CHAPTER II. BIOLOGICAL OPINION FOR GRIZZLY BEARS

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A. DESCRIPTION OF THE PROPOSED ACTION

This section describes the relationship of the project area to grizzly bear habitat and then focuses on the elements of the Revised Plan that may affect grizzly bears. This section also describes the guidelines and standards intended to provide security for grizzly bears, conservation of grizzly bear habitat, and specific measures proposed to avoid, reduce or minimize potential adverse effects of forest management activities on bears at the project level. The Analysis of Effects (see Section D) will consider the effects of implementing the proposed Revised Plan framework as well as the effects of implementing proposed standards and guidelines at the project level. Note that this biological opinion does not provide an analysis of effects for specific actions. Future actions undertaken by the KNF will undergo detailed analysis and further public comment as part of the site-specific NEPA process, and will undergo consultation under section 7 of the ESA as appropriate.

1. Action Area

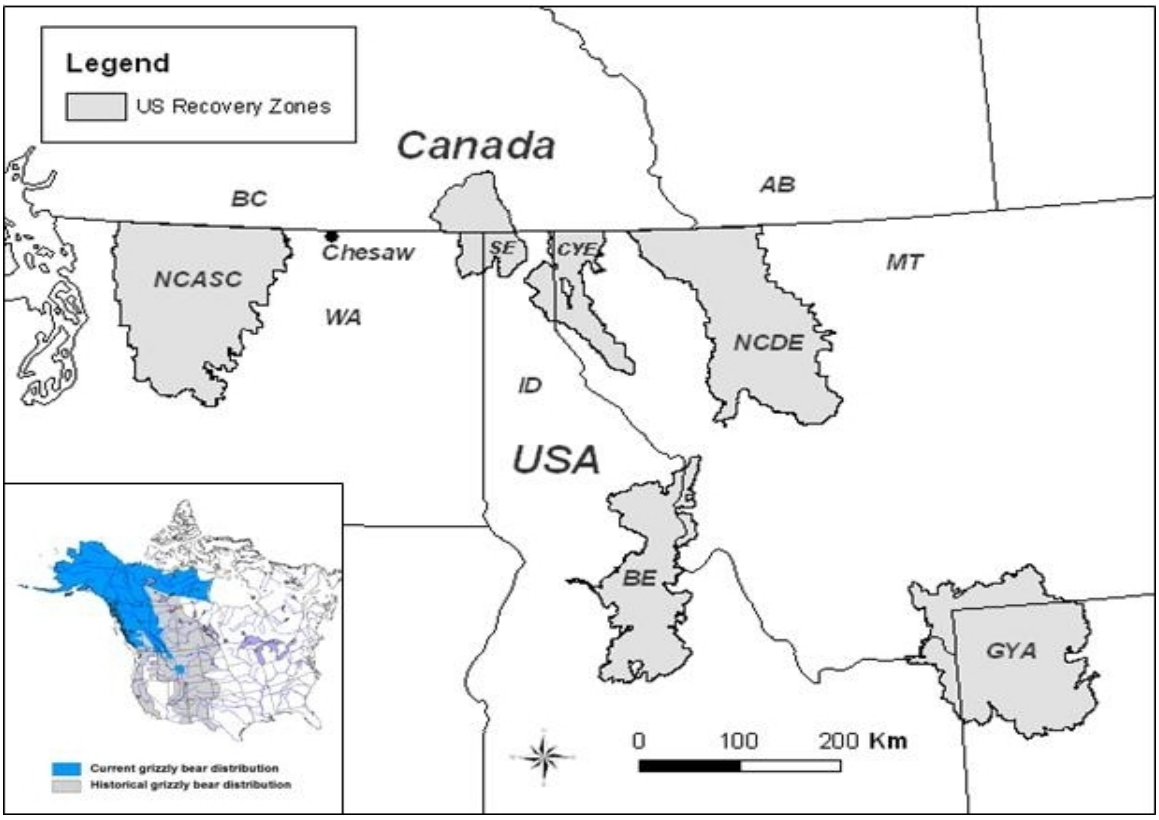
The Recovery Plan prompted the identification of six grizzly bear recovery zones (Figure II-1), defined as areas within which the population and habitat criteria for achievement of recovery will be measured (USFWS 1993, p.33): CYE, NCDE, Selkirk Ecosystem (SE), Bitterroot Ecosystem (BE); North Cascades Ecosystem (NCASC), and Yellowstone Grizzly Bear Ecosystem (YGBE). As previously described in Chapter I, two grizzly bear recovery zones overlap the KNF: the CYE and the NCDE.

The CYE recovery zone is situated in the KNF, IPNF, and a small portion of the Lolo National Forest. Grizzly bears associated with the CYE also occur in additional areas beyond the boundaries of the recovery zone. These land areas are referred to as 'bears outside recovery zone' (BORZ) areas and are characterized by recurring use by grizzly bears (USFS 2011c, p. 11; Figure II-2). Bears are also observed infrequently on other areas of the KNF outside the recovery zone and BORZ areas. A small portion (roughly three percent of the total acreage) of the NCDE recovery zone is situated in the KNF.

After grizzly bears were listed under the ESA, the Interagency Grizzly Bear Committee (IGBC) was established to develop guidelines for bear management (see IGBC 1986). The National Forests, Bureau of Land Management and National Parks, in coordination with the Service and state wildlife management agencies, delineated bear management units (BMUs) within each recovery zone to aid in managing habitat and monitoring population trends and to apply the recommendations of the IGBC. In the CYE recovery zone, BMUs approximate the annual home range size of adult females (from 50 to over 150 square miles). In the NCDE recovery zone, BMUs were further subdivided into subunits. The BMUs are analysis areas that approximate the lifetime size of a female's home range, while BMU subunits are analysis areas that approximate the annual home range size of adult females within the NCDE and YGBE. The BMUs and subunits were identified for management purposes to provide enough quality habitat for home range use and to ensure that grizzly bears were well distributed across each recovery zone. The

BMUs and subunits are not meant to depict the actual location of female home ranges on the landscape.

Figure II-1. Current and historic grizzly bear range[1] and location of recovery ecosystems[2].



1. Inset map illustrates historic (grey shade) and current grizzly bear distribution (dark blue). Adapted from Proctor et al. (2012).
2. GYA = Greater Yellowstone Area; NCDE = Northern Continental Divide Ecosystem; CYE = Cabinet-Yaak Ecosystem; SE = Selkirk Ecosystem; BE = Bitterroot Ecosystem; NCASC = North Cascades Ecosystem.

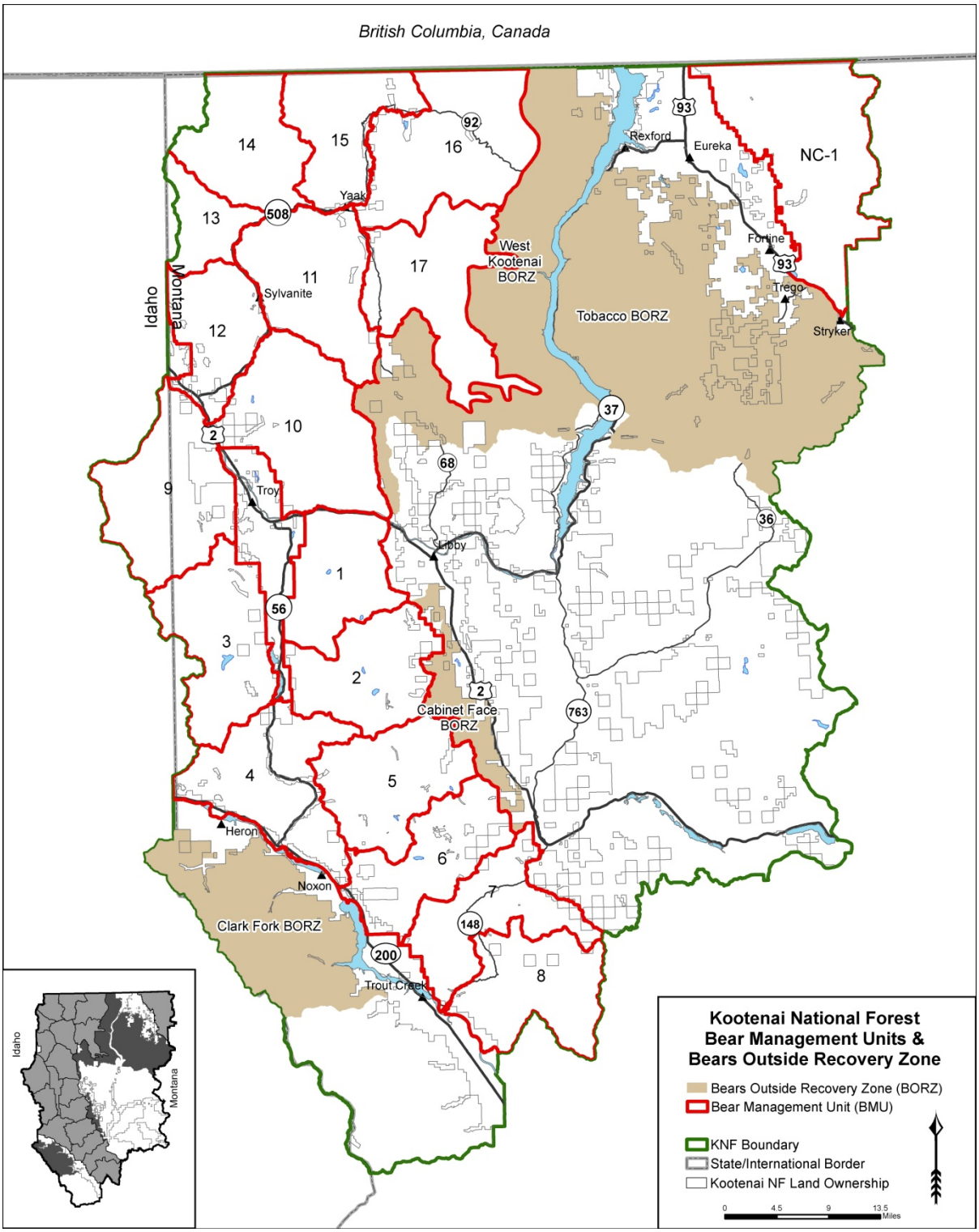


Figure II-2. Location of the Cabinet Yaak Ecosystem and its BMUs and BORZ on the KNF.

2. Proposed Action Description

As described in Chapter I, the Revised Plan direction is organized by goals, desired conditions, objectives, guidelines, and standards. The Revised Plan Forest-wide direction describes the framework under which lands will be managed for the next 10 to 15 years on the KNF.

The Revised Plan desired conditions for wildlife and vegetation and guidelines and standards related to wildlife are discussed in Chapter I and contained in Appendix A of the Terrestrial BA (USFS 2013a). Guidelines and standards are the procedures and requirements (respectively) applied to project and activity decision-making to achieve goals, desired conditions, and objectives. All projects must meet the guidelines and standards. The project-level requirements that provide conservation of grizzly bears are described in Table II-1. The guidelines and standards address the following grizzly bear management needs: linkage, access management/secure habitat, general habitat, human-bear conflicts, and denning habitat.

Table II-1. Forest-wide (FW) guidelines (GDL) and standards (STD) for wildlife (WL) in the KNF Revised Plan for grizzly bear conservation.

Management Need	Element Code[1]	Element Description
Linkage	FW-GDL-WL-12	Sets direction for interagency coordination and inclusion on wildlife crossing features in roadway construction and reconstruction.
Linkage	FW-GDL-WL-13	Restricts management activities within one-quarter mile of existing crossing features, and future crossing features.
Linkage	FW-GDL-WL-14	Maintains federal ownership in wildlife linkages identified through interagency coordination.
General Habitat	FW-GDL-WL-15	Applies “Interagency Grizzly Bear Guidelines,” or a conservation assessment once a grizzly bear population is delisted, to all management activities.
Access Management / Secure Habitat	FW-STD-WL-02	The Access Amendment is applied.
Access Management / Secure Habitat	FW-STD-WL-03	Sets direction for OMRD, TMRD, and Core within the KNF's portion of the NCDE (Krinklehorn and Therriault BMUs).
Human-Bear Conflict	FW-STD-WL-04	Requires sanitation measures to reduce human/wildlife conflicts and mortality in all permits and operating plans.

Denning Habitat / Human-Bear Conflict	FW-STD-WL-05	Prohibits grooming of snowmobiles routes in grizzly bear core habitat in spring after April 1 each year.

1. Elements of the plan include the goals, objectives, desired conditions, guidelines and standards.

The guidelines and standards discussed in Chapter 1 and Table II-1 would be applied Forest-wide as well as across the MAs and GAs. Management areas are those areas that have similar management characteristics and clarify the allowed uses on various parts of the KNF (see Table I-5 in Chapter I of this biological opinion). Table I-4 in Chapter I describes the allocation of all NFS lands across the MAs. The relationship of the BMUs and BORZ to the MAs is provided in Table II-2.

Table II-2. Distribution and percent of CYE and NCDE BMU acreages and BORZ acreages on the KNF within the designated management areas under the Revised Plan.

Management Area	Acres within BMUs	Acres within BORZ
1a – Wilderness	93,710 (8%)	0
1b – Recommended Wilderness	102,734 (8%)	0
1c – Wilderness Study Area	34,108 (3%)	0
2 – Eligible Wild, Scenic, Recreation River	34,634 (3%)	3,479 (1%)
3 – Special Area	23,131 (2%)	4,432 (1%)
4 – Research Natural Area	8,262 (<1%)	1,276 (<1%)
5a – Backcountry Non-motorized	194,516 (16%)	6,108 (1%)
5b – Backcountry Motorized	126,563 (10%)	33,153 (6%)
5c – Backcountry Winter Motorized and Summer Non-Motorized	69,997 (6%)	16,504 (3%)
6 – General Forest	547,480 (44%)	493,662 (88%)
7 – Primary Recreation Area	26 (<1%)	5,268 (1%)
Approximate Total	1,235,161	563,883

Geographic Areas have desired conditions that are specific to a locale, such as a river basin or valley. The GA desired conditions were developed to refine Forest-wide management to better respond to local conditions and situations that may occur within a specific GA. The desired conditions in GAs for listed species would not exert additional effects on the species, rather the desired condition would help the KNF achieve a Forest-wide desired condition, objective, standard, or guideline for the species. This is accomplished within the GAs by identifying or prioritizing areas where these conditions should be achieved. For example, a desired condition for wildlife in the Yaak GA states that low levels of disturbance occur for denning grizzly bear in the Northwest Peaks, Grizzly Peak, and Roderick Mountain areas. This condition complements Forest-wide desired condition for wildlife (FW-DC-WL-04), which states that low levels of disturbance exist in all grizzly bear BMUs to facilitate denning activities, spring use, limit displacement, and reduce human/bear conflicts and potential bear mortality. It also complements

Forest-wide guideline (FW-GDL-WL-01) which states that management activities on NFS lands should avoid/minimize disturbance in areas of predicted denning habitat during spring emergence (April 1 through May 1). In these examples, the GA desired conditions are identifying specific locations where the Forest-wide desired condition and guideline would be targeted.

The Revised Plan incorporates the recently completed Forest Plan Amendments for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the Kootenai, Idaho Panhandle, and Lolo National Forests (Grizzly Bear Access Amendment or Access Amendment). The Access Amendment established standards for core, open motorized route density (OMRD) and total motorized route density (TMRD) for each BMU in the CYE. Route densities include both roads and motorized trails. The road density standards are based on the research of Wakkinen and Kasworm (1997, p.6-8). The Access Amendment also established that there will be no net increase in either open or total road linear miles above baseline conditions in BORZ.

The Revised Plan also incorporates the Guidelines of the IGBC (USFS 1986, entire). The IGBC Guidelines are applied across the grizzly bear Management Situations (MS) (1 through 5) as delineated throughout the two recovery zones in the KNF. All of the lands within each recovery zone have been delineated into one of the management situations. As information and science related to grizzly bears evolved, the USFS began managing MS1 and MS2 essentially the same on NFS lands, according to direction for MS1. Management focuses on grizzly bear habitat maintenance, improvement and minimization of grizzly-human conflict. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. MS3 lands include private lands, campgrounds or other lands where grizzly bear presence and factors contributing to their presence will be actively discouraged. The IGBC Guidelines list eight elements on how to minimize grizzly bear-human conflict potential as it relates to wildlife management (USFS 1986, pp. 6-7). If the guidelines are met, then the management direction for each management situation is met.

