; Woodroffe 2000, pp. 166–168; Boyce *et al.* 2001, p. 34; Johnson *et al.* 2004, p. 976; Schwartz *et al.* 2010, p. 661). In light of this, the importance of secure habitat, simply defined as a function of distance from roads, is indisputable. No additional road closures are proposed as part of these HBRC; however, because current levels of open and total motorized route densities have been compatible with an increasing grizzly bear population in the NCDE, the HBRC proposes to maintain the baseline in the core of the ecosystem, the NCDE Recovery Zone.

Issue 11: Calculation of TMRD/OMRD: Several commenters and a peer reviewer had concerns with how TMRD and OMRD are calculated. The peer reviewer was concerned that "highway, county, and private roads are not included in the calculation of OMRD or TMRD" and "thus the percentage of each BMU that exceeds the threshold (1 mi/mi^2 or 2 mi/mi^2) is also underestimated." Commenters suggested that we need to consider in our calculation of TMRD and OMRD: (1) illegal off-road and off-trail use and that unauthorized motorized use should be included with Open Motorized Road Density (OMRD) and Total Motorized Road Density (TMRD) standards; (2) logging roads that have not been decommissioned (e.g., decommissioned roads cannot function as motorized or non-motorized trails); and (3) high-use trails. Some commenter disagreed with the justification for HBRC not considering trails, stating that the existing scientific literature documents displacement of individuals from preferred habitat (Schallenberger and Jonkel 1980; Jope 1985; McLellan and Shackleton 1989; Kasworm and Manley 1990; Mace and Waller 1996; White *et al.* 1999) even if there is not direct mortality or

documented population-level impacts. This displacement "may lead to sub-marginal nutrition, reduced reproduction, or greater exposure to adult predatory bears or human food sources, which can lead to human-caused mortality" (Mace and Waller 1997; USDA FS 2017a). In addition, trails may lead to habituation and food-conditioning. The removal of high-use trails from calculations and redefining it as secure core gives the false impression that security core has increased. High-use trails should be included because the Act's definition of harm and take include displacement in addition to direct mortality.

Some commenters opined that trespassing, which is poorly enforced, and non-motorized use on roads closed by gates still displaces grizzly bears and that roads must be reclaimed or decommissioned in order to not count in TMRD. Even if a road is so overgrown that reconstruction would be needed for future use, all culverts would need to be removed and the road removed from the "System" for it to be reclaimed or obliterated. Other commenters opined that impassable roads (e.g., the removal of a bridge or large culvert) is a new classification of roads introduced in the 2013 draft Conservation Strategy and that they are not the same as decommissioned roads (as defined in A19) and must be buffered and counted in TMRD. "Impassable" roads are often still function as non-motorized trails. Commenters submitted several examples of the USFS and/or a Biological Assessment not reducing TMRD for roads impassable to motorized vehicles, in compliance with A19, contrary to calculations on the Flathead NF that have reduced TMRD as a result of impassable roads that are retained in the road System, treating these impassable roads as reclaimed. In addition, some projects on the Flathead are proposing to lower TMRD by storing rather than decommissioning roads, which is currently being litigated. The IGBC unsuccessfully attempted to replace A19's security core with seasonally secure core, which allowed roads to be gated and seasonally closed. One commenter suggested that there is no data to support the effectiveness of seasonally closed roads, bears may avoid areas with seasonally closed roads if they have experience with the roads when they are open.

Response: The Federal agencies have no jurisdiction over highways, county roads, or private roads, and it is unrealistic to expect the agencies to be able to mitigate for high road densities that may exist on some other ownerships. The objectives for OMRD and TMRD were derived from the South Fork grizzly bear study area, which was predominantly (84 percent) National Forest lands (Mace and Manley 1993). Early attempts to extrapolate the same calculations to other portions of the NCDE that are characterized by less Wilderness and more intermingled ownerships revealed the problems associated with trying to account for roads on other ownerships. For example, data for roads on private lands were incomplete or lacking, and in some cases the information was considered proprietary. Through discussions with partner agencies, it was agreed that private roads and lands would be excluded from OMRD and TMRD calculations. Additionally, highways and county and city roads will not be included in OMRD and TMRD calculations but will be buffered for secure core calculations.

In response to other concerns regarding calculations of TMRD and OMRD:

(1) Federal agencies will continue to monitor and enforce compliance with its regulations, including those that restrict motorized use. Federal agencies also reinforce or otherwise improve closure devices when deemed necessary. On State Trust lands, the DNRC HCP requires all primary access closures within the PCA to be checked annually, and repairs to any defective closures must be made within one operating season following their detection. (NCDE Subcommittee 2018)
(2) All roads count towards total motorized route density unless it meets the definition of impassable or is decommissioned.
(3) The original recommendation to exclude areas within 500 m of high use non-motorized trails from secure core area calculations was based on the judgment of biologists and managers and several untested assumptions regarding the potential impacts of such trails on grizzly bears. No data were available on the actual use levels of non-motorized trails, and the threshold for "high" use (20 parties or more per week) was not based on literature or empirical data. Multiple studies have documented displacement of individual grizzly bears from non-motorized trails to varying degrees (Schallenberger and Jonkel 1980; Jope 1985; McLellan and Shackleton 1989; Kasworm and Manley 1990; Mace and Waller 1996; White *et al.* 1999). However, none of these studies documented increased mortality risk from foot or horse trails or population level impacts to grizzly bears. For example, while grizzlies in GNP are displaced to some degree by non-motorized trails (Jope 1985; White *et al.* 1999), conflicts and grizzly bear mortalities there are extremely infrequent and related almost exclusively to campgrounds and other human-use areas. Because of the difficulty in objectively defining and accurately identifying high intensity use trails, as well as the lack of data indicating that nonmotorized trail use results in disproportionate grizzly bear mortality or population declines, the decision was made to no longer include this in the definition for secure core. Removal of high intensity use non-motorized trails does change the baseline value for secure core in some BMU subunits, but all future activities would be held to this new baseline level. The baseline levels in the HBRC reflect this change. A comparison of "security core" (IGBC 1994, 1998) and secure core were reported in Appendix 6 of the draft Conservation Strategy. The HBRC set forth in the recovery plan supplement address the threats from habitat destruction and modification and will meet the needs of a recovered grizzly bear population in the NCDE. It is not necessary that threats be completely removed but must be sufficiently ameliorated such that they will not be a threat to the population's long-term persistence.

Roads that are gated are counted towards TMRD. Roads must be impassable or decommissioned to not count towards TMRD. Although impassable road can still function as non-motorized trails, non-motorized trails are no longer included in calculations of secure core (see above). Although it changed the calculation for the 2011 baseline it did not change the amount of habitat security provided to grizzly bears. The Conservation Strategy provides a comparison of secure core habitat versus core habitat, as defined by IGBC (1998, pp. 4–5). A stored road that meets the definition of either an impassable or reclaimed road but is left in the system (i.e., on the agency's transportation atlas) provides the same amount of secure core habitat for grizzly bears.

Although a stored road could be used at a later date for a project, it would be subject to the application rules in the Conservation Strategy (NCDE Subcommittee 2018, Chapter 3). The HBRC do not contain allowances for seasonally closed roads.

Issue 12: Temporary changes: Some commenters and one peer reviewer had concerns over the allowance for temporary changes in secure core, OMRD, and TMRD. Commenters contend that the population trend is inaccurate that is used to justify the 5/3/2 standard based on six unidentified projects that occurred during the same period. They continue that the 5/3/2 standard is misleading because it averages OMRD, TMRD, and secure core over a 10 year period when in actuality you could see a much larger short term change. Several commenters suggested that secure core should not shift over time but remain stable to allow females to learn to use these areas and pass on knowledge to their offspring. These allowable changes assume that grizzly bears will move to mitigation habitat and there will be no negative consequences to feeding, breeding, denning, and survival, contrary to research by Allen *et al.* (2011) in the Cabinet-Yaak Ecosystem. Other commenters were concerned that closed roads would be allowed to temporarily open for activities such as timber harvest and firewood cutting, resulting in a functional reduction of secure core habitat. The peer reviewer suggested that because "Boulanger and Stenhouse (2014) show that a threshold density of 0.75 km/km^2 or lower is desirable to maintain viable grizzly bear populations" allowable temporary increases should not exceed this level of OMRD. They also asked if there are regulations on restoration as set forth in the application rules (i.e., prohibiting the use of clover (Roever *et al.* 2008)).