B. STATUS OF THE SPECIES

1. ESA Listing Status

In 1975, the Service listed the grizzly bear as a threatened species in the contiguous United States (40 FR 31734-31736, July 28, 1975). The Service subsequently developed a grizzly bear recovery plan in 1982, and revised it in 1993 (USFWS 1993).

Since the original listing of the grizzly bear, the Service has completed four, 5-year status reviews (46 FR 14652, February 27, 1981; 52 FR 25523, July 7, 1987; 56 FR 56882, November 6, 1991; and September 6, 2011). None of these reviews warranted a change in the listing status of the grizzly bear. Since then, the Service has undertaken a number of actions to review the status of individual grizzly bear populations.

On March 13, 1990, the Service received a petition requesting the grizzly bear in the North Cascades Ecosystem (NCE) be reclassified from threatened to endangered. We made a positive

90-day finding on the petition and initiated a status review of the NCE grizzly bear population (55 FR 32103, August 7, 1990). On January 28, 1991, we received a petition requesting that we reclassify the grizzly bear populations in the CYE, SE, and the NCDE from "threatened" to "endangered." Then, on February 4, 1991, we received a petition requesting that grizzly bear populations in the SE, CYE, YGBE and NCDE recovery zones be reclassified from threatened to endangered. In 1992, we made a positive finding on these 2 petitions regarding the CYE and SE and initiated a status review for these 2 ecosystems (57 FR 14372, April 20, 1992). This same finding found that there was not substantial information presented about the YGBE or NCDE recovery zones and that the request to uplist the North Cascades Ecosystem population was already being addressed through initiation of a status review in 1990 (see 55 FR 32103, August 7, 1990).

In July 1991, the Service released a 12-month finding that reclassification of the North Cascades population from threatened to endangered was warranted but precluded (56 FR 33892, July 24, 1991). In 1993, we published a 12-month finding that the grizzly bear population in the CYE was warranted for uplisting to endangered status while the population in the SE was not (58 FR 8250, February 12, 1993). This warranted status for the CYE, like the North Cascades Ecosystem population, was determined to be precluded by higher priority actions. In 1998, we re-affirmed this position, publishing a notice that the North Cascades population and the CYE populations are warranted for endangered status, but precluded by higher priority actions (63 FR 30453, June 4, 1998). In 1999, after a Court remanded our finding regarding the SE population back to the Service, we released a 12-month finding that both the CYE and the SE populations were warranted for endangered status but precluded by higher priority actions (64 FR 26725, May 17, 1999). Since then, the North Cascades Ecosystem, SE, and the CYE populations have remained warranted for reclassification from threatened to endangered status but precluded by higher priority actions (64 FR 57534, October 25, 1999; 66 FR 54808, October 30, 2001; 67 FR 40657, June 13, 2002; 69 FR 24876, May 4, 2004; 70 FR 24870, May 11, 2005; 71 FR 53756, September 12, 2006; 72 FR 69034, December 6, 2007; 73 FR 75176, December 10, 2008; 74 FR 57804, November 9, 2009).

2. Species Description, Life History, Population Dynamics

Much of the following information is summarized from the grizzly bear recovery plan (Recovery Plan) (USFWS 1993, pp.5-8).

Grizzly bears are large (averaging 400-600 lbs for males, and 250-350 lbs for females) and long-lived (up to 40 years old) (Blanchard 1987, p. 102), but usually no more than 15-25 years in the wild. Grizzly bears are omnivorous, opportunistic feeders that require caloric intake in excess of maintenance requirements, particularly in later summer and fall, in order to build fat levels to survive denning.

Generally solitary, grizzly bears avoid one another, except during the mating season when male and female bears tolerate one another. Grizzly bears do not defend territories, but instead have home ranges they share with other grizzly bears, although social systems influence movements and interactions among resident bears. Home range sizes for adult female grizzlies vary from 50

to 150 square miles; an adult male can have a home range size as large as 600 square miles (Servheen 1983, p. 1026).

Grizzly bears in the contiguous United States spend 5 to 6 months in dens, typically beginning in October or November (Craighead and Craighead 1972, p.6). During this period, they do not eat, drink, urinate, or defecate. Over the course of the denning season, grizzly bears hibernate and may lose 30 percent of body weight. All of this weight is stored as fat, which is acquired during the 2 to 4 months prior to entering dens. During the pre-denning period, bears increase their food intake dramatically and may gain as much as 3.64 pounds per day (Craighead and Mitchell 1982, p. 544). Kasworm et al. (2010, pp. 58-59) reported denning chronology for radio-collared grizzly bears in the CYE from 1983 to 2009. Den emergence for female grizzly bears ranged from the 3rd week of March to the 3rd week of May and peaked between the 2nd and 4th weeks of April (Kasworm et al. 2010, p. 58). Den emergence for male grizzly bears ranged from the 4th week of March to the 4th week of April and peaked between the 2nd and 3rd weeks of April (ibid). Female grizzly bears entered their dens between the 3rd week of October and the 2nd week of December Kasworm et al. 2010 p. 59). Female grizzly bears entered their dens between the 1st week of November and the 4th week of December (ibid)

Mating occurs from May through July, and cubs are born inside the den in late January or early February. Cubs remain with their mother for 2 to 3 years (Schwartz et al. 2003, p. 564). The age at which females produce their first litter varies from 3 to 8 years, with litter size varying from one to four cubs. Grizzly bears have one of the lowest reproductive rates among terrestrial mammals. Grizzly bear females cease breeding successfully some time in their mid to late 20s (ibid, pp. 109-110).

3. Habitat Requirements

Grizzly bears are opportunistic omnivores and will eat fish, berries, grasses, leaves, insects, roots, carrion, small mammals, fungi, nuts, and ungulates. The bears are selective in their seasonal use of various kinds of forage and, therefore, move across the landscape as they follow the growth and abundance of preferred forage items (Mace et al. 1996, p. 1403; McLellan et al. 1999, p. 912, Kasworm et al. 2010, p. 64).).

Grizzly bears are habitat generalists. Basic habitat requirements include the availability of food and water, security (from humans and other bears), and den sites (Mace et al. 1996,p. 1403; 1999, p. 374-376; Linnell et al. 2000, p. 346) (Table II-3). While biologists agree that preferred habitats of grizzly bears include avalanche chute and early seral, fire-successional types, the proximity of hiding cover is also an important variable that has been shown to influence the use of foraging habitat. Given equal foraging opportunities, under cover and in the open, bears prefer to feed under cover.

Grizzly bears are selective in their seasonal use of various kinds of forage and, therefore, move across the landscape as they follow the phenological development and abundance of their preferred forage items. As a result, the productivity of grizzly bear populations is likely more strongly influenced by the availability of high quality food resources than by density-dependent regulating factors (IGBC 1987, pp. 51-59). It has also been observed that grizzly bears of all ages

will congregate readily at plentiful food sources and form a social hierarchy unique to that grouping of bears (Hornocker 1962, Craighead 1979, *In* USFWS 1993, p.2).

Table II-3. Grizzly bear key habitat requirements (*in* USFWS 2011a, p.a-3).

Habitat Requirement	Key Habitats
Spring foraging[1]	Low-elevation mesic vegetation
Summer, autumn foraging[1]	Moderate- to high-elevation mesic vegetation
Security cover and isolation from humans[2,3]	Cover provided by vegetation and topographic breaks; absence or low density of roads and trails
Denning habitat[4]	Remote, high-elevation areas with slopes greater than 30 degrees; friable, deep soils; and snow accumulations

Sources:
1 Mace et al. (1996); Mace et al. (1999); McLellan and Hovey (2001); Nielson et al. (2002); Waller and Mace (1997).
2 Archibald et al. (1987); Kasworm and Manley (1990); Mace et al. (1996); Mace et al. (1999); Mattson et al. (1987); McLellan and Shackleton (1988,1989); Wielgus et al. (2002).
3 Mace and Waller (1997); White et al. (1999); Graves (2002).
4 Pearson (1975); Servheen (1981); Zager and Jonkel (1983); Podruzny et al. (2002).

With the exception of a few forest vegetation types, such as horsetail associations, the majority of vegetative food items preferred by grizzly bears occur in early seral communities where forest cover is absent or relatively sparse (Servheen 1983, p. 1030). Foraging areas that are consistently described in the literature as favored by bears include avalanche chutes (Mace et al. 1996, p. 1395; Waller and Mace 1997, p. 1034; Ramcharita 2000, p. 27; McLellan and Hovey 2001, p. 97), fire-mediated shrub fields (McLellan and Hovey 2001, p. 97), and riparian areas (Servheen 1983, p. 1082; McLellan and Hovey 2001, p. 97; Kasworm et al. 2010, p. 65). Avalanche chutes may be used at any time of year, but seem to attract bears particularly in the spring. These areas are usually quite wet (due to deep snows that melt later than in other areas), and they contain both valuable forage species and a tangle of vegetation that provides visual screening. Fire-mediated shrub fields often contain soft-mast (e.g., berry) producing shrub species, an important food source for foraging bears in mid-summer and early fall. Riparian areas are primarily used in spring and early summer when habitats at higher elevations are still covered with snow or plant growth is otherwise delayed. Riparian areas provide a variety of key forbs and grasses, and a complex tree and shrub structure offering hiding cover. When bears emerge from their dens in the spring, their fat stores have been severely depleted; therefore, foraging to rebuild energy reserves is their primary focus. It is important that bears have adequate spring foraging opportunities close to their dens, especially when cubs have been born, to build up fat stores quickly.

Food habits not only vary between seasons but also between the recovery zones. Radio collared grizzly bears in the Cabinet Mountains and Yaak River made greatest annual use of closed timber, timbered shrubfields, mixed shrub snowchutes, mixed shrub/cutting units, alder shrubfields, huckleberry shrubfields, and graminoid and beargrass sidehill parks (Kasworm et al. 2010, p.59). Grizzly bears in Cabinet Mountains made greater use of mixed shrub snowchutes, alder shrubfields, huckleberry shrubfields, and beargrass sidehill parks whereas grizzly bears in

the Yaak River area used closed timber, timber, timbered shrubfields, mixed shrub/cutting units, and graminoid sidehill parks (Kasworm et al. 2010, p.59).

In the YGBE, four food sources have been identified as important to grizzly bear survival and reproductive success (Mattson et al. 1991a, p. 2). Winter-killed ungulates serve as an important food source in early spring before most vegetation is available (Green et al. 1997, p. 140; Mattson 1997, p. 165). During early summer, spawning cutthroat trout (*Oncorhynchus clarki*) are a source of nutrition for grizzly bears in the Yellowstone population (Mattson *et al.* 1991a, p. 1623; Felicetti *et al.* 2004, pp. 496, 499). Grizzly bears feed on army cutworm moths (*Euxoa auxiliaris*) during late summer and early fall as they try to acquire sufficient fat levels for winter (Mattson et al. 1991b, p. 2432; French et al. 1994, p. 394). Lastly, in some years, whitebark pine (*Pinus albicaulis*) seeds serve as an important fall food due to its high-fat, energy-rich content (USFWS 2011b, pp.9-11).

In the NCDE during summer, before berry crops are available, grizzly bears eat roots/corms/bulbs and other vegetation (Aune and Kasworm 1989; McLellan and Hovey 1995). On the eastern front of the Northern Rockies in Montana and in Glacier National Park, grizzly bears also feed on concentrations of lady bird beetles and army cutworm moths (Mattson et al. 1991b, p.2430). Once berries become available, grizzlies in the NCDE consume a wide variety of available berries (McLellan and Hovey 1995). The amount and species of berries in scats varies annually based on their availability (ibid). During late summer to fall, grizzly bears in the NCDE continue to eat berries but also consume more meat and roots/bulbs/corms (Aune and Kasworm 1989; McLellan and Hovey 1995). Late summer to fall is also the time when grizzlies make use of whitebark pine nuts when and where they are available (Aune and Kasworm 1989).

In addition to foraging habitat, a degree of isolation from humans and human-associated activities and hiding cover are necessary habitat components for grizzly bears (Mattson et al. 1987, pp. 18-22; McLellan and Shackleton 1988, pp.458-459, 1989, pp. 378-379; Mace et al. 1996, p. 1402-1403, 1999, pp. 374-376).

Human activities can result in direct mortality of bears, as well as indirect negative effects by displacing bears to less suitable habitats (McLellan et al. 1999, p. 918, Wakkinen and Kasworm 2004, p. 74). The most effective way to minimize the risk of adverse interactions between humans and bears is to provide spatial separation between areas of human activity and areas of bear activity. In areas where such separation is not possible, providing large areas of secure habitat that include seasonal habitats may reduce the potential for contact and minimize risk of disturbance and illegal mortality (Mace and Waller 1998, p.1014).

Managing public motorized access to grizzly bear habitat is one of the most common and effective ways to maintain a level of separation between grizzly bears and humans, which — (1) minimizes human interaction and reduces potential grizzly bear mortality risk; (2) minimizes displacement from important habitat where energetic requirements can be met with limited disturbance from humans; and (3) minimizes habituation to humans (Mattson et al. 1987, pp.19-20; McLellan and Shackleton 1988, pp.458-459; McLellan 1989, p. 1856; Mace and Manley 1993, pp.24-27; Mace et al. 1996, pp. 1402-3; Wakkinen and Kasworm 1997, pp.22-26). Secure habitat for grizzly bears referred to as core areas) is specifically defined by the IGBC (1998, p.4)

as areas that are at least 0.3 mile from any open road or motorized trail and that receive no motorized use of roads or trails during the period they are considered secure habitat (typically at least 10 years). Such lands should also encompass areas of seasonal importance for grizzly bears throughout the year.

While security cover allows grizzly bears to avoid contact with humans, the cover is sometimes necessary for bears to avoid contact with other bears. Strict territoriality among grizzly bears is not known, and intraspecific defense behavior generally tends to be limited to defense of limited food concentrations, defense of young, and surprise encounters (USFWS 1993. p.2). Adult male bears are known to kill juveniles, and adults also occasionally kill other adults. Females with cubs require spatial separation from aggressive males. This is particularly true in spring, when cubs-of-the-year are most prone to attack. Data are insufficient to fully assess the effects of predation on younger bears by adult bears (USFWS 1993, p.5), particularly when considering potential indirect effects of various human activities that may displace a subadult bear into the home range of an aggressive adult bear. Sows with cubs often select rugged and isolated habitats for this reason (Mace and Waller 1997, p. 148; Russell et al. 1979, p.124). Shrub and tree cover, as well as topographic landscape features, are commonly used as security from humans or other bears (McLellan and Hovey 2001, p. 97; Wielgus et al. 2002, p. 1604), and dispersing subadult bears may be forced to choose poor home ranges that may be equally dangerous to their survival (USFWS 1993, p.5). There are no broadly accepted Service or IGBC standards related to grizzly bear cover.

Another key habitat requirement for grizzly bears is the presence of suitable denning habitat. Den site characteristics are variable, but several researchers have described dens located at high elevations in remote areas with slopes greater than 30 degrees, soils that are deep, and aspects where snow accumulates (Craighead and Craighead 1972, p. 17; Linnel et al. 2000, p. 404; Mace and Waller 1997, p. 39; Podruzny et al. 2002, p. 25). Sloped sites are often selected because they facilitate easier digging and are generally stabilized by trees, boulders, or root systems of herbaceous vegetation. In addition to excavating dens, grizzly bears den in natural caves and hollows under the roots of trees. While individual den sites are rarely reported to be used for more than one winter, numerous researchers have observed that dens rarely occur singly, but are concentrated in areas that apparently possess appropriate environmental conditions (Craighead and Craighead 1972).

As discussed in our 2008 biological opinion on Amendment 24 to the Flathead National Forest (USFWS 2008, pp. 30 - 44), den abandonment has been documented in association with industrial activity and direct approach (Reynolds et al. 1986, p. 174; Harding and Nagy 1980, p. 278; Jonkel 1980, p. 3; Craighead and Craighead 1972, p. 31). Harding and Nagy (1980, p. 278) found that one grizzly bear abandoned its den after having the den driven over by a seismic vehicle. On the other hand, other events with seemingly similar levels of disturbance have not led to den abandonment (Jonkel 1980, p. 2; Reynolds et al. 1986, p. 174; Mace and Waller 1997, p. 41; Linnell et al. 2000, pp. 407-408). We are not aware of any primary-source reports in the literature of grizzly bear den abandonment directly attributed to snowmobile activity (USFWS 2008, p.33). Nor has other substantive adverse effects on bears from snowmobile use been substantiated (see discussion in USFS 2008, pp.32-53). In fact, Mace and Waller (1997, p. 41)

reported no abandonment of dens by grizzly bear even though snowmobiles were often seen within 2 km of den sites. Likewise, the Interagency Grizzly Bear Study Team has intensively researched grizzly bear ecology in the Yellowstone Grizzly Bear Ecosystem from the 1970's to present, but this research has never documented den abandonment attributed to snowmobiles.

In our 2008 biological opinion, we agreed with Graves and Reams (eds. 2001), that disturbance from snowmobiles may be most consequential shortly before or after den emergence of a female with cubs. Females and their cubs remain in the den site area for several weeks after emergence from dens (Haroldsen et al. 2002, p. 33; Mace and Waller 1997, pp. 37-38). Females with cubs have high energetic needs, and cubs have limited mobility for several weeks after leaving the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they will likely experience decreased fitness and the family group may be pushed to less suitable habitat. Our conclusion from 2008 remains the same: "In the judgment of the Service, snowmobile-related impacts on post-den emergence females with cubs are more likely to impart serious consequences than any potential impacts to denning grizzly bears." To date, we are unaware of any documentation of snowmobile-related impacts on post-den emergent females with cubs, although detection of such events may go unreported.

4. Habitat Fragmentation

Habitat linkage and connectivity are important components of grizzly bear habitat (Servheen et al. 2001, p. 164, USFWS 1993, p. 24). Fragmentation of habitat is particularly relevant to the survival of grizzly bears. Grizzly bears are large animals with great metabolic demands requiring extensive home ranges. Large expanses of unfragmented habitat are important for feeding, breeding, sheltering, traveling, and other essential behavioral patterns. Historically, as human settlements and developments along roads increased in grizzly bear habitat, grizzly bear populations became fragmented. This phenomenon continues today. That is, grizzly bears attempting to move within recovery zones or between recovery zones often encounter high volume roads, concentrated human development, and/or altered vegetation that does not provide foods, cover, or security. These conditions can contribute to human-caused mortality as well as deter movement and hence fragment populations. Maintaining linkage (areas providing safe passage across/through less than optimal environments) and connectivity (contiguous preferred habitat or cover) between small, isolated grizzly bear populations can benefit grizzly bears in several ways, including (1) allowing immigrant grizzlies to bolster a resident population in an area that has been affected by catastrophic events or negative environmental conditions, and (2) preserving genetic diversity by reducing negative effects from inbreeding. Task 37 in the federal *Grizzly Bear Recovery Plan* (USFWS 1993, p.36) called for the evaluation of linkage potential between grizzly bear recovery zones.

5. Grizzly Bear Dispersal, Movements, and Genetic Health

Because grizzly bears live at relatively low population densities and are vulnerable to excessive human-caused mortality, human-caused fragmentation of historically contiguous populations into isolated "remnant" populations is a management reality on the current ecological landscape (Forman and Alexander 1996, p. 207; Proctor et al. 2012, p. 5; Servheen et al. 2001, p. 164). It

is a widely accepted tenet in conservation biology that extinction risk of isolated populations is reduced even through minimal levels of connectivity (Soule 1987). At greatest risk of extinction are small isolated populations with less than 100 individuals. Such populations are more susceptible to extinction through demographic processes such as human-caused mortality, natural mortality, and lower population growth rates as well as environmental processes such as poor food years, climate change, and habitat loss. While the CYE (at issue in this biological opinion) and SE grizzly bear populations contain less than 100 individuals each, they are not entirely isolated from Canadian populations. Small populations benefit greatly from both demographic rescue (i.e., the immigration of female bears) and to a lesser degree genetic rescue (i.e., immigration of male bears). Although reconnection of these isolated populations is challenging (Forman and Alexander 1996; Lindenmayer and Fischer 2006), metapopulation theory directs that connectivity is the best long-term conservation practice to increase the resiliency, redundancy, representation, and overall probability of persistence of remaining grizzly bear populations in the lower 48 States (Boyce 2000, pp. 6-242-243).

Proctor et al. (2012, p.10) compiled and analyzed all known genetic and movement data for grizzly bears in 10 different study areas. They assessed the current state of genetic fragmentation within and between these study areas and used genetic assignment testing and movement data from radio-collared animals to compile what is known about current levels of male and female movement.

Samples from coastal British Columbia and the Selkirk Mountains south of Canadian Highways 3 and 3A (i.e., the SE) have unique genetic material that is dissimilar to other grizzly bear populations in southern Canada and the northern U.S. In the Selkirks, this difference is most likely due to genetic drift acting on a small isolated population over several generations because of anthropogenic pressures (Proctor et al. 2012, p. 33).

Although there are differences in heterozygosity values among study areas and recovery zones, there have been no detectable consequences on grizzly bear morphology, physiology, ecology, or biology related to these differences in genetic diversity as evidenced by normal litter size, little evidence of disease, an equal sex ratio, and physical characteristics such as body size and weight (Schwartz et al. 2006a, pp. 22-23; Kasworm et al. 2008, p. 67; USFWS, 2011b, p. 11).

These genetic differences are not the result of natural selection in varying environments or indicative of historical conditions. Instead, they are artifacts of human pressures (Proctor et al. 2012, pp.27-28). Grizzly bears face high mortality risk when moving between secure blocks of habitat. This mortality risk and very low population sizes resulting from past range contraction and mortality have resulted in genetic fragmentation. Each of these fragmented populations may possess genetic material missing from other populations. Maintenance of this genetic material is important to the long-term ability of this region's grizzly bears to respond to environmental changes.

Because grizzly bears have low reproductive rates (Bunnell and Tait 1981 as cited *In* Proctor et al. 2004, p. 150), long generational times (i.e., 10 years), and are slow to disperse across landscapes (Proctor et al. 2004, p. 148), there can be a lag time between fragmentation and

resulting changes in genetic diversity. The genetic data collected by Proctor et al. (2012, pp.16-23) reflect fragmentation occurring on the landscape in the recent past (i.e., last 30-60 years).

Proctor et al. (2012, pp.27-28) also examined grizzly bear movements between ecosystems that displayed varying levels of genetic separation. These movement data were collected from 1985-2007 and represent a more recent picture of fragmentation than genetic data.

In general, Proctor et al. (2012, p.35) found males move more frequently and over longer distances than females. This result is expected based on what we know about female home range size and the dispersal process. Females usually establish smaller home ranges than males that overlap with their mother's (Servheen et al. 1983, p.1032).). In doing so, they generally disperse over much shorter distances than male grizzly bears (McLellan and Hovey 2001, p.97; Proctor et al. 2004, p.154). The majority of migrants that moved from one study area to another were males (26) but a few females (4) were also observed moving between genetically fragmented populations (Proctor et al. 2012, pp. 21, 23). The earliest detections of grizzly bears from the NCDE found in the intervening area between the NCDE and the YBGE were male, and males make up most of the known occurrences in this region (Mace and Roberts 2012, p.27).

Connectivity must be examined in a genetic (requires males only) and demographic (requires females) framework. While male movements can enhance genetic diversity and reduce genetic fragmentation (Miller and Waits 2003, p. 4348; Proctor et al. 2012, pp.26-27), female movements into small populations are necessary to enhance growth rate (Proctor et al. 2012, pp.26-27). This concept is relevant to grizzly bear recovery in the NCE, SE, and CYE recovery zones, all of which contain small populations that are demographically and genetically isolated to varying degrees.

Proctor et al. (2012, p.34) documented increasing genetic and demographic fragmentation across Canada Highway 3. If allowed to continue, this fragmentation could lead to a loss of connectivity between U.S. and Canadian grizzlies. Canada Highway 3 is at least a partial barrier to population connectivity by minimizing female crossings (Proctor et al. 2012, p.35). Maintaining and increasing movements by females (i.e., demographic rescue) from larger populations (e.g. Canada or the NCDE) into the small populations (NCE, SE, and CYE) is critical to the long-term conservation of these populations. Recovery could be accomplished via natural movements or translocating animals.

Another aspect of connectivity Proctor et al. (2012, p.17) examined was known habitat use by grizzly bears in intervening habitats between Service-identified recovery zones. This habitat use is relevant to understanding how and where grizzly bears in different ecosystems may be linked in the near future. Proctor et al. (2012, p.20) found 4 males and 1 female using habitat between the Selkirk and Purcell Mountains in Canada, although there was no evidence indicating any migration between these 2 mountain ranges.

Mace and Roberts (2012, pp. 24-27) documented the distribution of grizzly bears in and adjacent to the NCDE recovery zone based on a compilation of telemetry data, mortality data, and DNA detections and found that a small number of both male and female grizzly bears are occupying habitat a substantial distance from the recovery zone boundary, including areas to the south, east and west of the recovery zone. One female grizzly bear with a cub is known to regularly use

habitat between the NCDE and CYE. Prior to dropping her collar in 2006, she and her offspring spent most of their summer in the Salish Mountains of Montana less than 2 miles east of the edge of the CYE while denning within the boundaries of the NCDE recovery zone (Kasworm et al. 2010, p.47). A positive development has been grizzly bears, including females with cubs, being documented in the Tobacco BORZ between the CYE and NCDE over the past several years (Kasworm et al. 2012, p. 16).

Currently, it is not possible to tell if movements we are observing reflect an increase in bear movements or an increase in detection effort and technology (e.g., radio-transmitter collars; genetic techniques) (Proctor et al. 2012, pp. 36-37). These promising detections of grizzly bear movements should be tempered by the idea that detected movement does not necessarily mean migrants are breeding successfully. If there is no successful reproduction, then there is no genetic or demographic rescue occurring. Also, there seems to be high mortality risk associated with migrant bears (Proctor et al. 2002, p. 128; Proctor et al. 2012, pp. 35-36). However, these data are helpful when considering how to most effectively manage and conserve the remaining grizzly bear populations in the lower 48 States. For example, these data emphasize the importance of maintaining demographic connectivity with Canadian populations and the small populations of the NCASC, SE, and CYE, while highlighting the importance of recovering these small populations so that they can provide genetic and demographic rescue for the Bitterroot Ecosystem. Of relevance, the NCDE appears to be well connected to Canadian populations genetically and its large population size means female movements from Canada into the NCDE are not absolutely required for demographic health to be maintained, although such female movements are beneficial. Similarly, the YGBE has a large enough population size that demographic rescue is not required. Instead, 1 to 2 male migrants every 10 years (i.e., genetic rescue) were deemed adequate to maintain current levels of genetic diversity in the YGBE (Miller and Waits 2003, p.4338).

6. Range-wide Status

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

New information regarding grizzly bear biology, current status, and threats has become available over the years since listing. This research and information has been valuable in addressing the impacts and management of roads, trails, recreation, and livestock management. It has also indicated the need for public information and assistance programs, along with attractant storage, to limit human-caused mortality of grizzly bears. Proctor et al. (2012) compiled and analyzed all known genetic and movement data for grizzly bears in southern Canada and the NCDE, CYE, SE, NCASC, and YGBE populations. As discussed earlier, genetic data indicate population fragmentation in the recent past (Proctor et al. 2012, pp.27-28). Movement data demonstrated that males move more frequently and over longer distances than females, but it is female

movements that are necessary to enhance a small population's growth rate (Proctor et al. 2012, pp.26-27).

Although there are six grizzly bear recovery zones, five are occupied; the BE does not have a grizzly bear population at this time. We have recent population data for the YGBE, NCDE, CYE and SE. The current range and distribution of grizzly bears in the lower 48 States is fluid as dispersal is occurring and the specific distribution has not been quantified systematically across all ecosystems. Grizzly bears now occur both within the formally designated recovery zones and in habitat adjacent to the NCDE, YGBE, SE and CYE (Wittinger et al. 2002, entire; USFS 2009, entire; Mace and Roberts 2012 p.120; Mace and Roberts 2011 p. 38, 39 and 2012 p. 24-27).

The following population estimates include grizzly bears in the recovery zone and adjacent habitat. There are about 1,500 grizzly bears in the lower 48 States, approximately: 765 in the NCDE; 600 in the GYA; 45 in the CYE; 30 in the SE; and less than 20 in the NCASC (Table II-4). Subadult and adult female survival has the largest influence on population trend in all ecosystems (Mace and Waller 1998, p.1008; Wakkinen and Kasworm 2004, p.68). Population numbers and trends are described below for each recovery zone.

A portion of the CYE and the NCDE recovery zones are included in the action area (see Environmental Baseline) considered in this biological opinion, and so are discussed in more detail below. The YGBE, NCASC, BE, and SE recovery zones are not affected by the Proposed Action.

Following is a summary of the status of grizzly bears for the four recovery zones not included in the action area followed by a more detailed discussion for the two recovery zones that are included in the action area.

Yellowstone Ecosystem

The YGBE is located in northwest Wyoming, eastern Idaho, and southwest Montana and encompasses 9,200 sq. mi. It is approximately 240 miles from the BE and at least 75 miles from the grizzly bear population in the NCDE. In 2008, the total population size for the YGBE population was estimated at 593, with a 95 percent confidence interval between 533 and 652 in 2011 (Haroldson 2012). The YGBE population was increasing in size approximately 4-7 percent annually from 1983 to 2001 (Haroldson 2009, p.12; Harris et al. 2006, Haroldson 2012). Population growth slowed to 0-2 percent from 2002 to 2011 (Haroldson 2012). For more details regarding GYA demographic features, please refer to the Yellowstone Final Rule (72 FR 14866, March 29, 2007), the latest Interagency Grizzly Bear Study Team (IGBST) Annual Reports (online at http://nrmsc.usgs.gov/products/IGBST), and Schwartz et al. (2006b, entire).

Table II-4. Most recent estimates of grizzly bear population size and population growth rate by recovery zone.

Recovery Zone	Estimated Population Size	Trend (% change annually)
Greater Yellowstone Area	593[a]	+ 2% [b]
Northern Continental Divide	765[c]	+3% [d]
Cabinet-Yaak	42[e]	– 0.8 % [e]
Selkirk	80[f]	+ 1.9% [g]
North Cascades	< 20	Unknown
Bitterroot	0	n/a

a. Interagency Grizzly Bear Study Team 2012 annual report; b. Haroldson 2012; c. Kendall et al. 2009; d. Mace and Roberts 2012; e. Kasworm et al. 2012; Kasworm 2013 unpublished data; f. Proctor et al. 2012; Wakkinen 2010; g. Wakkinen and Kasworm 2004

North Cascades Ecosystem

The NCASC of north central Washington (9,500 square miles) is estimated to contain less than 20 bears (Almack et al. 1993). The nearest population of grizzly bears is immediately north in Canada with an estimated 25 individuals but populations to the east and west of the Cascades in Canada are considered extirpated (North Cascades Grizzly Bear Recovery Team 2004, p.7). The distribution of grizzly bears within the NCASC is unknown due to a lack of data (USFWS 2011a, p.A-31). Very few credible sightings and reports exist. A recent confirmed sighting in the U.S. occurred in September 2010. There are a few credible reports from north of the border in the B.C. portion of this ecosystem (USFWS 2011a, p.A-27).

Bitterroot Ecosystem

The BE of east-central Idaho and western Montana (5,600 square miles) is not considered occupied by a population of grizzly bears at this time (USFWS 2011b, p. 27).

Selkirk Ecosystem

The SE is located primarily in northern Idaho but includes portions of Washington and Canada also. It encompasses over 2,200 square miles of the Selkirk Mountains of northeastern Washington, northern Idaho, and southern British Columbia. Approximately 47 percent of the recovery zone is in British Columbia with the remainder in the U.S. The 1993 Recovery Plan defined a portion of the SE within Canada so that it was at least 2,000 square miles in size. This size would promote the Recovery Plan's minimum population goal of 90 grizzly bears in the SE

(USFWS 1993 p. 99). In Canada, land ownership is roughly 65 percent Crown (public) land and 35 percent private. In the U.S. portion of the SE, land ownership is approximately 80 percent Federal, 15 percent State, and 5 percent private lands. Within the SE, 3 percent (39,976 acres) is designated Wilderness Area.