Response: Please see Issue 9 for further explanation of the population trend data used as the basis for the baseline and the 5/3/2 standard. Temporary roads are open for the specific objective of completing a project and are closed at its conclusion. The allowance for temporary increases in total motorized route density and open motorized route density, and for temporary decreases in secure core is intended to accommodate project activities to occur at a level similar to what occurred during the same time period when the grizzly bear population was increasing. In consultation with the Service, the five forests in the PCA implemented only six projects that temporarily increased OMRD and TMRD and/or temporarily decreased secure core. The application rule was based on the temporary changes that were allowed for these six projects. The rationale for allowing temporary changes is that such changes were evaluated and allowed on Federal lands through the section 7 consultation process with the Service while the grizzly bear was listed as threatened and was conducive to an increasing population. Between 2003 and 2010, six projects on USFS lands were developed that included either temporary increases in OMRD or TMRD or effects on secure core. Through the planning and section 7 consultation processes, these projects were allowed to proceed through temporary modification of the existing management direction. Five of the projects occurred on the Flathead NF and one on the Lolo NF, affecting 18 BMU subunits. The types of projects included timber salvage, timber harvest, and road management. During the life of these six federal projects, in affected subunits the OMRD temporarily increased an average of 5.4 percent, TMRD temporarily increased an average of 2.9 percent, and secure core fluctuated by 2 percent. The projects occurred during the period when the NCDE grizzly bear population is known to have been increasing (Kendall *et al.*

2009; Mace *et al.* 2012, Costello *et al.* 2016). It should also be noted that the amount of area that could be affected by future temporary increases in OMRD and TMRD and/or temporary decreases in secure core is substantially limited by the large percentage of lands that are in protected areas. For example, only about 1 percent of the secure core on the Helena NF and 4 percent of the secure core on the Lolo NF are within areas where road access could be allowed. Therefore we expect that this allowance for temporary increases/decreases will be compatible with the goal of recovering the grizzly bear population in the NCDE.

Clarification has been added to the temporary use of restricted roads for activities such as timber harvest and firewood gathering such that it must occur outside of secure core, cannot exceed 30 consecutive days during one non-denning season, and must occur outside of black bear hunting season and any potential grizzly bear hunting season. The calculations by Boulanger and Stenhouse (2014, p. 15) were based on female survival rates and reproductive states in their study area. The vital rates for the NCDE, including female survival rates, from 2004 to 2017 correspond to an annual population growth of 2.3 percent (Costello 2018, *in litt.*), therefore, we concluded that the current motorized route densities were conducive to an increasing NCDE grizzly bear population. In addition, Boulanger and Stenhouse (2014, p. 5) used road densities in their calculations whereas we use motorized routes, which includes roads and motorized trails. The Conservation Strategy sets forth application rules, such as the prohibition of clover in seed mixes, for motorized access management, hardrock mining, and oil and gas development on USFS lands (NCDE Subcommitte 2018, Chapter 3).

Issue 13: Habitat quality: Some commenters stated that Federal and State agencies have not conducted comprehensive habitat mapping of the ecosystem. In addition, there are no long-term, ecosystem-wide studies of grizzly habitat or preferred foods, which are necessary to establish objective, measurable HBRC. Commenters state that without such data there is no benchmark from which to gauge future habitat improvement or decline and its impact on bears. Some commenters stated the proposed monitoring methodology erroneously treats all habitat as if they were the same and would not adequately differentiate between areas of high quality and those that may be adversely impacted by factors such as motorized use, development, and livestock grazing. Commenters contend that any potential baseline should be based on habitat quality, quantity, and connectivity rather than a population figure alone. Commenters stated that the HBRC does not address the need for directly monitoring food resource availability, or changes to the environment such as large landscape fire or effects of vegetation management treatments on public lands. Commenters state the Service must identify a rigorous program for monitoring grizzly bear habitat conditions and apply it to the entire ecosystem. Commenters cited the findings of Doak (1995) where he documented an 8–13 year "lag time" between habitat decline and grizzly population. Commenters contend the agencies will be making decisions without adequate information, therefore endangering the long-term recovery of grizzlies in the NCDE.

Some commenters suggested that a comprehensive definition of habitat is needed that includes all the components required for grizzly bear survival and reproduction (nutrition, security as measured by risk of disturbance and mortality, vulnerability to conflicts, etc.). These

commenters stated that quantitative measures of habitat should encompass all aspects of habitat suitability and include classification of land units on a week by week basis for the following parameters: (1) energy abundance and availability: food quantity, quality and accessibility; (2) habitat disturbance: overall reduction in use of habitat to bears due to human activities, road densities, mortality risk to bears from attractants in the habitat unit; (3) landscape acceptability: size of the secure habitat block in relation to the sensitivity of this particular population of bears to disturbance; (4) security coefficients: rating of the habitat unit that reflects the history of sport hunting, capture, poaching, disturbance, etc.; (5) mortality component: a measure of the history of bear loss; and (6) seasonal availability: habitat ratings on a temporal basis for discrete areas to account for changing abundance and accessibility. One commenter also stated that HBRC should incorporate theoretical and empirical advances in the ecology of habitat patch choice and optimal foraging theory.

Response: Grizzly bears are resourceful omnivores that will make behavioral adaptations regarding food acquisition (Schwartz *et al.* 2014a, p. 75). Grizzly bear diets are characterized by high variability among individuals, seasons, and years (Servheen 1981; Mattson *et al.* 1991a; Mattson *et al.* 1991b; Schwartz *et al.* 2003b; LeFranc *et al.* 1987; Felicetti *et al.* 2003; Felicetti *et al.* 2004), reflecting their ability to find adequate food resources across a diverse and changing landscape. They opportunistically seek and consume the most nutritious plant and animal foods available to them. Grizzly bears will consume almost any food available, including living or dead mammals or fish, insects, worms, plants, human-related foods, and garbage (Knight *et al.* 1988; Mattson *et al.* 1991a; Mattson *et al.* 1991b; Schwartz *et al.* 2003b; Gunther *et al.* 2014). In areas where animal matter is less available, berries, grasses, roots, bulbs, tubers, seeds, and fungi are important in meeting protein and caloric requirements (LeFranc *et al.* 1987; Schwartz *et al.* 2003b). Even in areas where meat is abundant, grizzly bears forage on berries to maximize energy intake and mass gain (Robbins *et al.* 2007). There is no biological way to define "baseline" levels for various foods because the natural foods for grizzly bears naturally fluctuate, annually and spatially, across the ecosystem.

In the GYE, Schwartz *et al.* (2010, p. 658) used 21 years of data and nearly 12,000 known grizzly bear locations to create a habitat-based risk model that accounted for the habitat features associated with grizzly bear survival throughout the GYE. This risk model examined how motorized use of roads, productivity and seasonality of high-calorie foods, site developments, livestock allotments, number of homes on private lands, elk hunting units, and season influenced grizzly bear survival on the landscape (Schwartz *et al.* 2010, pp. 656–658). The resulting models identified source and sink habitats throughout the GYE and further supported our management approach of limiting motorized use and developed sites to improve grizzly bear survival (Schwartz *et al.* 2010, p. 659). This is the same baseline strategy that is being implemented in these HBRC for the NCDE.

Based on the literature (McLellan and Shackleton 1988; Kasworm and Manley 1990; IGBC 1994, 1998; Mace *et al.* 1996; Mace and Waller 1997a; Mace and Waller 1998; Boulanger and Stenhouse 2014), the key habitat conditions that affect grizzly bear population trend are

motorized route density and secure core, developed recreation sites, livestock allotments, vegetation management, and minerals and energy development, which have been quantified. Archived data are readily available for these habitat conditions for numerous points in time including the 2011 baseline, which is based on a period when the grizzly bear population trend was increasing (Mace *et al.* 2012, p. 124; Costello *et al.* 2016, p. 2). Doak (1995) cautioned against relying exclusively on population census data, which might not detect the impacts of habitat degredation. However, Doak (1995, p. 1372) only monitored female survival and assumed that all bears in source habitat go to sink habitat and the females move at the same rate. A monitoring system for habitat, demography, and body condition is described in the Conservation Strategy (NCDE Subcommittee 2018, Chapters 2 and 3). Partner agencies have committed to monitoring changes in vital rates (including survival, reproductive rate, and mortality cause and location) and body condition, which would detect a response to habitat changes sooner than the system described by Doak (1995, pp. 1371–1372).