Proctor et al. (2012, p.31) compiled data from multiple sources and conducted DNA-based population surveys) to estimate a population size of 83 grizzly bears in the SE, with 25-30 in the U.S. (W. Wakkinen 07/02/2013 pers. comm.), which is based on expert opinion. The Idaho Department of Fish and Game (IDFG) is currently working on a revised population estimate for the U.S. portion of the SE that will present a more scientifically rigorous estimate. As previously discussed, it was estimated in 2004 that the population of grizzly bears in the SE was slowly increasing at a rate of 1.9 percent annually (Wakkinen and Kasworm 2004, p.72). Recently, Wakkinen indicated that there is no evidence that would suggest any major changes from the 2004 population growth rate; however, this will be updated in upcoming years (W. Wakkinen 07/02/2013 pers. comm.).

Cabinet-Yaak Ecosystem

The CYE recovery zone is approximately 2,609 square miles in size and is located primarily in northwestern Montana with small portions in northern Idaho. The juxtaposition of the CYE population to the SE and NCDE grizzly bear populations to the east and west, respectively, makes it essential to long-term survival and recovery of grizzly bears throughout a significant portion of its range in the U.S.

Land ownership in the CYE is approximately 90 percent Federal, 5 percent State, and 5 percent private lands. The KNF manages approximately 72 percent of lands within the CYE recovery zone, with the Idaho Panhandle and Lolo National Forests administering the remaining Federal lands within the recovery zone. Approximately 5.6 percent (94,272 acres) of the CYE recovery zone is designated Wilderness. Major private land owners in the recovery zone include Plum Creek and Stimson Timber Companies. Individual landowners live on various-sized acreage along the major rivers. The relative distribution of grizzly bears across this ownership pattern is unknown, but is believed to be proportionate to land ownership (i.e., approximately 90 percent of the grizzly bear population lives on the 90 percent of public land within this recovery zone). In Canada, the portion of British Columbia directly north of the Cabinet-Yaak recovery zone is largely Crown land (public) with the exception of the Moyie and Kootenay River valleys.

Population Trend

The CYE is often described in terms of having two portions. The Cabinet Mountains portion forms the southern half of the CYE and is topographically diverse with steep mountain ranges (up to 8,700 feet) and definable seasonal habitats. The Yaak portion has gentler topography and lower elevations (up to 7,700 feet). Seasonal habitats are not as clearly definable. More research and telemetry work has occurred in the Yaak than the Cabinet Mountains. The U.S. portion of the CYE Recovery Zone was estimated to contain at least 42 grizzly bears during 2006 to 2011 (Kasworm et al. 2012, p.2). The Cabinet Mountains lie south of the Yaak River drainage and contain about 60 percent of the recovery zone. During 2006 to 2011, there were approximately

21 individuals in the Cabinet Mountains and 21 individuals in the Yaak portion of the recovery zone (Kasworm et al. 2012, pp.21-22). This population estimate of 42 grizzly bears is similar to our 1999 estimate of 30 to 40 in the CYE (64 FR 26725, May 17, 1999).

Demographic information from bears occurring outside a 10-mile buffer of the recovery zone is not used to assess population status. Therefore, while data may be collected within the portion of BORZ beyond the 10-mile buffer around the recovery zone, it is not used to determine the population status in the CYE. The 1993 Recovery Plan indicates that habitat within recovery zones, managed for grizzly bear use, is adequate to recover bear populations.

Survival analysis and reproductive data is used to calculate a "rate of change" in the population or "population trend". Only radio-collared bears are used in this analysis because they typically have known fates. Furthermore, standard methodology includes only female adults and sub-adults plus all yearlings and cubs when calculating trend. As long as there are sufficient males for breeding, males are not as important to the ability of the population to increase. Sub-adults are bears aged 2-4 years.

Survival rates have been calculated for radio collared native grizzly bears in the CYE from 1983-2012. All grizzly bears relocated into the Cabinet Mountain as part of the state's augmentation program (i.e. bears not native to the CYE) were removed from the sample and almost all of the remaining individuals were from the Yaak River portion of the population. A survival rate of 1.0 means all bears in that category survived and there was no mortality. From 1983-2009, Kasworm (2010a, 2010b) shows the survival rate for adult females in the CYE was 0.93, adult males 0.88, sub-adult females 0.78, sub-adult males 0.75, yearlings 0.85, and cubs 0.58. Kasworm et al. (2013) updates calculated survival rates through 2012 as: adult females 0.940; adult males 0.895; sub-adult females 0.811; sub-adult males 0.750; yearlings 0.900; and cubs 0.571. Survival rates in all sex and age classes show improvement except cubs. While cub survival is typically low, yearling survival is higher. It also appears that first time mothers are less successful at raising cubs than older, more experienced mothers. Sub-adult survival naturally decreases from yearling survival as bears are on their own without the protection of their mothers.

Reproduction is a measure of female cubs produced per adult female per year. In the CYE area Kasworm et al. (2013) shows the reproductive rate is 0.372. Sex ratio of observed cubs is assumed to be 50:50.

The observed rates of survival and reproduction are used to calculate a rate of change in the population (lambda). This calculation is essentially births - deaths = population change and is measured against a stable population depicted by lambda equaling 1.0. This calculation only involves female adult and sub-adult survival plus all yearling and cub survivals.

In 2006 lambda for the CYE grizzly bear population reached its lowest point (0.920) since calculations started, indicating an annual rate of decline of -8.3 percent. However, in 2009, the point estimate of lambda for all data (from 1983-2009) had increased to 0.963 (Kasworm 2010a, 2010b). This equates to a population declining at an annual rate of -3.8 percent. In 2012, the updated lambda (for 1983-2012) is 0.992 which corresponds to a -0.8 percent annual rate of

change (Kasworm et al. 2013). Thus, lambda has improved and moved closer to stability (1.0). Again, an indication that the CYE grizzly bears population status is improving (Figure II-3).

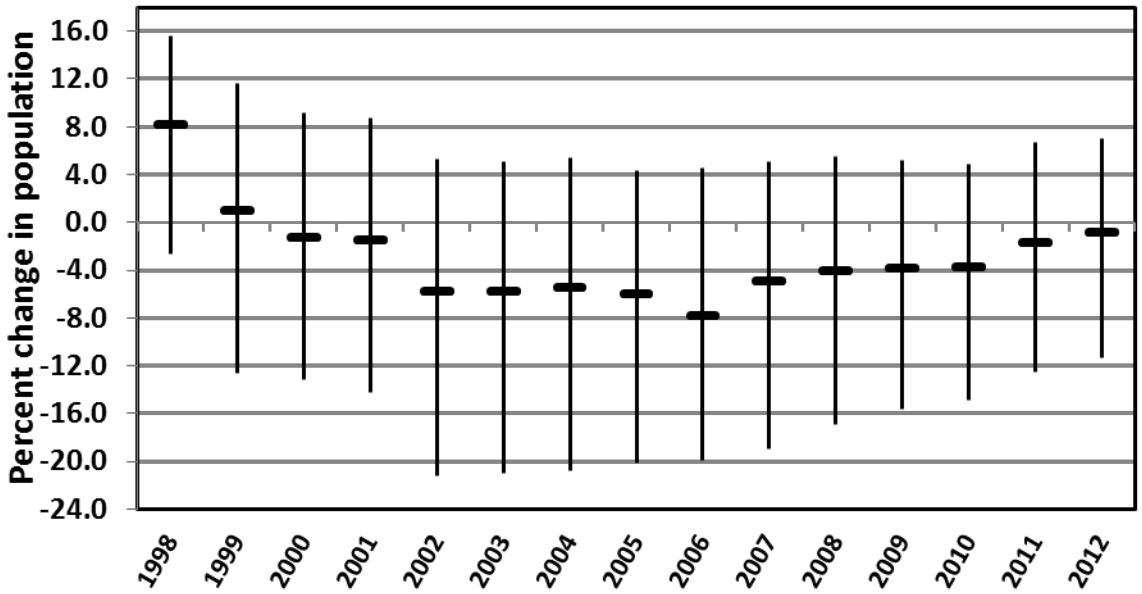


Figure II-3. Point estimate and 95 percent confidence intervals for cumulative annual calculation of population rate of change for native grizzly bears in the Cabinet-Yaak recovery area 1983-2012.

Status of Recovery Criteria

The Recovery Plan estimated that a recovered population in the CYE recovery zone would consist of a minimum of about 100 individual grizzly bears and grizzly bears would also live in and use areas outside the CYE recovery zone. Therefore, Recovery Plan population parameters include bears observed up to 10 miles outside the recovery zone boundary (USFWS 1993, p.83).

Demographic recovery criteria were developed to address overutilization and human-caused mortality (listing factors) within each recovery zone and a 10 mile surrounding buffer by ensuring a sufficient population size and distribution. These demographic recovery criteria include measures for population size, distribution, and sustainable mortality. The Service is in the process of updating demographic recovery criteria for each ecosystem, based on new science and techniques. However, an update is not complete for the CYE grizzly bear population and so we use the 1993 criteria.

Following are 1993 demographic criteria and the mortality data in recent years for the CYE. The 1993 CYE demographic criteria are: (1) six females with cubs over a running 6-year average both inside the recovery zone and within a 10 mile area immediately surrounding the recovery zone, excluding Canada; (2) 18 of 22 BMUs occupied by females with young from a running 6-year sum of verified sightings and evidence; and (3) known human-caused mortality not to

exceed 4 percent of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30 percent of total human-caused mortality shall be females. These mortality limits cannot be exceeded during any two consecutive years for recovery to be achieved. In 1993, grizzly bear numbers were low in this ecosystem therefore the *goal* for human-caused mortality was zero. In reality, the goal of zero human-caused mortality of grizzly bears in the CYE is not likely attainable over time. However, recovery programs aim to reduce mortality to the extent possible. The 1993 Recovery Plan demographic criteria and status for the CYE is summarized in Table II-5

In the CYE, one of the four 1993 demographic recovery criteria were met in 2012 (Kasworm 2013, unpublished data). The population goal of 6 females with cubs has not been met. The 6-year running average was 2.8 females with cubs. The distribution criterion has not been met with only 13 of 22 BMUs occupied by females with young. A positive metric was demographic criteria for human caused mortality, which was met each year for the past four years (2008-2011) (Kasworm et al. 2012, p.18); but it was not met in 2012. The running 6-year average (2007-2012) of total human-caused mortality was 1.7 animals/year (the limit is no more than 1.6) including 0.5 females each year (ibid). Female mortality (0.5),meets the recovery limit of no more than 30% (0.5) of total mortality. However, in 1993, the Recovery Plan stated the mortality *goal* was zero.

Table II-5. Status of the Cabinet-Yaak recovery zone during 2006-2011 (Kasworm et al 2012) in relation to the demographic recovery targets from the grizzly bear recovery plan (USFWS 1993).

Recovery Criteria (USFWS 1993)	Target or *Limit*	Status - 2006-2011(Kasworm et al. 2012, p.18)
Females with cubs (unduplicated sightings)	6 (6-year average)	2.5 females with cubs
Distribution of females with young (BMUs occupied)	18 of 22	12 of 22 BMUs occupied
Human caused mortality limit (4% of minimum estimate)	*1.4 (6-year average)*	1.3 bears (6 year average)
Female, human-caused, mortality limit (30% of total mortality)	*0.4 (6-year average)*	0.3 female bears (6 year average)

Grizzly Bear Mortality in the CYE

Based on data from 1983 to 2011, total grizzly bear mortality rates in the CYE appear to have increased. During the period 1983 to 1998, the mortality rate was 10 percent (that is 10 percent of bears die from all causes in a given year). From 1999 to 2011 that rate increased to 15 percent (Kasworm et al. 2012, p.35). Some of the increase in natural mortality is probably related to poor berry production from 1998 to 2004 (ibid). There appears to be a strong relationship between poor huckleberry production and total mortality in the CYE. During this same time period (1999 to 2011), an increase in human-caused mortality on private lands in the U.S. also

contributed to the increase in overall mortality. Poor berry production may have caused bears to search more widely for foods that may occur on private lands; several mortalities during this time period were associated with private lands (ibid). Notably, while human-caused mortality on private lands *increased*, human-caused mortality on public lands in both Canada and the U.S. *decreased*. As presented in the Access Amendment Biological Opinion (USFWS 2011b, p. 20-27), Kasworm's 2010 synopsis of mortality rates concluded that since 1999, there appears to have been an increase in the numbers of grizzly bears killed on private lands in the CYE recovery area. Also since 1999:

a). natural mortality on U.S. public lands in the CYE recovery area was 53 percent of mortality among radio-collared bears;

b). human-caused mortality on private lands in the U.S. was 23 percent of mortality among radio-collared bears;

c). human-caused mortality on U.S. public lands was 14 percent of mortality among radio-collared bears; and

d). human-caused mortality in B.C. was 10 percent of mortality among radio-collared bears.

Therefore, mortality on private lands in the U.S. has become the largest source of human-caused mortality in the CYE. Grizzly bears are now being killed by humans at disproportionately higher numbers on private lands than on NFS lands: the CYE is about 90 percent public land, yet human-caused mortality on these lands is only about 14 percent of the mortality among radio-collared bears. The CYE is about 10 percent private land, yet human-caused mortality occurring on private land is 23 percent of mortality among radio-collared bears. To accomplish recovery of the population in the CYE, efforts to reduce the high levels of human-caused mortality on private lands are necessary (ibid). Since 2010, 5 additional mortalities have occurred in the CYE. All were human-caused and 4 were on NFS lands and one was on private lands in the U.S.

To address hunter-related mortality, Montana and Idaho state agencies have ongoing hunter outreach efforts. Montana Fish Wildlife and Parks (MFWP) has implemented a mandatory bear identification test since 2002 to help educate hunters in distinguishing species in an effort to reduce mistaken identity and grizzly bear mortality. MFWP also runs numerous public announcements in the media prior to and during hunting seasons, reminding hunters to be knowledgeable and use proper precautions in grizzly bear habitat. A grizzly/black bear identification test is available on the Idaho Fish and Game (IDFG) website and informational letters are mailed to black bear and elk hunters in the fall and spring (Wakkinen 2012, Research and Management Update, p. 2).

7. Factors Affecting the Status of Grizzly Bears in the CYE

Factors affecting the CYE have been described as incomplete habitat conservation measures, unsustainable human-cause mortality, small population size, and population fragmentation that resulted in genetic isolation (USFWS 2011b, p.33).

Human-caused Mortality

In the entire CYE, including British Columbia, between 1982 and 2012, a total of 67 known mortalities occurred for radio-collared grizzly bears from all forms (Table II-6). Of the known mortalities, 49 were human-caused (ibid) and 37 (76 percent) of these were ascribed a known cause of death. Of these 37 mortalities, 54 percent were attributed to poaching (8), mistaken identity during hunting (6), and self-defense (6) (i.e., gunshot related mortalities). Twelve additional grizzly bears were found dead, 9 were killed by gunshot as evidenced by a bullet, but exact cause is unknown and may be related to poaching, mistaken ID, or spiteful killing. All of 12 unknown cases occurred during the hunting season (W. Kasworm 04/04/2013 pers. comm.).

Table II-6. Number of known grizzly bear mortalities by cause in the CYE from 1982 through 2012 (W. Kasworm 04/04/2013 pers. comm.).

Type of Mortality	Canada	United States		Total
	BC	USFS	Other [1]	
Natural				
Conspecific predation [2]	0	3	0	3
Other	4	9	0	13
Subtotal	4	12	0	16
Human				
Poaching	0	2	6	8
Mistaken Identity	0	6	1	7
Self Defense	1	4	1	6
Management Removal/Sanitation	5	0	1	6
Legal Hunting (BC only)	3	0	0	3
Trapping (incidental)	1	1	0	2
Research	1	1	0	2
Train Collision	0	0	3	3
Motor Vehicle	0	0	0	0
Unknown	2	7	3	12
Subtotal	13	21	15	49
Unknown	0	2	0	2
Total	17	33	15	67

[1] Other = includes private, state, and railroad lands.
[2] Conspecific = grizzly bears killing grizzly bears.

As demonstrated by the data, hunting for other species both in Canada and the U.S. in the CYE adds to illegal or mistaken identity mortality of grizzly bears within the greater CYE. The province of British Columbia (B.C.) and the states of Montana, Idaho, and Washington allow hunting for black bears, as well as other wildlife species, on both sides of the border within and

around the recovery zone. Legal hunting of grizzly bears no longer occurs[1] in the U.S. or B.C. but grizzly bears are taken by poachers and occasionally are mistakenly killed during the black bear or big game hunting season. Among several of MFWP's hunter outreach efforts is a mandatory identification test implemented in 2002 to help educate hunters in distinguishing species and reducing mistaken identity and reducing grizzly bear mortalities. MFWP also runs numerous public announcements in the media prior to and during hunting seasons, reminding hunters to be knowledgeable and use proper precautions in grizzly bear habitat.

To address mortalities on private lands, the MFWP employs grizzly bear specialists that handle reports of "nuisance" grizzly bears and trap offending bears. In the CYE, the bear specialist works directly with the public to inform residents as to how to live in grizzly bear habitat without conflicts with bears, and assists them with nuisance black and grizzly bear conflicts. Nuisance grizzly bears are typically habituated to seeking out human-related foods and garbage and pose serious threats to human safety, and often are destroyed. In the CYE, based on anecdotal information, there has been an increase in the number of residents seeking proactive help (e.g. fencing gardens, beehives and other attractants) to prevent conflict prior to an incident and fewer incidents involving problem bears have occurred during recent years (Annis 2013), and represents notable progress toward reducing the potential for conflicts between people and grizzly bears, and in return reduces grizzly bear mortality.

To date, there have been no grizzly bear deaths associated with food attractants on NFS lands in the CYE recovery zone. There has been a concerted effort to improve sanitation on NFS lands throughout the ecosystem, with many campgrounds retrofitted—or scheduled to be retrofitted—with bear resistant garbage and/or food storage containers to reduce encounters and the potential for habituation. Additionally, all resort and recreation residence special use permits renewals in-or-near the recovery zones boundaries include a sanitation guidelines as part of the special use permit. Finally, all National Forests that encompass these CYE recovery zone have implemented mandatory food storage orders that assist in minimizing this impact (USFS 2013a, p. 73 and Appendix C). The KNF Forest-wide Food Storage Order fulfilled one of the two (the other being Access Management) major grizzly bear habitat management needs for federal lands in the CYE.

Habitat Conservation

Habitat conservation includes measures and programs to avoid or reduce habitat loss or displacement of grizzly bears from important seasonal habitats. Displacement is used in general terms to describe "under-use" of habitat. It does not necessarily mean that grizzly bears would totally avoid an area, or be excluded in some way from ever using an area. Such measures and programs that provide habitat conservation include acquisition of important lands for grizzly bears to prevent human encroachment and development; agreements for the conservation and protection of grizzly bear habitat by precluding activities that might otherwise displace bears;

[1] Hunting of grizzly bears was legal in British Columbia until 2008 (USFS 2013a, p. 66).

and comprehensive access management and secure habitat (core areas) for grizzly bears to limit human disturbance and subsequent displacement or risk of conflict.

Land Acquisitions. Land acquisition and exchange in the CYE has placed additional areas within this recovery zone in the public domain and may benefit the long term conservation of the species. There have been 2 major land exchanges in particular that have been beneficial to grizzly bear habitat within the CYE. In 1997 the KNF completed a land exchange in which 33 square miles of land owned by Plum Creek Timber Company were placed in public ownership. Almost all of this land was within the CYE grizzly bear recovery zone and is now under Forest Service management.

In 2005, the Montana Department of Fish Wildlife, and Parks (MFWP) acquired almost 2 square miles in the Bull River Valley between the East and West Cabinet Mountains in the Bull BMU on the KNF. A conservation easement on an adjacent one square mile was accepted from the Avista Company. The area, now known as the Bull River Wildlife Management Area, provides linkage of public land across the river valley and will have value for a number of species including bull trout, westslope cutthroat trout, grizzly bear, lynx, and bald eagle.

Conservation Plans and Agreements. In 1995, the British Columbia provincial government developed a grizzly bear conservation strategy for the lands to the north of the CYE (British Columbia Ministry of Environment, Lands, and Parks 1995, entire). A major goal of the Strategy was to ensure effective, enhanced protection and management of habitat through land use planning processes, new protected areas, and the Forest Practices Code. Gilnockie Provincial Park was established in 1995 just north of the international border in the upper Yaak River drainage. The 11 square mile park is managed similarly to U. S. wilderness areas with little road access.

In September 2012, the MFWP secured a 28,000 acre conservation easement with Stimson Lumber Company for land in the City of Troy. These lands are the largest remaining private in-holding in the CYE recovery zone. The Kootenai Valleys Conservation Program protects important fish and wildlife habitat providing opportunities for linkage and connectivity across Highway 2 in the CYE (see additional information below in Fragmentation and Genetic Isolation).

Additional conservation in the CYE will be achieved through implementation of the State of Montana's recently completed habitat conservation plan (HCP) which addresses the effects of its forest management program on grizzly bears in the CYE. As a result of that plan, open road densities on state lands will be maintained or improved, lands will be inactive for a period of 8 years following a commercial timber sale (to provide habitat security for grizzly bears), and all State forest management employees and its contractors will adhere to food storage and sanitation requirements.

Wheeled Motorized Access Management (also influences Human-caused Mortality): Secure habitat is important to the survival and reproductive success of grizzly bears, especially adult female grizzly bears (Mattson et al. 1987, pp.18-19; IGBC 1994, p. 1). Grizzly bear habitat security is primarily achieved by managing motorized access which—1) minimizes human interaction and reduces potential grizzly bear mortality risk; 2) minimizes displacement from

important habitat; 3) minimizes habituation to humans; and 4) provides habitat where energetic requirements can be met with limited disturbance from humans (Mattson et al. 1987; McLellan and Shackleton 1988; McLellan 1989; Mace and Manley 1993; Mace et al. 1996; Wakkinen and Kasworm 1997). In 1998, an IGBC interagency task force examined motorized access management and produced recommendations to standardize definitions and methods (IGBC 1998, pp.3-5). This report recommended three parameters to include as components of access management: 1) open motorized route density (OMRD)[2]; 2) total motorized route density (TMRD); and 3) core areas.

In the CYE, the benchmark for the proposed standards are the average levels of access and secure habitat reported by Wakkinen and Kasworm (1997, p.1) to adequately support a female grizzly bear with cubs:

- On average, 26 percent of a female grizzly bear home range had TMRD greater than 2 miles per square mile.
- On average, 33 percent of a female grizzly bear home range had OMRD greater than 1 mile per square mile.
- On average, 55 percent of a female home range was comprised of core area (i.e., roadless area or areas with barriered roads).

Past management actions on NFS lands related to motorized access (e.g., timber sales and associated road construction, road maintenance, and watershed improvements through sediment reduction from roads – including road decommissioning) led to the existing wheeled motorized vehicle route system on the landscape.

The 2011 Access Amendment for the SE and CYE established standards for core area, OMRD and TMRD for each BMU in the Recovery Zones (USFS 2011c). The road density (OMRD and TMRD) security measures are calculated on a BMU basis using a GIS moving-windows routine. The Access Amendment established timeframes within which all standards in individual BMUs in the CYE would be met (i.e. completion by 2019). Actual accomplishment dates will depend on management priorities, funding, and the completion of required project-level environmental analyses under NEPA. The Access Amendment also established the amount of administrative use that may occur on each individual gated road within the recovery zone, based on the "bear year" (spring, summer and fall). Each district retains a count of use that occurs by road; this information is reported to the FWS in the spring of each year. Another key feature of the Access Amendment was the re-evaluation of BORZ boundaries and establishment of a no-net increase in existing linear miles of open and permanent roads.

There are 22 BMUs in the CYE recovery zone. According to Service calculations (USFWS 2011a. p. A-39), in the CYE recovery zone, there was an increase of approximately 24,230 acres of core area from 2000 to 2010. This translates into an increase from about 56 percent of the

[2] Includes both roads and trails

CYE recovery zone to more than 57 percent of the CYE recovery zone providing core area habitat. Overall, motorized route densities have been reduced and secure habitat has increased in the CYE since the grizzly was listed.

The Grizzly Bear Access Amendment standards and their current status are displayed in Table II-7. Attainment of the standards is anticipated by approximately 2019. At that time, core area in the CYE will have increased by 20,756 acres such that 58.5 percent of the CYE is in core area and 20 of 22 BMUs will meet the research benchmark for core area (USFWS 2011a, p. A-60). Additionally, OMRD and TMRD will improve, such that 15 of 22 BMUs will meet or be better than the OMRD research benchmark (currently 15 of 22 meet) and 16 of 22 BMUs will meet or be better than the TMRD benchmark (currently 13 of 22 BMUs meet) (USFWS 2011a, p. A-66).

The grizzly bear access amendment fulfills one of the two (the other being a Food Storage Order) major grizzly bear habitat management needs for federal lands in the CYE.

Table II-7. Status of standards for core, OMRD, TMRD for the CYE BMUs in the action area for bear year 2011[1]. Values in blue reflect standards set in place in November 2011 in the Access Amendment.

Forest Zone	Bear Management Unit	Percent OMRD >1 mi/mi^2 (standard)	Percent TIMRD>2 mi/mi^2 (standard)	Percent Core Area (standard)	Percent Federal Land
	1 (Cedar)	15 (15)	8 (15)	83 (80)	99
	2 (Snowshoe)	18 (20)	16 (18)	77 (75)	94
	3 (Spar)	30 (33)	26 (26)	62 (59)	95
	4 (Bull)	38 (36)	29 (26)	62 (63)	84
	5 (St. Paul)	29 (30)	23 (23)	58 (60)	97
	6 (Wanless)	32 (34)	34 (32)	53 (55)	85
	7 (Silver Butte)	24 (26)	23 (23)	63 (63)	92
	8 (Vermilion)	32 (32)	24 (20)	55 (55)	93
	9 (Calahan)	28 (33)	27 (26)	58 (55)	90
	10 (Pulpit)	45 (44)	27 (34)	54 (52)	95
	11 (Roderick)	28 (28)	27 (26)	54 (55)	96
	12 (Newton)	43 (45)	32 (31)	56 (55)	92
	15 (Garver)	31 (33)	26 (26)	54 (55)	94

Forest Zone	Bear Management Unit	Percent OMRD >1 mi/mi^2 (standard)	Percent TIMRD>2 mi/mi^2 (standard)	Percent Core Area (standard)	Percent Federal Land
	16 (EF Yaak)	29 (33)	27 (26)	54 (55)	96
	17 (Big Cr.)	31 (33)	16 (26)	56 (55)	99
KNF/IPNF	13 (Keno)	33 (33)	25 (26)	59 (59)	99+
	14 (NW Peak)	28 (31)	26 (26)	56 (55)	99+
	18 (Boulder)	34 (33)	35 (29)	49 (55)	92
	19 (Grouse)	60 (59)	59 (55)	32 (37)	54
	20 (North Lightning)	35 (35)	19 (20)	64 (61)	94
	21 (Scotchman)	37 (34)	27 (26)	63 (62)	81
Lolo	22 (Mt. Headley)	38 (33)	37 (35)	(55)	89

1. *Data provided reflect on-the-ground access conditions during the 2011 "bear year" (i.e. April 1 – November 30 in the Cabinet-Yaak ecosystem).*

Small Population Size

Currently, small population size is being addressed by MFWP's augmentation program and efforts to maintain linkage and connectivity. The latter is discussed below under the heading Fragmentation and Genetic Isolation.

Augmentation. From 1990 to 1994, the MFWP captured four female grizzly bears in the Flathead River Valley of British Columbia and released them in the Cabinet Mountains to augment the existing population. One of the transplanted bears and her cub died of unknown causes a year after release (Kasworm et al. 1998, p.151). The remaining three bears were monitored until their collars fell off. The program was designed to determine if transplanted bears would remain in the target area and ultimately contribute to the population through reproduction. Three of four transplanted bears remained within the target area for more than one year. Though one of the transplanted bears produced a cub, the animal had likely bred prior to translocation and did not satisfy the criteria for reproduction with native males.

In 2005, the MFWP again began augmenting the grizzly bears in the Cabinet Mountains. In 2005 and 2006, an adult female grizzly bear and a subadult female, respectively were transplanted from the North and South Fork Flathead River drainages to the Cabinet Mountains. No bears were transplanted in 2007 as no suitable females were captured. Two female grizzly bears were released during 2008. In October 2008 both of these bears were killed. Since 2009, 5 bears were moved from the NCDE to the CYE. The two males, moved in 2010 and 2011,

remain in the CYE (Mace and Roberts 2012, p. 32). All three females returned to the NCDE (ibid).

Augmentations and reintroductions of wildlife species typically include an expectation for relatively high mortality of relocated individuals and emigration of relocated individuals from the release area. However, augmentation of grizzly bears into the Cabinet Mountains has met significant success to date. Kasworm et al. (2012, pp.22 and 25) reported that fourteen bears have been added to the Cabinet Mountains population since 1990 (11 females and 3 males) through the augmentation effort. Three female bears and one male have left the target area and 4 bears are known to be dead. One of the bears that is known to be dead survived for 16 years in the Cabinet Mountains and produced at least 9 young. Those offspring are known to have produced at least 8 young. Few captures or hair snags of native bears in the Cabinet Mountains since the beginning of the augmentation program in 1990 suggest that the population was probably smaller than originally estimated (much fewer than 15 bears). The information also indicates that the Cabinet Mountains grizzly population would probably have disappeared without augmentation. The MFWP intends to continue the augmentation effort into the future with plans to relocate two bears for the coming season (depending on suitability of captured bears) (J. Williams 06/12/2013 pers. comm.).

Fragmentation and Genetic Isolation.

The effects of fragmentation and genetic isolation are closely related to the small size of the CYE population, which is discussed above.

Fragmentation. Presently, there has been limited movement of native bears between the Cabinet Mountains and Yaak portions of the CYE. One subadult male has crossed the Kootenai River moving from the Yaak to the Cabinets and then returning to the Yaak (W. Kasworm 8/24/2013 pers. comm.). However, there is currently no indication of successful movement and breeding activity by native bears resulting in gene flow between the two portions of the recovery zone. Grizzly bears augmented into the Cabinet Mountains have crossed Highway 2 during exploratory movements moving into the Yaak area and east back to the NCDE (ibid). We are encouraged by this recent data on grizzly bear movements in the CYE. In the past 5 years there have been more detections of Yaak grizzly bears (telemetry and hair snags) nearer the Kootenai River on the north side than in previous years (ibid). Recent DNA results show the first documented movement of a grizzly bear between the SE and the CYE (W. Wakkinen 07/02/2013 pers. comm.). The DNA data indicate that a young male grizzly bear that was born in the SE successfully crossed into the Cabinet Mountains of the CYE. The parents and sibling of the young male remained in the SE.

Potential isolation from grizzly bears in the Canada portion of the greater CYE is identified as a potential threat to grizzly bears in the U.S. portion of the ecosystem. Conditions in Canada and along the international boundary currently allow movement of grizzly bears between Canada and the Yaak portion of the CYE, but grizzly bear habitat is being affected by highways and associated development in Canada. Kasworm (2013 , p.3) reported the movements of an augmented female grizzly bear from the Cabinet Mountains through the Yaak to the NCDE north

to Canada and then back to the CYE. The female grizzly has made this trip in two consecutive years.

The Kootenai Valleys Conservation Easement Program described above under Conservation Agreements, protects lands important for linkage and connectivity within the CYE. The MFWP recently secured the Kootenai Valleys Conservation Easement Project on 28,000 acres of Stimson Lumber lands along Highway 2 near the town of Troy. These lands represent the largest in-holding of private lands in the CYE recovery zone and are largely surrounded by KNF lands. Conservation of these lands maintains habitat necessary for linkage and connectivity between the Cabinet Mountain and Yaak River bears in the CYE.

As stated above, one female grizzly bear with a cub is known to regularly use habitat between the NCDE and CYE and additional females with cubs have also been observed in the Tobacco BORZ between the CYE and NCDE (Kasworm et al. 2012, p. 16).

Genetic Isolation

Proctor et al. (2012, p.10) compiled and analyzed all known genetic and movement data for grizzly bears in 10 different study areas. The genetic data reflect fragmentation occurring on the landscape in the recent past (i.e., last 30-60 years) and may not reflect current, improved levels of connectivity and recent movement of grizzly bears between areas. In other words, current grizzly bear populations may not be as isolated as the genetic data of this study suggest. Therefore, it is useful to supplement these genetic data with movement data to get a complete picture of current population connectivity.