Issue 14: Stable isotope/body condition monitoring: Numerous commenters stated that the use of stable isotope analysis and body condition from captured bears is an inadequate surrogate measure of habitat quality and will not provide accurate information within a sufficient time frame (e.g., the lag effect) to detect and respond to changes in habitat. Additionally, commenters expressed concerns that: (1) bears captured for management purposes could create a sampling error; (2) that the HBRC do not contain a protocol for handling the large number of bears necessary to facilitate such a monitoring strategy; (3) body condition can mask habitat decline if bears are travelling farther to secure alternative foods to maintain their body condition, which increases the risk of human-bear conflicts and mortalities.

Several peer reviewers suggested that although not necessary given the proposed standards for habitat management combined with monitoring of body condition and stable isotope patterns, it would be desirable to map high-caloric foods and/or seasonal important foods, particularly during hyperphagia, to understand their spatial and temporal distribution. Since population trends are to be measured using Kaplan-Meier methods these would provide direct measures of the important foods, and would lead to further understanding of the relationships between these foods and body condition, isotopes, and individual performance (cub production and survival) which would enable better predictions of the effects of changing climate. This reviewer also states using the telemetry locations to build a reliable, habitat quality basemap, in combination with OMRD, TMRD, human settlement and recreational use maps, would provide a functional habitat map that could enable road closures and security areas to be in areas most important to bears while not encumbering people with road closures where a high road density does not matter much to bears. Over time, with a good, representative sample of bears with GPS collars, such a map will become apparent using simply the raw GPS locations – they will be piled on top of each other in good habitats. A statistical analysis, however, may help separate the influence of human use from habitat quality, but it may not even be needed. Then, with an understanding of the relative importance of each season on bear numbers, the habitats important to the population can be identified and increasingly isolated from people – helping both bears and human safety. Another suggested that spatially understanding seasonal distribution of foods and

detection of C-4 foods using stable isotopes may indicate when bears switch from natural to anthropogenic foods. For example, a bear switching from natural meat sources to livestock would not cause a change in δ15N and a decline in δ15N may be the result of a good berry production year. One peer reviewer cautioned that "Relationships between changing diets, changing abundance of various foods, changes in both black and grizzly bear densities (i.e. inter and intra specific competition), and spatial and seasonal trends in body condition for each age, sex, and reproductive status of females is complex and monthly samples of bears captured and measured may need to be well distributed spatially resulting in a need to handle many bears." They suggested that a baseline of body condition be developed for the "2011 era" by month and BMU, sex, age class, and female reproductive status to assess body condition as a monitoring tool.

Response: We recognize that stable isotope analysis and body condition from captured bears do not provide a complete analysis of habitat quality by themselves. However, this information will serve as indicators for possible changes in food availability over time. When combined with monitoring of vital rates (i.e., survival, reproductive rate, mortality cause and location), population trend, and the habitat baseline, stable isotope analysis and body condition serves as detect early changes in habitat productivity and allow for adaptive management. For example, the databases for mortality and conflicts, including cause and location, will provide information if there is no change in the amount of meat being consumed by grizzly bears but they are consuming more livestock. As acknowledged by several peer reviewers, mapping habitat use by season would be desirable, but it is not necessary for the recovery of the NCDE grizzly bear population.

Issue 15: Food monitoring: Multiple commenters suggested that the HBRC should put more emphasis on the assessment of grizzly bear food resources and how they may change over time given the predicted changes in vegetation and ungulate management, human development, and climate conditions. Suggestions for long-term food studies included documentation of the distribution and seasonal availability of preferred foods such as berries, whitebark pine, mushrooms, moth sites, gravel bed river floodplains, riparian areas, fisheries, army cutworm moths, ants, and ungulates.

Some commenters stated that the HBRC should impose restrictions on human use and development in areas that contain high value grizzly bear food sources (e.g., huckleberries (McLellan 2015)) to prevent human-bear conflict. Commenters also stated that requiring mapping of key foods would provide managers the ability to predict bear movements and implement strategies to prevent conflicts in areas with high human use. Commenters stated that it has been repeatedly documented that in years of poor berry production bears expand their search for alternative foods which leads to higher instances of conflict and increased bear mortality. Some commenters were concerned with a "berry famine" that correlated with an increase in bear deaths and rates (McLellan 2015). Productive huckleberry fields take 30 to 40 years to return post-fire. Habitat conditions have deteriorated in the core of the ecosystem as a

result of fires, extirpation of whitebark pine post-1990, and the "berry-famine," causing bears to move to the periphery of the ecosystem.

Response: Great variability in grizzly bear diets has been found between individuals, seasons, and years. Because of this wide variation, it is infeasible to maintain on-the-ground monitoring of availability and use of individual food sources. Instead, the Conservation Strategy proposes to monitor the habitat objectives in combination with the stable isotope analysis to assess any changes in the overall assimilated diet and the physiological condition of animals through bioelectrical impedance values (NCDE Subcommittee 2018, Chapter 3). These data will provide insights into possible changes in food availability and nutritional condition of bears over time. See the response to Issue 21 for comments about increases in human recreational activities.

Issue 16: Habitat monitoring: Several commenters contend that HBRC monitoring should include an assessment and long-term plan for directly monitoring habitat conditions and food source availability in order to protect adequate habitat in light of potential environmental changes such as large landscape fire, effects of vegetation treatments, and the effects of global climate change. Some commenters provided recommendations on specific parameters to be monitored including: distribution of attractants; road densities and secure habitat; spatially-explicit indicators of habitat productivity; remotely-sensed normalized difference vegetation index (NDVI), greenness, and Actual Evapotranspiration (AET); avalanche chutes via aerial photography and advanced very high resolution radiometer (A VHRR); extent, location, and annual production of important berries; army cutworm moth sites and levels of bear use of these sites; extent of regenerating forest using USFS inventories and remotely sensed NDVI; extent of closed-canopy forest using remotely-sensed NDVI and A VHRR as it becomes available. Commenters state that these metrics are either directly related to current causes of most grizzly bear deaths in the NCDE or important habitat features that affect the productivity and densities of grizzly bear populations in this ecosystem and would be important proxies for birth and death rates that would provide signals of potentially improving or deteriorating conditions well in advance of when these changes would show up in population trend. One commenter suggested shifting to a population monitoring model utilizing hair-sample DNA and camera monitoring to ensure that a productive bear population dynamic exists. Lastly, one commenter suggested monitoring strategies already exist to detect "early warnings" (Biggs *et al.* 2009; Drake and Griffen 2010; Carpenter *et al.* 2011; Dai *et al.* 2012; Barnovsky *et al.* 2012; Daos and Bascompte 2014; Martin *et al.* 2015; Doncaster *et al.* 2016; Litzow and Hunsicker 2016; Pace *et al.* 2016; Jarvis *et al.* 2016; Seekell 2016).

Response: The Service's policy states that biological criteria and threats-based criteria should be a part of recovery plans. We previously developed biological criteria (USFWS 1993); these HBRC serve as the threats-based criteria. At the time of listing, the the Service determined that grizzly bears were threatened, in part, by destruction, modification, or curtailment of habitat. Specifically, grizzly bear range was reduced, and land use practices, including livestock grazing, timbering and construction of roads and trails into areas that were formerly inaccessible, resulted in making bears more accessible to legal hunters, illegal poachers, human-bear conflicts. These

HBRC directly address these threats. As set forth in these HBRC, the NCDE Monitoring Team will monitor secure core and motorized route access, livestock allotments, and developed recreation sites. In addition, they will monitor stable isotope ratios, body condition, and several demographic criteria (NCDE Subcommittee 2018, Chapters 2–3). The signatories to the Conservation Strategy have committed to reviewing and updating the Conservation Strategy, including monitoring protocols, based on the best available science (NCDE Subcommittee 2018, Chapter 5). While monitoring other habitat variables may be beneficial to grizzly bears, it is not necessary nor feasible for recovery purposes.