Proctor et al. (2012, p.31) documented increasing genetic and demographic fragmentation across Canada Highway 3. If allowed to continue, this fragmentation could lead to a loss of connectivity between U.S. and Canadian grizzlies. This is an important concern for the CYE where the population is small, hence maintaining and increasing movements by females (i.e., demographic rescue) is critical to the long-term conservation of these populations. Recovery could be accomplished via natural movements or translocating animals.

Proctor et al. (2012) found 4 males and 1 female using habitat between the Selkirk and Purcell Mountains, although there was no evidence indicating any migration between these 2 mountain ranges. Mace and Roberts (2012, Figure A1, contained in this biological opinion as Figure II-4) compiled the distribution of verified records of grizzly bears in and adjacent to the NCDE recovery zone based on a compilation of telemetry data, mortality data, and DNA detections. They documented both male and female grizzly bears in habitat between the NCDE and CYE. We have documented one female grizzly bear with a cub that regularly uses habitat between the NCDE and CYE. She and her offspring spend most of their summer in the Salish Mountains of Montana less than 2 miles east of the edge of the CYE while denning within the boundaries of the NCDE recovery zone (Kasworm et al. 2008). There have been several different grizzly bears with cubs documented using habitat west of Highway 93, since 2002 (USFWS 2011b, pp.29-30).

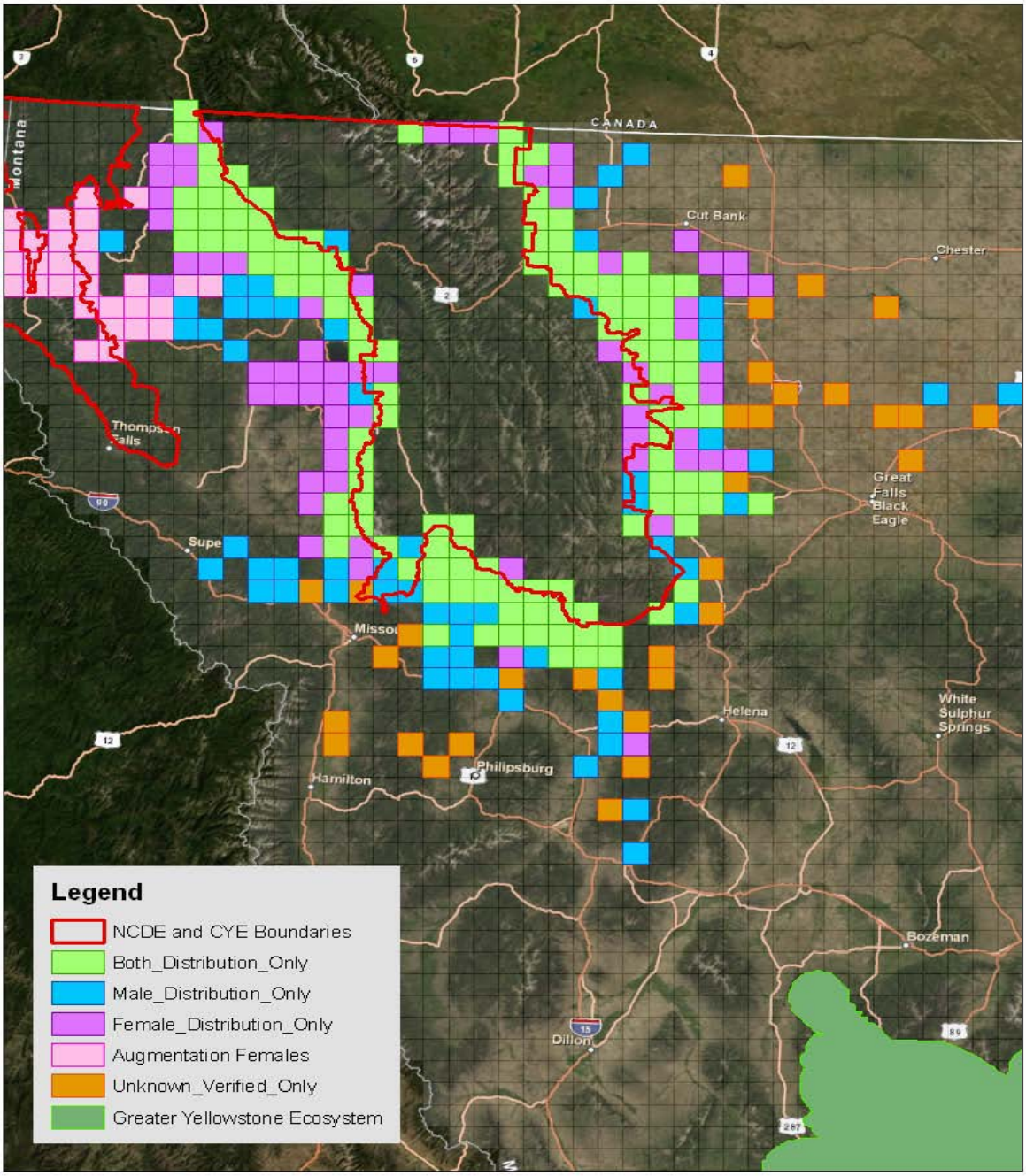


Figure II-4. Distribution of grizzly bears in and adjacent to the NCDE federal recovery zone from 1989 to-2011). Based on telemetry data, mortality data, and DNA detections in 2004 (from Kendall et al. 2009) *in* Mace and Roberts 2012*. ****Occupancy was based on presence within 10 km^2 grid cells.*

Currently, it is not possible to tell if movements we are observing reflect an increase in bear movements or an increase in detection effort and technology (e.g., radio-transmitter collars; genetic techniques) (Proctor et al. 2012). These promising detections of grizzly bear movements should be tempered by the idea that detected movement does not mean migrants are breeding successfully. If there is no successful reproduction, then there is no genetic or demographic rescue occurring. There seems to be high mortality risk associated with migrant bears (Proctor et al. 2002, p.128; Proctor et al. 2012). However, these data are helpful when considering how to most effectively manage and conserve the remaining grizzly bear populations in the lower 48 States. For example, these data emphasize the importance of maintaining demographic connectivity with Canadian populations and the small populations of the North Cascades ecosystem, SE, and CYE. Recovery of these small populations may eventually provide genetic and demographic rescue such that a grizzly bear population could establish in the Bitterroot Ecosystem.

The MFWP augmentation program is an important component of maintaining the genetic health of the population. Studies demonstrate that inbreeding depression can be reversed through augmentation (Hedrick 1995 and 2001; Keller and Waller 2002 as cited *In* USFWS 2006a, p. A-17). Augmentation of the Cabinet Mountains segment aids in alleviating the isolation within that portion of the CYE. However, interchange of bears is ultimately dependent on creating and/or maintaining effective habitat linkage zones between the Yaak and the Cabinet Mountains (USFWS 2006a, p. A-17), as well as between the NCDE and CYE.

Summary of Status of Grizzly Bears in the CYE

In 2006, the Service identified the six priority conservation needs to achieve grizzly bear recovery in the CYE grizzly bear recovery zones, and they pertain to the action area (see Section C. Environmental Baseline) as well:

1. Augment the Cabinet Mountains and Canadian Selkirks populations;
2. Limit human-caused mortality;
3. Enhance population linkage across Highways 2, 3, 200, 135, and 95;
4. Address the needs of bears outside the recovery zone line;
5. Inside the recovery zone, a) complete access management in most important areas and b) improve sanitation standards on public land;
6. Increase outreach and public involvement.

The following progress has been made since 2006 to address these concerns:

- Ongoing augmentation program in the CYE (need 1)
- Ongoing public education and outreach programs in both recovery zones (needs 2 and 6), including:

  - In Montana, hunter education since 2002; bear specialist programs since 2007 (MFWP 2013); and regular programs of public information and education within the CYE recovery zone by the IPNF and KNF (USFS 2013a, p. 73)

- Implementation of the Kootenai Valleys Conservation Easement Project in the city of Troy (2012) in the CYE (need 3)
- Completion of the Access Amendment for BMUs and BORZ on NFS lands in the CYE and SE on the KNF and IPNF in 2011 (needs 4 and 5a)
- Implementation of food storage orders on all forests overlapping the CYE in 2011 and on the IPNF in the SE (need 5b).

The CYE grizzly bear population has a slightly declining, but improving trend since 2006. Since 2006, lambda (rate of change in the population) has improved and moved closer to stability (1.0) – an indication that the CYE grizzly bears population status is improving. Food storage orders and access management (the two primary issues affecting bears on Federal lands) are in place. Lands along Highway 2 have recently been secured through a conservation easement to protect important future linkage areas. Additionally, the MFWP continues its augmentation program and hunter education, outreach, and specialist programs. The augmentation efforts have resulted in increasing grizzly bear numbers in the Cabinet Mountains through successful reproduction of a relocated female and her offspring.

Northern Continental Divide Ecosystem

The NCDE is essential to the conservation and recovery of grizzly bears. Grizzly bears remain on less than two percent of their historic range in the lower 48 States. The juxtaposition of the NCDE population to the CYE grizzly bear populations to the west, makes it essential to long-term survival and recovery of grizzly bears throughout a significant portion of its range in the U.S.

The NCDE of north central Montana (9,600 square miles) is approximately 45 miles from the BE and 15 miles from the CYE. Of the 5,717,399 acres within the NCDE recovery zone, 78 percent (4,443,035 acres) are Federally-owned, 4 percent (231,545 acres) are State owned, 7 percent (390,403 acres) are Tribal owned, and 10 percent (585,461 acres) are privately owned. An additional 1 percent is either water (66,953 acres) or owned by city/county government (1 acre). Federal ownership is primarily divided among Glacier National Park (17 percent) and the Flathead National Forest (40 percent) with the Lewis and Clark, Helena, Lolo, and Kootenai National Forests managing most of the remaining Federal Lands (20 percent) within the NCDE. Thirty percent (1,728,509 acres) of all lands inside the NCDE are designated Wilderness Areas.

Population Trend

In 2004, the USGS conducted an extensive DNA-based study to estimate the grizzly bear population size in 7.8 million acres of occupied grizzly bear range in and around the NCDE recovery zone. The Northern Divide Grizzly Bear Project involved genetic analysis of

noninvasive hair sampling collected during 2004. A final total grizzly bear population estimate of 765 grizzly bears was reported for the year 2004 (USGS 2008), and the population has increased since then (Mace and Roberts 2012). The population estimate of 765 for 2004 illustrates the conservative nature of the recovery plan minimum population estimate of 304 grizzly bears in 2004. The DNA-based estimate is scientifically robust, and is more than two times the recovery plan estimate.

In 2004, Montana Fish, Wildlife and Parks initiated a NCDE grizzly bear trend monitoring project (Mace and Chilton 2009). The purpose of this program is to estimate population trend by monitoring the survival and productive rates of radio-instrumented female grizzly bears. Thus far, a total of 104 individual females have been captured and monitored (Mace and Roberts 2011). Results reveal an annual growth of about 3 percent since 2004 indicative of an increasing grizzly bear population in the NCDE (ibid.).

Grizzly bears are well distributed throughout the NCDE recovery zone. Based on conflicts, mortalities, observations, and the NCDE DNA population study, we know that grizzly bear range has expanded outside of the recovery zone boundaries (Mace and Roberts 2011, pp. 38-39). For instance, a male grizzly bear was documented approximately 80 miles east of the recovery zone boundary in 2009. Both males and females are becoming increasingly common in river and creek bottoms and shrubby draws between the recovery zone boundaries and Interstate 15 to the east along the Rocky Mountain Front. There have been three female grizzly bears with cubs documented west of Highway 93 in the Flathead River valley since 2002 and three 3 male grizzly bears documented south of Interstate 90 since 2002 (USFWS 2011b).

Status of Recovery Criteria

With the recent DNA-based population estimate for 2004, the methodology to estimate minimum population size outlined in the 1993 recovery plan has become outdated (Servheen 2008). In an effort to apply the DNA-based population estimate for the year 2004 to the existing recovery plan criteria (USFWS 1993), the Service has outlined an interim process (Servheen 2008). This interim process will remain in effect until such time as the five-year status review and the formal recovery plan revision are complete. Because the DNA-based population estimate is for the year 2004, the interim process makes some assumptions in order to be applicable to post-2004 grizzly bear populations, with the primary assumption being that grizzly bear populations do not increase or decrease rapidly. Assuming that grizzly bear populations increase or decrease slowly under most conditions, we now use the 2004 population estimate of 765 grizzly bears post-2004, rather than use the Recovery Plan's minimum population estimate based on females with cubs. Using the 2004 population estimate is conservative because it is not accounting for the three percent positive population trend that has been calculated for the NCDE. Mace and Roberts (2012) indicate an increasing trend since then.

We will however, continue to use the 1993 Recovery Plan criteria, applying the conservative 4 percent total mortality limit and the 30 percent female mortality limit. However, we now apply the criteria to the population estimate of 765 grizzly bears. As of 2011, the 6-year average of known human-caused total mortalities in the NCDE is 20.3 (USFWS 2012a in litt.). Using our

criteria limits applied to the population estimate, we find that total known human-caused mortality is below the sustainable mortality level of no more than 30.6 per year. The 6-year average of known human-caused female mortalities in the NCDE is 7.2, also below the sustainable mortality level of no more than 9.2 per year. Table II-8 displays the known human-caused mortality for the NCDE from 2006 through 2011. This is an interim application of the DNA-based population estimate of 765 grizzly bears using the methods in the 1993 recovery plan to determine the sustainable mortality limits for the NCDE.

Table II-8. NCDE known human-caused grizzly bear mortality and 6-year averages compared to sustainable 6-year averages of 30.6/year for all bears and 9.2/year for all females – 2006 through 2011 (USFWS 2012a in litt.; C. Servheen 07/22/2013 pers. comm.).

Year	All Bears	All Female Bears
2006	14	4
2007	26	7
2008	11	7
2009	20	7
2010	21	5
2011	30	13
2012	18	4
Total	122	43
6-year Running Average	20.3/year (compared to 30.6/year)	7.2/year (compared to 9.2/year)

The USGS study (Kendall et al. 2009) also indicated that in 2004:

1) Female grizzly bears were present in all 23 BMUs.

2) The number and distribution of female grizzly bears indicated good reproductive potential.

3) The occupied range of NCDE grizzly bears now extends 2.6 million acres beyond the 1993 recovery zone.

4) The genetic health of NCDE grizzly bears is good, with diversity approaching levels seen in undisturbed populations in Canada and Alaska.

5) The genetic structure of the NCDE population suggests there was population growth between 1976 and 2007.

6) Human development is just beginning to inhibit interbreeding between bears living north and south of the U.S. Highway 2 corridor, west of the Continental Divide.

Factors Affecting the Status of Grizzly Bears in the NCDE

Human-caused Mortality - Attractant- related grizzly bear deaths are among the leading causes of grizzly bear mortality in the NCDE (C. Servheen 01/28/2013 pers. comm.). Data collected between 2000 and 2012 demonstrate management removal of habituated grizzly bears related to human food, garbage, pet and bird feed, and livestock, resulted in approximately 33 percent of total grizzly bear mortality within the NCDE recovery zone (Table II-9).

Table II-9. Human-caused grizzly bear mortality in the NCDE from 2000 to 2012 (USFWS 2011, C. Servheen 01/28/2013 pers. comm.).

	Source of Human Caused Mortality in the NCDE									
Year	Mgmt Removal	Mistaken ID	Self-defense	Illegal	Not known	Train	Car	Capture Related	Augment-ation	Total
2000	7	3	3	6	0	0	1	0	0	20
2001	9	0	2	4	0	4	1	1	0	21
2002	4	0	3	2	0	1	4	0	0	14
2003	4	1	1	3	0	1	3	0	0	13
2004	13	1	1	5	1	4	3	3	0	31
2005	6	2	2	4	0	0	0	4	1	19
2006	3	1	0	3	0	3	0	2	1	13
2007	2	1	4	4	0	5	6	0	0	22
2008	2	2	1	3	0	0	1	1	2	12
2009	3	3	5	4	1	2	0	1	0	19
2010	11	0	0	2	0	0	5	0	1	19
2011	12	1	8	4	0	3	1	0	1	30
2012	4	0	3	7	0	0	3	0	1	18
Total	76	15	30	44	2	23	25	12	6	233

Annual monitoring indicates that the three most common forms of human-caused mortalities in the NCDE from 2000 through 2012 were management removals, illegal killings, and mistaken identification. Human-caused grizzly bear mortality levels were unusually high in 2004 (Table II-9). Many of the unprecedented number of conflicts in 2004 can be attributed to a dramatic huckleberry failure (similar to that recorded in the CYE for that year) and resulting conflicts arising from attractants on private lands luring bears onto private property. The grizzly bear population has been increasing from 2004 to 2011, despite the level of human-caused mortality (Mace and Roberts 2012, p. 24). Much of the recent grizzly bear mortality continues to occur on private lands (C. Servheen 01/28/2013 pers. comm.).