Issue 17: Developed site criteria: Several commenters expressed concern with the standards for allowing increases in developed recreational sites. Many commenters stated that the allowance for one new campground or expansion every ten years in each Bear Management Unit (BMU) would not meet the HBRC objective to maintain the 2011 baseline for secure core habitat. Peer reviewers and commenters state that there is no clear definition regarding the size or extent of a single development that would be allowed which creates a wide range of uncertainty where one site could mean a campground with 10 tent sites or one with 50 sites. They note that with 23 BMUs, there could be 23 new or expanded developed sites within 10 years, and after 50 years more than 100 new or expanded developed sites along with the ancillary infrastructure, which would greatly increase the risk of habituation, management conflict and mortality to grizzly bears. In addition, they state that the assumption that this level of expansion is acceptable, because it was compatible with an expanding grizzly bear population in the past, ignores the cumulative impacts of past and future expanded recreation sites, and whether or not there exists some saturation point, beyond which the density of developed sites renders the habitat no longer secure or useful for grizzly bears. Recommendations from commenters included: (1) no expansion of developed sites in the PCA; and (2) application of a baseline and standards for developed sites in Zones 1 and 2. Peer reviewers supported monitoring the effect of increases in developed recreation sites, including winter sites (e.g., ski areas) that may spill over into summer use.

On the other hand, some commenters contend that the relationship between overnight recreation sites and the displacement of grizzly bears is overstated and not supported by available science.

Response: The primary concern regarding developed recreation sites is not displacement or fragmentation but rather the potential for bear mortality or removal as a consequence of habituation and/or food conditioning (Gunther *et al.* 2004). One of the most effective ways to prevent human-grizzly bear conflicts and increase grizzly bear survival on public lands is to require users and recreationists in grizzly bear habitat to store their food, garbage, and other bear attractants so that they are inaccessible to bears. Securing potential attractants can prevent bears from becoming food conditioned and displaying subsequent unacceptable aggressive behavior. Storing attractants in a manner that prevents bears from accessing them is effective in limiting grizzly bear mortality, human-grizzly bear encounter, and human-grizzly bear conflicts. Attractant storage rules have been implemented on Federal, Tribal, and most State lands within

the Recovery Zone. An interactive map of food storage orders is available at: http://igbconline.org/food-storage-regulations-2/.

Most of the grizzly bears killed or removed by management agencies in the NCDE in the past had been involved in conflicts related to unsecured attractants such as garbage, bird feeders, pet/livestock feed, and human foods. Although the majority of these conflicts and mortalities occurred on private lands, developed recreation sites on public lands remain of concern. For this reason, the NCDE Grizzly Bear Conservation Strategy concluded that it is important to limit increases in the number or capacity of developed recreation sites to levels that occurred during the period when the grizzly bear population was stable to increasing through Section 7 consultation (NCDE Subcommittee 2018, Chapter 3). Because there is not a strong pattern of grizzly bear mortalities associated with developed recreation sites in the NCDE, we do not believe that precluding any increases within the primary conservation area is necessary. The Conservation Strategy sets forth habitat management objectives for areas outside of the Recovery Zone (NCDE Subcommittee 2018, Chapters 1 and 3). Habitat management in Zone 1 is focused primarily on constraining motorized access and limiting the risk of grizzly bear mortality, for example through proper handling and storage of food/attractants. To meet the purpose of Zone 1, it is not necessary to constrain developed recreation sites in Zone 1. The demographic monitoring area encompasses both the PCA and Zone 1, ensuring that the number and sources of mortality will be tracked and can be addressed if future problems develop.

Issue 18: Livestock allotments: Multiple commenters provided input regarding livestock allotments. Concerns over the presence of livestock allotments included: (1) increased grizzly bear mortality as it continues to grow and expand; and (2) that the impacts to grizzly bears was underestimated because allotments on Montana school trust lands were not considered in the HBRC. Suggestions for modifying the regulation of livestock allotments included: (1) considering the location of the allotment as some areas will have an increased likelihood of conflict with grizzly bears (e.g., west of Augusta) compared to other areas (e.g., north of Drummond); (2) closing all inactive allotments and prohibiting new allotments or increases in AUMs in the PCA, Zone 1 (including the DCAs) and/or Zone 2; (3) monitoring existing allotments for conflict and voluntarily phasing allotments out when appropriate; and (4) prohibiting allotments within areas of grizzly bear habitat.

We received comments from peer reviewers regarding the establishment of boneyards. One peer reviewer questioned the need for the establishment of boneyards at all given that they serve as a major attractant for grizzly bears (Morehouse and Boyce 2011; Northrup and Boyce 2012) and recommended efforts to remove boneyards such as those done by the Blackfoot Challenge and Waterton Biosphere. They recommended additional regulations of boneyards included: (1) details regarding where boneyards will be allowed, (2) minimum distances from other livestock pastures, and (3) minimum distances from roads or trails. Another peer reviewer expressed concern that by not allowing boneyards to be established on National Forest lands they may become an attractant on private land. In addition they cautioned that diversionary feeding (i.e.,

boneyards) may only be successful for a limited time if the practice leads to larger bears that become reliant on deadstock to meet their nutritional needs.

On the other hand, some commenters expressed a desire for increased protections of livestock from depredation.

Response: Grizzly bear mortality is expected to increase as the population increases and distribution expands into areas where there are more private than public lands. The cause and location of grizzly bear mortalities and conflicts is monitored by the NCDE monitoring team. Between 1975 and 2017, there was only 1 management removal of a grizzly bear inside the Recovery Zone on Federal lands as a result of livestock depredation. Therefore, we conclude that the current standards for management of livestock allotments on Federal lands has been successful at minimizing conflicts. The HBRC only applies to Federal lands. However, the Conservation Strategy commits to continuing to monitor livestock allotments and using adaptive management on all Federal, State, and Tribal lands. In addition, the Conservation Strategy extends the livestock allotment objectives from the Recovery Zone into Zone 1 to meet the objective of minimizing grizzly bear mortality in Zone 1 (NCDE Subcommittee 2018, Chapter 3). The Conservation Strategy also includes a recommendation to phase out sheep allotments, because of the higher likelihood of conflicts with sheep than cattle, with willing permittees as the opportunity arises.

Boneyards can be helpful in reducing conflicts by removing carcasses away from livestock grazing area, but can also be problematic when established in an inappropriate area. Boneyards will not be established on Federal lands in the Recovery Zone and will be located in areas that will minimize the risk of habituating grizzly bears to human presence.

Issue 19: Climate change: Numerous commenters stated that the 2011 baseline is outdated, ignores the effects of climate change upon habitat conditions, and fails to properly account for how conditions in existence in 2011 might actually change in the future. Commenters contend that the increased heat and drought resulting from the effects of climate change will directly affect bears and habitat conditions. Some commenters state further study of the effects of climate change on NCDE grizzly bears, particularly as it relates to the availability of food due to adverse effects on the quality of habitat, must be conducted and considered in the recovery criteria. One commenter contends that the Service, because of the ongoing effects of climate change, "cannot establish a threshold of minimal habitat values to be maintained within each Cumulative Effects Analysis Unit in order to ensure that sufficient habitat is available to support a viable population."

Commenters contend that global climate change is resulting in a reduction in snow pack, shifts in denning times, shifts in the abundance and distribution of natural foods, and changes in fire frequency and intensity. Reduced snowmelt run-off and soil moisture will decrease food availability and change the distribution of vegetation. The decreased snowpack will decrease avalanche chutes, which are an important forage area for bears upon den emergence. In addition,

decreased winter severity reduces the availability of winter-killed ungulate carcasses upon den emergence in the spring. Bojarska and Silva (2012) found that temperature and snow conditions (depth and duration) were the "most important factors affecting the feeding ecology of the brown bear." One commenter expressed concerns that changes in the frequency and severity of fires can reduce canopy cover and reduce berry crops.

Response: We acknowledge that there is uncertainty as to whether maintaining baseline habitat conditions will be sufficient in the face of future ecological challenges such as private land development and climate change. However, the NCDE Monitoring Team will compile and evaluate the population and habitat conditions on Federal, State and Tribal lands per the established monitoring schedule in the Conservation Strategy to assure that the desired population objectives are being achieved, and if needed, to recommend appropriate management adjustments as discussed in (NCDE Subcommittee 2018, Chapters 1, 3, 5).