To address food and attractant storage issues, the National Forests, Glacier National Park, and Bureau of Land Management also enforce a food-storage order throughout the NCDE, and have various information programs regarding recreating safely in grizzly bear habitat. MFWP employs grizzly bear specialists that work with the public, primarily to inform residents as to how to live in grizzly bear habitat without conflicts with bears.

The MFWP grizzly bear specialists that handle nuisance grizzly bear reports, and trap offending bears. These specialists work with the public to inform residents as to how to live in grizzly bear habitat without conflicts with bears. Nuisance grizzly bears are typically habituated to seeking out human-related foods and garbage and pose serious threats to human safety, and often are destroyed. The MFWP manages black bear and big game hunting in the state. Among other measures to reduce defense of life and mistaken identity kills of grizzly bears, MFWP requires a mandatory black bear and grizzly bear identification training for all black bear hunters in the state. The National Forests have various information programs regarding recreating safely in grizzly bear habitat. Access management has been addressed on NFS lands in the NCDE through Amendment 19 to the Flathead National Forest Plan or similar management. Additionally, all Forests, Bureau of Land Management and Glacier National Park enforce food storage and sanitation orders in the recovery zone. Grazing allotments do not represent a substantial risk of mortality within the NCDE.

Summary of the Status of Grizzly Bears in the NCDE

All status evidence indicates the strength of this population, including current distribution of grizzly bears within and outside the recovery zone, a total population estimate of 765 grizzly bears in the NCDE for the year 2004, and the three percent positive rate of annual growth since then. Kendall et al. (2009) found that the recent decrease in genetic differentiation and the expanded distribution of grizzly bears in the NCDE are consistent with population growth. The results of the study suggest that the NCDE grizzly bear population is doing better than previously thought (Ibid.). The number and wide distribution of female grizzly bears detected during the study (Kendall et al. 2009), along with reported numbers and locations of recent sightings and conflicts, information and observations of MFWP (Jonkel 2008 unpublished presentation as cited *In* USFWS 2010; Madel 2008 unpublished presentation as cited *In* USFWS 2010; Mace and Roberts 2012), also suggest an increasing number of grizzly bears outside the recovery zone. Based on the best available information, the Service concludes that the status of the NCDE grizzly bear population is robust and at or nearing recovered levels. Future data will continue to be used to assess population growth or decline.

The NCDE is large, comprised of large portions of public lands, including Glacier National Park and large blocks of wilderness areas. Motorized access on federal multiple use lands is managed under appropriate standards and guidelines, and a Food Storage Order is in place throughout the recovery zone on most Federal lands. Current levels of human-caused mortalities appear to be sustainable. More than 17 percent of this ecosystem is private land and the majority of bear-human conflicts and bear deaths occur on these private lands. Therefore, efforts by MFWP and other agencies and NGOs to work with private landowners to minimize these conflicts remain important for this population of grizzly bears.

8. Climate Change

This section describes current climatic conditions, anticipated future conditions, and the anticipated effects on grizzly bears.

Current Conditions

Global warming of the past 50 years is due primarily to human-induced increases in heat-trapping gases, causing increases in global average temperatures, and changes in ocean heat content, precipitation, atmospheric moisture, and Arctic sea ice (Karl et al. 2009, p.9). Analysis of various climate data for the Northern Hemisphere suggest that the rate of warming observed in the 20th century, as well as the magnitude of global temperatures from 1990 to 2004, is unprecedented in the past 2000 years (Moberg et al. 2005, p.615).

At the National level, over the past 50 years, the U.S. average temperature has risen more than 2 degrees Fahrenheit (°F), precipitation has increased an average of about 5 percent, extreme weather events, such as heat waves and regional droughts, have become more frequent and intense, and sea level has risen along most of the U.S. coast (Karl et al. 2009, p.27). In addition, cold-season storm tracks are shifting northward and Arctic sea ice is declining. Ecosystem processes are affected by climate and by the concentration of carbon dioxide in the atmosphere (Janetos et al. 2008, p.2). The diversity of living things (biodiversity) in ecosystems is itself an important resource that maintains the ability of these systems to provide the services upon which society depends. Many factors affect biodiversity including: climatic conditions; the influences of competitors, predators, parasites, and diseases; disturbances such as fire; and other physical factors. Human-induced climate change, in conjunction with other stresses, is exerting major influences on natural environments and biodiversity, and these influences are generally expected to grow with increased warming (ibid).

In the western United States, both the frequency of large wildfires and the length of the fire season have increased substantially in recent decades, due primarily to earlier spring snowmelt and higher spring and summer temperatures (Westerling et al. 2006, pp.942-943). Changes in climate have contributed significantly to several major insect pest outbreaks in the United States and Canada over the past several decades. Drought and hot, dry weather have led to an increase in outbreaks of insects in the Columbia Basin, especially mountain pine beetle (ISAB 2007, p.91). Even though there are few climate change studies specific to sub-regions, such as western Montana, there is some data available for the state. For instance, the Montana Climate Action Project (NCAT 2009, http://www.montanaclimatechange.com/learn.php) website reports that warmer springs are making snow melt sooner, and early snowmelt leaves rivers low by summer's end. Over the last century, the average temperature in Helena, Montana, has increased 1.3 °F, and precipitation has decreased by up to 20 percent in many parts of the state.

Future Regional and Local Climate Conditions

The following information is summarized from the USDA Forest Service Kootenai and Idaho Panhandle National Forests Planning Zone (KIPZ) Climate Change Report (USFS 2010b) and KNF Land Management Plan draft EIS (2011b).

An assessment on climate change for the planning zone (i.e., the area encompassed by the KNF and IPNF Revised Forest Plans) synthesized the most recent scientific information regarding how future climate change may impact forest resources and disturbance processes on the KNF and the IPNF (USFS 2010b, pp. i-vii). This report concluded the average annual temperatures will increase 2.2°F by the 2020s and 3.5°F by the mid-21st century. The greatest temperature

increases are predicted for the summer season. Precipitation predictions are considered less certain, but most of the climate change models project decreases in summer precipitation, increases in winter, and little change in the average. It is also predicted that some extreme events will occur more frequently or with greater magnitude, while others may be less frequent (i.e., more unusually warm periods and fewer really cold spells). Other research for the northern Rockies (Westerling et al. 2006, Running 2006, Morgan et al. 2008) predicts warmer springs, earlier snowmelt, and hotter, drier summers with longer fire seasons and larger, more intense fires.

The report also concludes climate changes are likely to increase the frequency of large fire years in the Northern Rockies and that fire seasons will be longer. Some of the climate change modeling efforts has suggested that by the 2080s, the amount of area burned by wildfires in the Pacific Northwest region (including Idaho and western Montana) would double or triple. However, as explained in more detail in the KIPZ Climate Change Report, there are a number of key sources of uncertainty regarding this issue.

The potential influence of climate change on some of the key forest insects and diseases of the Northern Rockies is discussed in the KIPZ Climate Change Report (USFS 2010b, pp.i-vii). In addition, a literature review of climate change and forest diseases of Western North America is presented in Kliejunas et al. (2009, p.2). These documents conclude that climate change will lead to reductions in tree health and will improve conditions for some insects such as bark beetles and damaging pathogens such as root diseases.

Over the last 50 years, average spring snowpack (April 1 snow water equivalent) has declined and average snowmelt runoff is occurring earlier in the spring. These trends are observed for northwestern Montana, the entire Pacific Northwest, and much of the western U.S. Since the available data is limited to the last 50 years, it is not clear whether these trends are persistent long-term trends or reflect short-term decade-to-decade variability that may reverse in coming years. Several recent studies of the same trends across the entire western U.S. have concluded that natural variability explains some, but not all, of the west-wide trend in decreasing spring snowpack and earlier snowmelt runoff.

Climate Change Effects to Grizzly Bears

Climate change trends in the Pacific Northwest region will be important to grizzly bears with respect to how these trends may affect denning behavior, foraging habitat availability, and fire-regimes.

Predicted decreases in snowpack levels may shorten the denning season as foods are available later in the fall and earlier in the spring. Spring and fall encounters between grizzly bears and people may therefore increase, escalating the mortality risk to bears during these times.

An additional effect of climate change could be changes in the availability of and distribution of foraging areas due to increasing temperatures and seasonal changes in precipitation. The extent and rate to which plant species and communities would be affected is difficult to predict. Changes in vegetative distributions may also influence other mammal distributions, including prey species like ungulates.

As described earlier, grizzly bears are opportunistic feeders and will consume almost any available food. Because grizzly bears are such successful omnivores, climate-induced vegetative changes may not have detectable negative effects on grizzly bear populations in the lower 48 States.

An increase in the frequency of large-scale wildfires may result in reductions in forest cover and some types of foraging habitat, while potentially creating other types of foraging habitat, e.g. shrub, berry, and grassland forage areas.

Grizzly bears are habitat generalists and opportunistic omnivores, able to find resources in a wide variety of habitat conditions. It is difficult to predict how this large, wide-ranging species would respond to environmental changes associated with climate change. At this time, the scope and scale of such changes are unknown, and the effects (positive or negative) on grizzly bears would likely be variable across the landscape.

Through KNF's significant participation in the IGBC, it is made aware of new findings relative to grizzly bears in the action area. If climate change affects the status of the grizzly bear such that we have new information relevant to our effect analysis below, reinitiation of the consultation may be necessary.

9. Analysis of the Species Likely to be Affected

Grizzly bears are a wide-ranging species requiring large, interconnected areas of suitable habitat. The preponderance of grizzly bear habitat in recovery zones occurs on NFS lands. Grizzly bears on the KNF occur in the CYE and NCDE recovery zones. The CYE grizzly bear population is small, about 40 bears, and the NCDE population is robust at over 765 bears. The KNF Revised Plan Forest-wide direction describes the framework under which lands will be managed for the next 10 to 15 years on the KNF. The biological opinion considers the effects of implementation of the Revised Plan as well as the effects of Plan elements specific to the conservation of grizzly bears and grizzly bear habitat.

C. ENVIRONMENTAL BASELINE

The environmental baseline section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat, if applicable), and ecosystem, within the action area (USFWS and NMFS 1998).

The environmental baseline includes:

- the past and present impacts of all Federal, State, or private actions and other human activities in an action area,
- the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early section 7 consultation, and
- and the impact of State or private actions that are contemporaneous with the consultation in process[50 CFR §402.02].

1. Action Area

As described in Section A., this biological opinion addresses the effects on grizzly bears related to the KNF Revised Plan. Therefore, the action area is the entire KNF. Currently, grizzly bears on the KNF are most often using habitat within BMUs and BORZ - adjacent areas on the KNF identified as having recurring use by grizzly 'bears outside of the recovery zone'. However, bears are also observed infrequently on other areas of the KNF and given the 10 to 15 year timeframe this plan will be in place, it is reasonable to assume that grizzly bears may occur in additional areas of the KNF during the life of the plan.

Within the action area, there are 15 BMUs in the CYE recovery zone wholly in the KNF, 2 BMUs in the CYE with shared ownership between KNF and IPNF (Keno and NW Peak), 4 BORZ areas associated with the CYE, and two BMU subunits in the NCDE recovery zone (Tables II-10, II-11, and II-12). Figure II-2 shows the location of the KNF BMUs and BORZ associated with the CYE.

2. Status of the Species within the Action Area

Within the action area, the status of grizzly bears are affected by the same mechanisms affecting the overall status of the grizzly bear populations in the CYE and NCDE, as described above in the Range-wide Status sections for the CYE and NCDE.

Table II-10. CYE BMUs, acreage, current status of and standards for core, open motorized route density (OMRD), total motorized route density (TMRD) and core, and percent federal land in the action area for bear year 2011.

Forest Ownership	Bear Management Unit	Acreage	Percent OMRD>1 mi/mi^2 (standard)	Percent TMRD>2 mi/mi^2 (standard)	Percent Core Area (standard)	Percent Federal Land
KNF	1 (Cedar)	56,818	15 (15)	8 (15)	83 (80)	99
	2 (Snowshoe)	65,241	18 (20)	16 (18)	77 (75)	94
	3 (Spar)	75,701	30 (33)	26 (26)	62 (59)	95
	4 (Bull)	81,750	38 (36)	29 (26)	62 (63)	84
	5 (St. Paul)	70,210	29 (30)	23 (23)	58 (60)	97
	6 (Wanless)	64,148	32 (34)	34 (32)	53 (55)	85
	7 (Silver Butte)	63,151	24 (26)	23 (23)	63 (63)	92
	8 (Vermilion)	68,567	32 (32)	24 (20)	55 (55)	93
	9 (Calahan)	85,617	28 (33)	27 (26)	58 (55)	90
	10 (Pulpit)	95,924	45 (44)	27 (34)	54 (52)	95
	11 (Roderick)	77,746	28 (28)	27 (26)	54 (55)	96
	12 (Newton)	51,562	43 (45)	32 (31)	56 (55)	92
	15 (Garver)	58,842	31 (33)	26 (26)	54 (55)	94
	16 (EF Yaak)	97,586	29 (33)	27 (26)	54 (55)	96
	17 (Big Cr.)	83,724	31 (33)	16 (26)	56 (55)	99
KNF/IPNF	13 (Keno)	51,235	33 (33)	25 (26)	59 (59)	99+
	14 (NW Peak)	83,027	28 (31)	26 (26)	56 (55)	99+

1, Data provided reflect on-the-ground access conditions during the 2011 "bear year" (i.e. April 1 – November 30 in the Cabinet-Yaak ecosystem.

3. Factors Affecting Species Environment within the CYE Portion of the Action Area

As discussed under Status of the Species, the primary factors affecting the CYE grizzly bear population include access management, human-caused mortality, population size, and fragmentation and genetic isolation. Below, we summarize the status of habitat conservation, human-caused mortality, and fragmentation as well as human-caused mortality within the action area. Lastly, we include a discussion of other activities occurring on KNF lands that affect grizzly bears in the action area.

Access Management

As reported under Status of the Species, the KNF recently completed a Forest Plan amendment providing direction for access management in grizzly bear BMUs within the CYE recovery zone. The current and anticipated status of the 17 BMUs in the action area relative to the Access Amendment are in Table II-10.

Once the standards are attained (anticipated by approximately 2019), 16 of the 17 BMUs in the action area will meet the research benchmark for core area (USFWS 2011a, p. A-60). Additionally, OMRD and TMRD will improve or be maintained, such that 13 of 17 BMUs will meet (or be better than) the OMRD research benchmark and 14 of 17 BMUs will meet (or be better than) the TMRD benchmark (Table II-10).

Another key feature of the Access Amendment was the re-evaluation of BORZ boundaries. In BORZ, the Access Amendment limits linear road miles to no more than the existing baseline open and total permanent roads as displayed in Table II-11.

Table II-11. Motorized access conditions for BORZ associated with the CYE on the KNF as of bear year 20111.

BORZ Name	Total Size in Acres	KNF Lands in Acres	Total Linear Miles of Roads on KNF Lands (Access Amendment baseline in parentheses)	Total Linear Miles of Open Roads on KNF Lands (Access Amendment baseline in parentheses)
Clark Fork[2]	101,899	100,421	236.3 (256.1)	172.4 (176.9)
Cabinet Face[3]	28,052	27,093	164.1 (164.1)	130.0 (128.0)[4]
West Kootenai	173,122	169,705	607.9 (615.3)	323.7 (315.9)[5]
Tobacco	287,240	266,947	1109.3 (1,123.9)	867.0 (867.0)

1. Data provided reflect on-the-ground access conditions during the 2011 "bear year" (i.e. April 1 – November 30 in the Cabinet-Yaak ecosystem
2. Total area designated as KNF lands are updated from USFS (2011b) numbers based on a corrected GIS layer.