The cumulative effects model was designed to predict the inherent productivity of habitat and the cumulative effects of human activities on bear use of that habitat. The model relies on relative value coefficients to calculate habitat value and habitat effectiveness indices across a large landscape. The indices were intended to provide managers with a tool to compare or predict how habitat value and habitat effectiveness indices change over time in response to management actions. However, several aspects of the model make it difficult to interpret the results. Many of the inputs to the model are expert opinion rather than empirically derived data from grizzly bears. There is substantial variation in annual food source availability and in individual bear behavior that is not accounted for in the model. Habitat coefficients derived in one part of the ecosystem may not be reliably extrapolated to geographically distant areas. Ultimately, it is unknown what a change in the index value actually means to the bear population. Stenhouse *et al.* (2003) evaluated a cumulative effects model but were unable to demonstrate a correlation between model predictions and actual habitat use by radio-collared bears in Canada. Due to these limitations of cumulative effects models, the Conservation Strategy has instead taken the approach of providing guidance for and monitoring of habitat and population trends in relation to an established baseline.

Great variability in grizzly bear diets has been found between individuals, seasons, and years. Because of this wide variation, it is infeasible to maintain on-the-ground monitoring of availability and use of individual food sources. Instead, the Conservation Strategy proposes to monitor the habitat objectives in combination with the ratio of stable isotopes to assess any changes in the overall assimilated diet and the physiological condition of animals through bioelectrical impedance values. These data will provide insights into possible changes in food availability and nutritional condition of bears over time.

Climate change may result in a number of changes to grizzly bear habitat, including a reduction in snowpack levels, shifts in the abundance and distribution of some natural food sources (Rodriguez *et al.* 2007), and changes in fire regimes (Nitschke and Innes 2008; McWethy *et al.* 2010) that could contribute to shortening of the denning season (Leung *et al.* 2004) and shifts in

denning times (Craighead and Craighead 1972; Van Daele *et al.* 1990; Haroldson *et al.* 2002, Johnson *et al.* 2018 (black bears)). Most grizzly bear biologists in the U.S. and Canada do not expect habitat changes predicted under climate change scenarios to directly threaten grizzly bears (Servheen and Cross 2010). These changes may even make habitat more suitable and food sources more abundant. However, these ecological changes may also affect the timing and frequency of human-grizzly bear interactions and conflicts (Servheen and Cross 2010).

Climate change could create temporal and spatial shifts in grizzly bear food sources (Rodriguez *et al.* 2007; Roberts *et al.* 2014). Changes in plant community distributions have already been documented, with species' ranges shifting further north and higher in elevation due to environmental constraints (Walther *et al.* 2002; Walther 2003; Walther *et al.* 2005) or outbreaks of insects or disease (Bentz *et al.* 2010). A net loss in forested areas is anticipated as forest contraction occurs more rapidly than forest expansion, with an expected increase in productivity in montane, subalpine, and alpine areas and a decrease in productivity in lower elevation, warmer, and drier sites (Whitlock *et al.* 2017). It is unclear whether avalanche chutes, an important habitat component to grizzly bears, will decrease, possibly as a result of decreased snowpack, or increase, as a result of increases in "rain on snow" events that may decrease the stability of snowpack. Changes in vegetative food distributions also may influence other mammal distributions, including potential prey species like ungulates (White *et al.* 2018). Montana is experiencing a longer growing season with an earlier spring and extended summer (Whitlock *et al.* 2017). While the extent and rate to which individual plant species will be impacted is difficult to foresee with any level of confidence (Walther *et al.* 2002; Fagre *et al.* 2003; Roberts *et al.* 2014), most bear biologists agree that grizzly bears are flexible enough in their dietary needs that they will not be impacted directly by ecological constraints such as shifts in food distributions and abundance (Servheen and Cross 2010).

Fire regimes can affect the abundance and distribution of some vegetative bear foods (e.g., grasses, berry producing shrubs) (LeFranc *et al.* 1987). For instance, fires can reduce canopy cover which usually increases berry production. However, excessive canopy removal due to fires or vegetation management may decrease berry production through subsequent moisture stress and exposure to sun, wind, and frost (Simonen 2000). Fire frequency and severity may increase with late summer droughts predicted under climate change scenarios (Nitschke and Innes 2008; McWethy *et al.* 2010; Whitlock *et al.* 2017). Increased fire frequency has the potential to improve grizzly bear habitat. Low to moderate severity fires may be the best for short-term improvements while high severity fires can produce long-lasting berry fields if the severity does not damage rhizomes (Simonen 2000; Zager *et al.* 1983). High severity fires may reduce grizzly bear habitat quality immediately afterwards by decreasing hiding cover and delaying regrowth of vegetation, although Blanchard and Knight (1996) found that increased production of forb foliage and root crops in the years following the high intensity, widespread Yellowstone fires of 1988 benefited grizzly bears. We do not anticipate altered fire regimes will have significant negative impacts on grizzly bear survival or reproduction in the NCDE, despite its potential effects on vegetation.

Issue 20: Non-recreation Development: Several commenters were concerned that the HBRC do not adequately address the potential impacts of non-recreation development, including future impacts from subdivision, exurban sprawl, housing, and resource extraction. Some commenters stated that increased development will result in a rapidly increasing human presence in the NCDE which may compound habitat fragmentation, increase incidents of bear-human conflict, and increase vehicle caused mortalities. One commenter stated that the HBRC should contain guidance to locate human facilities outside of highly productive bear habitat in order to minimize the potential for disturbance, conflicts, and habituation. Some commenters state that the HBRC do not adequately consider potential impacts of development associated with resource extraction activities (e.g., timber harvest, mining, and oil and gas permits), including: (1) arousal of denning bears, which may cause den and cub abandonment; (2) long-term habitat damage resulting from "temporary" projects; (3) reduced forest canopy from logging or salvage operations; (4) increased habitat fragmentation; (6) increased bear-human conflicts (e.g., unsecured attractants). In addition, increased roads for projects destroys habitat, increases mortality from vehicle collisions, displaces bears, and increases access for hunters and poaches. Some commenters expressed that activities such as oil and gas drilling and the use of off-road vehicles should not be allowed within areas of grizzly bear habitat. One commenter suggested that the HBRC compensate for the increase in the number of people visiting or living in grizzly bear range with a proportional decrease in the open roads and trails because "human numbers have roughly the same effect as road mileage on presence of bears at a regional scale." On the other hand, a few commenters expressed a desire for expansion of timber harvest.

Response: We acknowledge that there is some uncertainty as to whether maintaining baseline habitat conditions will be sufficient in the face of future habitat changes such as private land development. However, the omnivorous diet, large home range size, and behavioral flexibility of grizzly bears gives us reasonable confidence that the approach of maintaining baseline conditions that coincided with an increasing population will be successful in sustaining the population. Further, 78 percent of the Recovery Zone is comprised of Federal land, and 67 percent of the lands are protected areas, such as Wilderness Areas, Wilderness Study Areas or Inventoried Roadless Areas, that would not be subject to future impacts from development such as subdivisions, exurban sprawl, and housing construction. Habitat conditions on Federal, State and Tribal lands, as well as trends in private land development, will be monitored according to an established schedule (NCDE Subcommittee 2018, Chapter 3). Population and habitat monitoring data also will be compiled and evaluated (NCDE Subcommittee 2018, Chapters 2 and 3). The Conservation Strategy documents the impact that have occurred on private lands, and the substantial efforts that management agencies have devoted toward private landowner outreach to reduce human-grizzly bear conflicts. The signatories of the Conservation Strategy are committed to continuing those efforts (NCDE Subcommittee 2018, Chapters 1, 4, and 5).

The Conservation Strategy includes stipulations for no surface occupancy for new oil, gas, and hardrock mining leases on USFS lands inside the Recovery Zone (NCDE Subcommittee 2018, Chapter 3). We do not have the authority to change the terms of valid existing rights. The project restrictions set forth in the secure core habitat and motorized route access criteria will

limit the level of development in the Recovery Zone to a level that existed during a period that the NCDE grizzly bear population was increasing.

Issue 21: Human recreational activities: Several commenters opined that the HBRC do not adequately address potential impacts from recreational activities and future increases in recreational use. Potential impacts that commenters were concerned with are: (1) disturbance from high quality areas (Gunther), (2) increased mortality (Gunther; Memo from K.C. Kendall to IGBC members 1994; Mattson 2002), and (3) habitat fragmentations. Commenters contend that a new proposal by Montana's governor to expand recreation in the back country will add significant human contact and pressure. Some commenters were particularly concerned with mountain biking and extreme trail running as they may cause disturbance that is similar to that of motorized access because they occur at faster speeds than traditional non-motorized access. These activities may even result in increased numbers of human injuries/death and bear mortality (Servheen *et al.* 2016). Commenters suggested that because Mattson *et al.* (2011) showed that erratic movements are more likely to provoke attacks by cougars, the Service should conduct analysis of grizzly bear attacks to determine if they are associated with particular human behaviors. Some commenters expressed concern with H.R. 1340 out of the House Committee on Natural Resources because it would allow mountain biking and other wheeled devices in Wilderness Areas if passed.

Response: Inside the Recovery Zone, the vast majority of lands, 67 percent, are protected areas (Wilderness Areas, Wilderness Study Areas, or Inventoried Roadless Areas) (NCDE Subcommittee 2018, Chapter 3). Motorized recreation during the summer, spring, and fall inside the Recovery Zone will be limited to existing roads and motorized trails as per the standards in the Conservation Strategy that restrict increases in roads or motorized trails. Recreation at developed sites such as lodges and campgrounds will be limited by the developed sites habitat standard described in the Conservation Strategy. Ongoing information and education efforts are an important contributing factor to successful grizzly bear conservation and will continue under the Conservation Strategy (NCDE Subcommittee 2018, Chapter 5). The number and capacity of existing developed sites on Federal lands has had minimal increases from the 2011 baseline through Section 7 consultation and increases will be limited to this level (1 per BMU per decade) under the Conservation Strategy (NCDE Subcommittee 2018, Chapter 3).

Current and projected levels of non-motorized recreation, including mountain biking, do not occur at a level that requires limitations. The Conservation Strategy's adaptive management approach will allow managers to respond to detrimental levels of non-motorized recreation, should they occur, on a case-by-case basis and also provide managers with the data necessary to determine if ecosystem-wide limitations may be necessary in the future.

Issue 22: Other criteria: We received several comments with suggestions for additional HBRC, including: (1) an assessment of impacts of human activities to riparian zones and fish populations including the introduction of potentially harmful levels of pollutants like polychlorinated biphenyls (PCBs), mercury, nitrogen, and phosphorus; (2) food storage orders

for recreationists in the NCDE that are consistent between land management agencies; and (3) the potential impacts of snowmobiling. Commenters state that there has been increased use of snowmobiles outside of approved seasons of use and in areas that should not function as snowmobile trails. The period of snowmobile use is "inappropriately" extended by the clearing of brush and deadfall. In addition, commenters were concerned that the HBRC do not address the potential displacement of grizzly bears from den sites (e.g, den abandonment) by snowmobile use. In particular, females with cubs are particularly vulnerable in the spring to late season snowmobiling, potentially causing early den emergency or displacement from the den site which may lead to abandonment and/or decreased fitness of cubs. A lack of available information is not a justification for not protecting grizzly bears against the threat of snowmobiling.

Response: The HBRC set forth in the recovery plan supplement address the threats and will meet the needs of a recovered grizzly bear population in the NCDE. We have no information leading us to believe that pollutants in riparian zones are a threat to the NCDE grizzly bear population.

As human populations and recreational activities have increased in the NCDE, efforts have been made by Federal, State, and Tribal agencies to reduce human-grizzly bear conflicts through food storage orders. Food storage orders have been expanded as the NCDE grizzly bear population expands. Within the Recovery Zone (aka primary conservation area) and Zone 1, food storage rules have or will be implemented on Federal, Tribal and most State land (NCDE Conservation Strategy 2018, Chapters 1 and 4). Food storage orders are also in place on most Federal and State lands within Zone 2.

Although snowmobiling has the potential to disturb bears while in their dens and after den emergence from their dens in the spring, the best available information suggests that current levels of snowmobile use are not appreciably reducing survival or recovery of grizzly bears. Most information is largely anecdotal, although there is sufficient information to indicate that some individual bears have the potential to be disturbed. There have been no documented cases of grizzly bears abandoning dens as a result of snowmobiling in the NCDE (Roberts 2018, *in litt.*). Approximately 89 percent of all denning habitat is within designated wilderness or other areas that are closed to snowmobiling (USDA FS 2017c, p. 56). The Forest Plan Revision for the Flathead NF and the Forest Plan Amendment for the Helena-Lewis and Clark, Kootenai, and Lolo NFs include a standard that would require no net increase in the percentage of area of miles of routes designated for over-snow vehicle use during the den emergence time period (USDA FS 2017a, p. 2; USDA FS 2017b, p. 15). Because the potential for disturbance exists, the Conservation Strategy will continue to evaluate new science as it becomes available and the Conservation Strategy will be revised as necessary (NCDE Subcommittee 2018, Chapters 1 and 5).

Issue 23: Human-bear conflicts: Several comments were received regarding human safety and potential impacts to activities on private lands. Commenters stated that the Recovery Plan should set out guidance for the Service, States, and other partners on methods to minimize

threats to humans, from grizzly bears and criteria that may be used to keep grizzly bears out of towns and peoples' backyards. Some commenters contend that people who at one time were supportive of grizzly bear recovery have become less supportive as they feel that an increasing bear population may threaten their families and livestock's safety. Commenters also noted that the NCDE 2013 Grizzly Bear Conservation Strategy in Chapter 4 speaks to the importance of maximizing human safety and minimizing property loss and that currently "human conflicts are not adequately addressed, there are negative consequences for the individual bear and the people involved, and support for grizzly bear management and conservation in the NCDE is undermined." Commenters advocated for continuation and expansion of efforts to provide public education and address human conflict situations in a timely manner.

Several commenters stated that trash management, animal husbandry practices (such as using electric fencing, sanitary carcass removal, using lambing or calving sheds), public education, code enforcement and hazing could alleviate human-bear conflicts. Commenters also suggest that in addition to increasing education/co-existence programs for homeowners and recreationists, the Service must also monitor and account for ongoing threats such as tracking the numbers and locations of bear attractants and working to minimize conflicts to avoid excessive grizzly bear mortalities as a result of management removals. In general, throughout all of Zone 2, including the Divide, Elkhorns and Big Belt Geographic Areas, we recommend the prevention of conflicts through proactive measures, rather than simply reacting to conflicts which typically results in dead bears. Grizzly bears are less likely to come in conflict with people if they have both secure and suitable habitat with adequate bear foods available to them (Gunther *et al.* 2004). Without this, there will most certainly be conflicts and thus, increased mortality of bears.

Commenters suggested that "Understanding how and where food sources will change (and how quickly declines could occur) was identified as important to knowing where and how to focus bear-human conflict management efforts and reduce human-related mortality. It will also inform whether bears need additional or different secure habitat areas to acquire sufficient resources in the future (Servheen and Cross 2010)." Another commenter suggested seasonal closures of highly protective habitats (i.e., known high-quality food areas) to reduce conflicts.

Response: Although the objective of the HBRC are limited to establishing HBRC on Federal lands that will meet the needs of a recovered grizzly bear population, we recognize the importance of outreach and information and education to the long-term conservation of the NCDE grizzly bear population. Reducing conflicts as a result of motorized access and livestock allotments are two components of the HBRC. Details relating to implementing effective outreach efforts and preventing and responding to human-grizzly bear conflicts are in the Conservation Strategy (NCDE Subcommittee 2018, Chapters 1 and 4). Management agencies devote significant efforts toward outreach programs for hunters, recreationists, and private landowners to minimize human-grizzly bear conflicts and to manage bears and potential site-specific conflict situations. These efforts will continue under the Conservation Strategy (NCDE Subcommittee 2018, Chapter 4). In addition, food storage orders are in place on most Federal, State, and Tribal lands within the NCDE (NCDE Subcommittee 2018, Chapters 1 and 4). Please

see the interactive map of food storage orders on the Interagency Grizzly Bear Committee webpage at: http://igbconline.org/food-storage-regulations-2/. Lastly, the NCDE Monitoring Team will continue to track causes and locations of conflicts and mortalities as part of the ongoing monitoring efforts, which will allow for adaptive management. We feel confident that we will be able to detect the consequences of significantly reduced habitat productivity.

Issue 24: Private lands: Some commenters suggested that the private land be removed from the primary conservation area and moved to at least, Zone 1, to allow for more liberal management of the grizzly bears on those lands. This land that is mostly in agriculture production or human settlements may have traditional and nontraditional food sources for bears, but is not socially appropriate or reasonable habitat for the bears. Commenters also stated that the outline for Zone 3 needs to be moved to the east. When the zone was formed grizzly bears were rarely seen in that area. There is now an unexpected increase in the numbers of bears and distance they have spread from the Primary Conservation Area. Privately owned agriculture land is not appropriate habitat for grizzly bears. While population and mortality data may not be collected in Zone 3, the animals that wander past that currently defined border to the east will still be considered protected after delisting. Moving the Zone 3 border to meet the border of the North and South Dakota and Wyoming would eliminate the unforeseen issue of bears remaining under the Act in an area presenting new management issues.

Response: As a listed species under the Act, grizzly bears have the same protections as a threatened species throughout the lower-48 States outside of the Greater Yellowstone Ecosystem DPS that was delisted in 2017 (82 FR 30502, June 30, 2017). These HBRC apply only to Federal lands within the NCDE Recovery Zone. Discussions regarding moving the Zone 3 or DPS boundary are not pertinent to this HBRC.

Issue 25: Corrections and clarifications: A few of the comments contained suggested corrections to information contained in the HBRC as well as requests for clarification. For example, the Draft Supplement states that both core habitat and road densities should be maintained at or above 2011 baseline levels. Commenters recommend that this criterion be rephrased to clarify that the core habitat is maintained above the 2011 baseline, while the open and total road density is kept below the 2011 baseline. Commenters also asked the criteria to be clarified such that they apply to each bear management unit or subunit and the Recovery Zone.

Response: Changes were made to the final HBRC to incorporate the suggested corrections and clarifications.

APPENDIX B

Table 1. Habitat baseline (corrected as of 2014) of motorized access for each BMU subunit in the NCDE Recovery Zone. OMRD = percentage of subunit that is ≥ 1.0 miles/square mile. TMRD = percentage of subunit that is ≥ 2.0 miles/square mile. CORE = percentage of subunit that is secure core habitat.

BMU	Subunit Name	Principal Agency	OMRD	TMRD	CORE
BATM	Badger	LCNF-Rocky Mtn Front RD	0	0	94
BATM	Heart Butte	LCNF-Rocky Mtn Front RD	1	0	81
BATM	Two Medicine	LCNF-Rocky Mtn Front RD	2	1	87
BGSM	Albino Pendant	FNF-Spotted Bear RD	0	0	100
BGSM	Big Salmon Holbrook	FNF-Spotted Bear RD	0	0	100
BGSM	Black Bear Mud	FNF-Spotted Bear RD	0	0	100
BGSM	Brushy Park	FNF-Spotted Bear RD	0	0	100
BGSM	Buck Holland	FNF-Swan Lake RD	24	41	49
BGSM	Burnt Bartlett	FNF-Spotted Bear RD	0	0	100
BGSM	Hungry Creek	FNF-Spotted Bear RD	0	0	100
BGSM	Little Salmon Creek	FNF-Spotted Bear RD	0	0	100
BGSM	Meadow Smith	FNF-Swan Lake RD	20	54	41
BGSM	White River	FNF, Spotted Bear RD	0	0	100
BITE	Birch	LCNF-Rocky Mtn Front RD	0	0	93
BITE	Teton	LCNF-Rocky Mtn Front RD	12	4	75
BNKR	Big Bill Shelf	FNF-Spotted Bear RD	11	7	87
BNKR	Bunker Creek	FNF-Spotted Bear RD	5	3	92
BNKR	Goat Creek	FNF-SLRD & MT DNRC	23	59	39
BNKR	Gorge Creek	FNF-Spotted Bear RD	0	0	100
BNKR	Harrison Mid	FNF, - Spotted Bear RD	1	0	99
BNKR	Jungle Addition	FNF-Spotted Bear RD	19	17	68
BNKR	Lion Creek	FNF-SLRD & MT DNRC	19	47	51
BNKR	South Fork Lost Soup	FNF-SLRD & MT DNRC	25	49	40
BNKR	Spotted Bear Mtn	FNF-Spotted Bear RD	20	18	68
CODV	Pentagon	FNF-Spotted Bear RD	0	0	100
CODV	Silvertip Wall	FNF-Spotted Bear RD	0	0	100
CODV	Strawberry Creek	FNF-Spotted Bear RD	0	0	100
CODV	Trilobite Peak	FNF-Spotted Bear RD	0	0	100
DELK	Falls Creek	LCNF-Rocky Mtn Front RD	0	0	85
DELK	Scapegoat	LCNF-Rocky Mtn Front RD	2	0	83
HGHS	Coram Lake Five	FNF-Hungry Horse RD	30	46	14
HGHS	Doris Lost Johnny	FNF-Hungry Horse RD	57	19	36
HGHS	Emery Firefighter	FNF-Hungry Horse RD	19	20	53
HGHS	Peters Ridge	FNF-HHRD & SLRD	52	25	34

BMU	Subunit Name	Principal Agency	OMRD	TMRD	CORE
HGHS	Riverside Paint	FNF-Hungry Horse RD	19	16	72
HGHS	Wounded Buck Clayton	FNF-Hungry Horse RD	28	30	65
LMFF	Dickey Java	FNF-Hungry Horse RD	9	0	85
LMFF	Lincoln Harrison	Glacier NP	0	0	98
LMFF	Moccasin Crystal	FNF-Hungry Horse RD	8	1	81
LMFF	Muir Park	Glacier NP	0	0	98
LMFF	Nyack Creek	Glacier NP	0	0	100
LMFF	Ole Bear	Glacier NP	0	0	94
LMFF	Pinchot Coal	Glacier NP	0	0	99
LMFF	Stanton Paola	FNF-Hungry Horse RD	8	3	83
LNFF	Anaconda Creek	Glacier NP	5	0	94
LNFF	Apgar Mountains	Glacier NP	15	4	81
LNFF	Canyon McGinnis	FNF-GVRD & FNF-TLRD	18	31	52
LNFF	Cedar Teakettle	FNF-Glacier View RD	35	36	24
LNFF	Dutch Camas	Glacier NP	6	0	93
LNFF	Lake McDonald	Glacier NP	13	5	85
LNFF	Lower Big Creek	FNF-Glacier View RD	18	20	66
LNFF	Upper McDonald Creek	Glacier NP	9	2	90
LNFF	Werner Creek	FNF-Glacier View RD	19	21	42
MSRG	Beaver Creek	FNF-Swan Lake RD	6	26	66
MSRG	Cold Jim	FNF-Swan Lake RD	18	57	43
MSRG	Crane Mtn	FNF-Swan Lake RD	28	56	26
MSRG	Crow	Flathead IR	6	3	92
MSRG	Glacier Loon	FNF-Swan Lake RD	22	43	45
MSRG	Hemlock Elk	FNF-Swan Lake RD	6	30	64
MSRG	Piper Creek	FNF-SLRD & MT DNRC	19	44	52
MSRG	Porcupine Woodward	FNF-SLRD & MT DNRC	28	73	15
MSRG	Post Creek	Flathead IR	10	5	87
MSRG	Saint Marys	Flathead IR	4	2	94
MLFK	Alice Creek	HNF-Lincoln RD	9	17	71
MLFK	Arrastra Mountain	HNF-Lincoln RD	15	19	75
MLFK	Monture	LNF-Seeley Lake RD	1	0	99
MLFK	Mor-Dun	LNF-Seeley Lake RD	17	17	78
MLFK	N-Scapegt	LNF-Seeley Lake RD	0	0	100
MLFK	Red Mountain	HNF-Lincoln RD	22	20	62
MLFK	S-Scapegt	LNF-Seeley Lake RD	10	14	79
MULK	Krinklehorn	KNF-Fortine RD	22	14	75
MULK	Therriault	KNF-Fortine RD	26	12	71
NFSR	Lick Rock	LCNF-Rocky Mtn Front RD	0	0	100
NFSR	Roule Biggs	LCNF-Rocky Mtn Front RD	0	0	100

BMU	Subunit Name	Principal Agency	OMRD	TMRD	CORE
NEGL	Belly River	Glacier NP	0	0	99
NEGL	Boulder Creek	Glacier NP & Blackfeet IR	18	13	76
NEGL	Chief Mtn	Glacier NP & Blackfeet IR	28	10	53
NEGL	Poia Duck	Glacier NP & Blackfeet IR	23	8	68
NEGL	Upper Saint Mary	Glacier NP	11	1	89
NEGL	Waterton	Glacier NP	0	0	100
RTSN	Mission	LNF-Seeley Lk RD & MFWP	23	57	33
RTSN	Rattlesnake	LNF-Missoula RD	3	13	86
RTSN	South Fork Jocko	Flathead IR	38	14	59
SUBW	South Fork Willow	LCNF-Rocky Mtn Front RD	8	2	88
SUBW	West Fork Beaver	LCNF-Rocky Mtn Front RD	12	4	84
SEGL	Divide Mtn	Glacier NP & Blackfeet IR	32	25	67
SEGL	Midvale	Glacier NP & Blackfeet IR	7	4	87
SEGL	Spot Mtn	Glacier NP & Blackfeet IR	10	3	79
STRV	Lazy Creek	MT DNRC	68	62	10
STRV	Stryker	MT DNRC	37	33	50
STRV	Upper Whitefish	MT DNRC	34	57	54
SLVN	Ball Branch	FNF-Spotted Bear RD	8	7	84
SLVN	Jewel Basin Graves	FNF-Hungry Horse RD	19	19	72
SLVN	Kah Soldier	FNF-Spotted Bear RD	19	19	68
SLVN	Logan Dry Park	FNF-HHRD & FNF-SBRD	30	33	52
SLVN	Lower Twin	FNF-Spotted Bear RD	9	2	91
SLVN	Noisy Red Owl	FNF-Swan Lake RD	22	14	59
SLVN	Swan Lake	FNF-Swan Lake RD	40	24	46
SLVN	Twin Creek	FNF-Spotted Bear RD	0	0	100
SLVN	Wheeler Quintonkon	FNF-HHRD & FNF-SBRD	25	18	66
TESR	Deep Creek	LCNF-Rocky Mtn Front RD	4	2	73
TESR	Pine Butte	LCNF-Rocky Mtn Front RD	6	2	71
UMFF	Flotilla Capitol	FNF-HHRD & FNF-SBRD	0	0	100
UMFF	Long Dirtyface	FNF-Hungry Horse RD	0	0	100
UMFF	Plume Mtn Lodgepole	FNF-HHRD & SBRD	0	0	100
UMFF	Skyland Challenge	FNF-Hungry Horse RD	20	17	63
UMFF	Tranquil Geifer	FNF-Hungry Horse RD	0	2	90
UNFF	Bowman Creek	Glacier NP	6	0	93
UNFF	Coal & South Coal	FNF-Glacier View RD	15	21	72
UNFF	Ford Akokala	Glacier NP	7	1	93
UNFF	Frozen Lake	FNF-Glacier View RD	10	4	86
UNFF	Hay Creek	FNF-Glacier View RD	24	16	55
UNFF	Ketchikan	FNF-Glacier View RD	16	3	72
UNFF	Kintla Creek	Glacier NP	3	0	96

BMU	Subunit Name	Principal Agency	OMRD	TMRD	CORE
UNFF	Logging Creek	Glacier NP	4	0	94
UNFF	Lower Whale	FNF-Glacier View RD	36	17	50
UNFF	Quartz Creek	Glacier NP	4	0	93
UNFF	Red Meadow Moose	FNF-Glacier View RD	25	17	55
UNFF	State Coal Cyclone	FNF-GVRD & MT DNRC	31	27	59
UNFF	Upper Trail	FNF-Glacier View RD	14	4	88
UNFF	Upper Whale Shorty	FNF-Glacier View RD	12	11	86
USFF	Basin Trident	FNF-Spotted Bear RD	0	0	100
USFF	Gordon Creek	FNF-Spotted Bear RD	0	0	100
USFF	Jumbo Foolhen	FNF-Spotted Bear RD	0	0	100
USFF	Swan	LNF-Seeley Lake RD	32	16	55
USFF	Youngs Creek	FNF-Spotted Bear RD	0	0	100

Table 2. Habitat baseline of developed recreation sites in each BMU in the NCDE Recovery Zone.

BMU Name	Recreational Residences	Campgrounds		Other Sites with Overnight Use		Admin. Sites
		# of Campgrounds	# of Campsites	# of Sites	Type of Capacity	
Badger Two Medicine	-	1	17	-	-	2
Big Salmon	32	5	66	3	8 cabins; 9 rooms	11
Birch Teton	7	3	23	1	6 cabins; 1 room	1
Bunker	-	8	57	3	17 cabins; 2 rooms; 4 bunkhouses	4
Continental Divide	-	-	-	-	-	4
Dearborn Elk	1	-	-	-	-	2
Hungry Horse	-	19	169	1	1 cabin	4
Lower Middle Fork Flathead	10	12	32	-	-	12
Lower North Fork Flathead	82	17	545	10	54 cabins; 2 bunkhouses; 186 rooms; 362 emp. beds	23
Mission Range	1	1	25	1	1 cabin	
Monture Landers Fork	-	5	47	1	1 cabin	8
Murphy Lake	-	17	109	5	5 cabins	1
Northeast Glacier	-	27	428	6	27 cabins; 350 rooms; 316 emp. beds	15
North Fork Sun River	-	-	-	-	-	5
Rattlesnake	-	1	3	1	1 cabin	1
Southeast Glacier	-	11	143	2	5 emp. beds	8
Sullivan	20	15	114	2	9 cabins; 1 room; 1 bunkhouse	10
Stillwater River	-	2	3	-	-	1
South Fork Sun Beaver Willow	74	7	72	5	20 cabins; 2 rooms; 3 bunkhouses; 10 RV	9
Teton Sun River	17	3	36	1	2 bunkhouses	6
Upper Middle Fork Flathead	-	2	21	2	2 cabins	5
Upper North Fork Flathead	7	24	184	6	6 cabins	21
Upper South Fork Flathead	-	-	-	1	1 cabin	6

Recreational Residences. These are full-time or seasonal recreational residences on Federal lands. We have no authority to limit increases in capacity at these existing sites so it is not reported for these residences. However, any new recreational residences will have to follow the developed recreational site standard.

Other Sites with Overnight Use. Cabin rentals, guest lodges with or without rooms and/or cabins, camps, etc. Capacity is the number of cabins, rooms, bunkhouses, employee beds (GNP) and RV sites.

Campgrounds. Campground development ranges from fully developed with all amenities to very minimal development and not much above a dispersed site. There are group sites included; however, the number accommodated at one group site is variable. Dispersed campsites are not counted here.

Administrative Sites	Administrative Sites include ranger stations, work centers, guard stations, active fire lookouts, etc. While these sites are not subject to the Developed Site standards, increases in the number of administrative sites on Federal lands will be minimized so they are reported here to provide transparency and accountability.

Table 3. Habitat baseline for active cattle and/or sheep grazing allotments in the NCDE Recovery Zone.

Land Manager	No. of active Allotments	Type	AUMs*	Additional Information
Flathead NF	3	Cattle	320	
Helena-Lewis and Clark NF	24	Cattle	9,857	2 additional allotments are currently inactive – AUMs not included
Helena-Lewis and Clark NF	1	Sheep	133	
Lolo NF	1	Cattle	30	
Kootenai NF	1	Cattle	373	2 additional allotments are currently inactive – AUMs not included
Glacier NP	0	NA	NA	GNP does not permit commercial grazing allotments within Park boundaries

*AUMs (Animal Month Units) are calculated by multiplying the permitted number of sheep or cow/calf pairs times the months of permitted use. Actual use by sheep or other livestock in many cases may have been less than the permitted numbers identified for 2011.