3. Total area designated as KNF lands are updated from USFS (2011b) numbers based on a corrected GIS layer.
4. Road 4745 appears to have been incorrectly identified as closed in the baseline from the Access Amendment. The approximately two miles of road on 4745 should have been included as open in the baseline. There is no change on the ground, just a correction in the database.
5. Most of this increase is due to temporary use of roads for timber sale activities in BY 2011. Approximately one mile of the increase is due to access to private lands in BY 2011. There is also approximately another one mile of the Ziegler Mountain motorized trail that was not accounted for in the Access Amendment baseline when it should have been. This change is only an update of the database and does not reflect changes on the ground.

In 2004, the Service issued a biological opinion on the KNF's original access amendment plans (USFWS 2004). We determined that the amendment was not likely to jeopardize grizzly bears. The amendment's Record of Decision and the Service's biological opinion were challenged in

court. The biological opinion was upheld in the District Court. However, the court remanded the decision back to the Forests (Kootenai, Idaho Panhandle, and Lolo National Forests) for further consideration of requirements under NEPA. In 2011, the Forests proposed a revised access amendment. The Service found the revised amendment was more conservative (good for bears) than the 2004 access amendment. In 2011, we issued a biological opinion on the revised amendment and determined that it was not likely to jeopardize grizzly bears (USFWS 2011a). We expect that eventual achievement of the motorized access and security standards in the amendment will create conditions that are conducive to supporting adult female grizzly bear home ranges across the CYE recovery zone. We determined that the amendment would contribute to recovery of the grizzly bear population(s) in the CYE (and SE). The amendment is now being implemented by the Forests.

The grizzly bear access amendment fulfills one of the two (the other being a Food Storage Order) major grizzly bear habitat management needs for federal lands in the CYE. The recent implementation of the Access Amendment, which incorporates road density and core area standards based on the research by Wakkinen and Kasworm (1997, pp.6-8), is expected to reduce the potential for both displacement of grizzly bears from key habitat and the risk of human-caused mortality on KNF lands. This would be achieved by generally moderating the miles of road in grizzly bear habitat and providing large blocks of habitat where motorized use of roads and trails is prohibited. This strategy results in more acres of grizzly bear habitat that lies outside the direct influence of open and low-use motorized roads.

The population-level effects of the amendment will require time to become evident because of the low reproductive rate of grizzly bears, which results in a population that increases or decreases slowly over time. Long term monitoring of the population will continue to verify trends. Even with implementation of the amendment, some level of human-caused mortality is likely to persist on private and to a lesser extent, public lands.

Small Population Size

As described under *Section B. Status of the Species*, augmentation efforts by MFWP in the action area strive to address risks of small population size in the CYE and reduce grizzly bear mortality. Additionally, the Access Amendment (USFS 2011a) will reduce the risk of human-caused mortality on KNF lands. Human-caused mortality in the U.S. portion of the CYE is the single biggest source of known mortality for the population (36 human-caused mortalities vs. 12 natural mortalities - Table II-6).

Fragmentation/Genetic Isolation

Generally, habitat conditions on NFS lands within linkage zones currently contribute to connectivity and linkage within the CYE population and between the recovery zones (Kasworm 02/04/2012 pers. comm.). Highways, railroads, and private land uses contribute to fragmentation and increase the risk of isolation. As discussed above (*Section B. Status of the Species*), augmentation in the Cabinet Mountains moderates the effects of this isolation. The recent purchase of the Kootenai Valleys Conservation Easement Project also conserves important lands in the corridor which will contribute to maintaining or promoting connectivity. The 2011 access

amendment limits new road construction in the BORZ and limits linear miles of road to no more than the existing baseline open and total permanent roads to prevent additional impacts of road densities on grizzly bears between the CYE and NCDE. A positive development has been grizzly bears, including females with cubs, being documented in the Tobacco BORZ over the past several years.

Other Factors On KNF Lands

Other factors affecting grizzly bears on KNF lands in the action area as described in the Revised Plan terrestrial biological assessment (USFS 2013a) include, grazing, recreation, motorized over-snow routes, and mining.

Grazing

As described in its biological assessment, the USFS (2013a p. 92) reports that grazing occurs in 6 allotments that overlap BMUs (14,609 acres or 1 percent of the BMU acres on the KNF – this includes 4,880 acres in the NCDE portion of the KNF) and 13 allotments that overlap the BORZ (210,468 acres or 37 percent of the BORZ (mostly in the Tobacco BORZ and 2 allotments in the West Kootenai BORZ). To date, there have been no grizzly bear/livestock conflicts associated with livestock use on the KNF.

Recreational Use

Recreational use of the NFS lands can contribute to human-bear conflicts and displacement from suitable habitats. The KNF received 1.11 million visits by people recreating between October 2001 and September 2002 (USFS 2009d). Of the total number of visits, approximately 60 percent occurred within or adjacent to the CYE recovery zone. The KNF has an extensive information and education program to educate Forest users on the difference between black bears and grizzly bears and how to behave when recreating in grizzly bear habitat. These programs help reduce the likelihood of human-bear conflicts.

As noted above, the access management program is also expected to adequately reduce the risk of displacement of grizzly bears from key habitats and is also expected to reduce the potential for human-caused grizzly bear mortality on the KNF by moderating the miles of road in grizzly bear habitat and providing large blocks of habitat where motorized use of roads and trails is prohibited. Many visitors to NFS lands remain fairly close to motorized access routes as evidenced by the Revised Plan Draft EIS analysis (USFS 2011d, pp. 213, 265). To reiterate the information presented in the section above, *Grizzly Bear Mortality in the CYE*, recreational use such as hiking on trails or driving scenic routes does not appear to result in conflicts leading to mortality of grizzly bears. Most grizzly bear deaths on the CYE in the KNF are hunting related or occur during the hunting season (W. Kasworm 04/04/2013 pers. comm.). Further, MFWP has hunter education, public outreach and bear specialist programs to reduce the potential for conflict between grizzly bears and hunters and recreationists, in an effort to reduce grizzly bear mortality.

Motorized Over-the-Snow Routes

As discussed above under *section B. Status, 3. Habitat Requirements*, our primary concern related to motorized over snow routes as it relates to grizzly bears is that disturbance from snowmobiles may be most consequential shortly before or after den emergence of a female with cubs. Females and their cubs remain in the den site area for several weeks after emergence from dens (Haroldsen et al. 2002, p. 33; Mace and Waller 1997, pp. 37-38). Females with cubs have high energetic needs, and cubs have limited mobility for several weeks after leaving the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they would likely experience decreased fitness and the family group may be pushed to less suitable habitat. To date, litter abandonment by grizzlies due to snowmobiling activity has not been documented in the lower 48 States (Hegg 2010 pp. 26-27; Servheen 2010 pers. comm. as cited *In* USFWS 2011b, p.34) nor has other substantive adverse effects on bears from snowmobile use been substantiated (Mace and Waller 1997, p.41; USFS 2006, pp.3-263 3-373).

Within the CYE recovery zone, there are 53 miles of groomed snowmobile trails and 58 miles of ungroomed routes on KNF lands (USFS 2013a, p. 83). Off-route use occurs on approximately 18,686 acres within the KNF portion of the CYE recovery zone. Off-route snowmobile travel occurs on about only 5 percent of modeled denning habitat on KNF lands within the CYE (ibid), where dens or females with cubs that have recently emerged from dens could be affected.

Mining

The Revett Troy copper/silver mine occurs in the Spar BMU. The mine has been in operation for over 20 years and affects approximately 50 acres of disturbed area at the mine site on NFS lands and an additional 400 acres of private lands (USFS 2003). The mine is currently in production under an approved Plan of Operations. In 2006, the Service issued a biological opinion for the re-start of the Troy Silver mine (USFWS 2006, entire). This facility was not operational between 1993 and 2004 due to low mineral prices. It is now operating and extracting over 100,000 pounds of silver and 15.5 million pounds of copper annually (Revett 2009). Operation of the mine and implementation of its mitigation plan was determined to contribute to or be compatible with the six priority needs to achieve recovery in the CYE (USFWS 2006, p.A-16). Further, the parameters of the plan were determined to adequately conserve habitat for the continued use and occupancy by grizzly bears in the affected BMU (3) (ibid, p. 18). Thus far, there have been no reported conflicts between grizzly bears and people as a result of the operation of the Troy Mine (W. Kasworm 02/04/2013 pers. comm.).

In 2006, the KNF approved Revett Silver Company's Rock Creek Mine proposal. This copper/silver mine would be located in the southern Cabinet Mountains and affect the Bull, St. Paul, and Wanless BMUs. The mine would operate for about 30 years, extracting 10,000 tons of ore per day. The mine's permit boundary would encompass 1,560 acres; 483 acres would be directly impacted by mining activity, including 3.5 miles of road construction and 5.4 miles of road reconstruction; 1,078 acres would remain undisturbed. Of the 483 acres directly impacted by mining activity, 323 acres are NFS lands and 160 acres are privately owned. The mitigation measures for the proposed mine would offset the adverse impacts of the project on grizzly bears

and are expected to improve habitat and population status in the CYE. The KNF's 2006 approval and the Service's biological opinion on the mine's effects on grizzly bears, lynx and bull trout (USFWS 2006) were challenged in court. The no-jeopardy biological opinion was upheld by the Federal District Court and again upheld by the U.S. 9th Circuit Court of Appeals. Implementation of the mine project has been delayed by court challenges including one case related to the USFS NEPA analysis. The KNF is now in the process of completing its final supplemental EIS on the mine. Because the start-up of this mine has been delayed, and because the mine is not yet operational and the mitigation plan is not in effect, for this biological opinion, we are not considering this proposal in our assessment of baseline conditions for grizzly bears. When construction begins on the Rock Creek Mine, it will move forward in compliance with the Revised Plan. At that time, the extensive, phased mitigation plan would offset the unavoidable adverse effects related to the mine by substantially improving the baseline conditions for grizzly bears. Refer to the *Wildlife Monitoring and Mitigation Plan for the Rock Creek Mine* for details on the requirements related to grizzly bears. Mitigation includes addressing attractant storage issues in the CYE, an additional bear specialist and law enforcement officer, key land acquisitions and other measures (USFWS 2006, pp. A-2 through A-7).

Linkage

Linkage between the KNF's BMUs in the CYE and the NCDE are hindered by Highways 2 and 93 between the two recovery zones (Servheen et al. 2003). The recent implementation of the access amendment in BORZ (which requires no net increase in baseline open roads for these areas) moderated some effects associated with the security of the habitat associated with these linkages, but would not address the challenges that would face grizzly bears attempting to cross these busy Highways.

Factors Affecting the Species in the NCDE Portion of the Action Area

The NCDE grizzly bear population is robust, expanding its range, and trend is currently increasing at three percent per year (Mace and Roberts 2012, Mace and Roberts 2011, *In* Service, 2011a, p. A-12). Additional factors affecting the NCDE in the action area as described in the terrestrial biological assessment (USFS 2013a) are access management, attractants, motorized over snow use, grazing, and linkage.

Access Management

The research benchmarks for OMRD, TMRD, and core for the NCDE are recognized as 19:19:68, respectively (Mace and Manley 1993). KNF's BMU subunits within the NCDE are presented in Table II-12 and are in good condition for grizzly bears when compared to the research benchmarks. The entirety of the Krinklehorn subunit meets research benchmarks for core, OMRD, and TMRD. Currently, in the Therriault subunit only the OMRD research benchmark is not met.

Table II-12. NCDE BMUs acreage, percent NFS lands, and current standards relative to open motorized route density (OMRD), total motorized route density (TMRD), and core, in the action area as of 2010 (have not changed since 2008).

BMU Subunit	Size (acres)	NFS Lands[1]	OMRD	TMRD	Core
Krinklehorn	47,487	99%	18	11	75
Therriault	67,538	99%	23	10	7##

1. Krinklehorn and Therriault BMU subunits include 360 and 140 acres of private lands, respectively (J. Anderson 01/31/2013 pers. comm.).

Grazing

There are 4,880 acres in grazing allotments in the NCDE portion of the KNF. There have been no conflicts associated with these allotments in the KNF. Attractant-related human-caused grizzly bear mortality is also a concern in the NCDE and Food Storage and Sanitation Orders are in effect in the KNF.

Motorized Over-the-Snow Routes

There are 7 miles of groomed routes and 4 miles of ungroomed routes on the KNF portion of the NCDE (USFS 2013a, p. 92). Off-route use occurs on approximately 7,905 acres of the KNF portion of the NCDE or 21 percent of the denning habitat on the NCDE portion of the KNF (ibid).

Linkage

Linkage between the KNF's BMUs in the CYE and the NCDE are hindered by Highways 2 and 93 between the two recovery zones (Servheen et al. 2003). The recent implementation of the access amendment in BORZ (which requires no net increase in baseline open roads for these areas) moderated some effects associated with the security of the habitat associated with these linkages, but would not address the challenges that would face grizzly bears attempting to cross these busy Highways.

D. EFFECTS OF THE ACTION

The effects of the action are considered along with the status of the species, the environmental baseline, and cumulative effects (defined and analyzed below) for purposes of preparing a biological opinion on a proposed Federal action (USFWS and NMFS 1998, p.4-23 through 4-30).

"Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, and that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. [50 CFR §402.02]

1. Factors to be Considered

This section considers the effects to grizzly bears from implementation of the Revised Plan direction as guided by the Revised Plan elements (goals, objectives, desired condition, standards, and guidelines). It also considers how the Revised Plan direction is moderated by elements specific to the conservation of grizzly bears and grizzly bear habitat.
Notably, the Revised Plan also implements the previously consulted-on Access Amendment (2011a). The contents, data, analyses, and conclusions of the *Biological Opinion Forest Plan Amendments for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones on the Kootenai, Idaho Panhandle, and Lolo National Forests* (USFWS 2011b) are incorporated in this analysis in their entirety. In subsequent sections of this analysis we cite page numbers from the Access Amendment that support a particular conclusion; however, we considered the entirety of that document for the purposes of our analysis of the Revised Plan.

Except in the case of the motorized route densities and over-snow motorized use, this biological opinion does not provide an analysis for effects of specific actions. Rather, analysis is a broad-scale examination of the types of projects and activities conducted under the Revised Plan that could potentially occur in grizzly bear habitat and result in effects on grizzly bears. Because of the broad-scale analysis, the KNF is responsible for section 7 consultation on all future projects (conducted under the Revised Plan) that may affect the grizzly bear or its habitat, even if those projects are consistent with Revised Plan.

As mentioned, the exception to this broad-scale analysis is motorized route densities and over-snow motorized use. For motorized route densities, the science is clear that above certain densities, bears suffer adverse effects that can lead to significant impairment of grizzly bears'

ability to feed, breed, or shelter. Further these densities have been carefully examined, monitored and reported by the USFS. Hence, we are able to ascertain the level of adverse effects on grizzly bears related to road densities, and that analysis, previously conducted in our consultation on the 2011 Access Amendment, is brought forward in this analysis as is the associated incidental take statement. For over-snow motorized use (i.e. snowmobile use) the Forest examined, monitored, and reported the amount of denning habitat that was impacted by late season snowmobile use. The best available science and information suggests that recently emerged females with cubs would be vulnerable to adverse disturbance effects of snowmobile use near den sites during late spring. Thus, we are able to ascertain the level of adverse effects and provide surrogate measures of incidental take of grizzly bears related to late-season snowmobile use.

Our analysis will be used to determine the potential for the Revised Plan direction (and effects from motorized access and snowmobile use in grizzly denning habitat to jeopardize the affected populations of grizzly bears (CYE and NCDE). In our analysis of effects of the Revised Plan, we will discuss the effects of the revised plan and application of the elements in the MAs relative to BMUs, subunits, or BORZ, which are the units of analysis commonly used to describe effects on grizzly bears (see Section A.1).

2. Analyses for Effects of the Action

The following sections analyze the direct and indirect effects of the implementation of the elements of the Revised Plan on grizzly bears. The effects will be discussed by broad categories of risk factors as identified in the Environmental Baseline section (above) and in the USFS BA (2013a) for the action area. The effects of the Revised Plan are discussed under the following, often overlapping categories:

1. **Access management** including: roads, secure habitat, and motorized over-snow use.
2. **Habitat management** including vegetation management, fire management, and linkage.
3. **Human-caused mortality risk to grizzly bears** including attractant/food storage and information and education programs and grazing allotments.
4. **Other Potential Effects** such asmining proposals, collection of forest products, and special uses.

For each category of effect, we begin with a general summary of what the science currently tells us about the potential impacts on grizzly bears and grizzly bear habitat. This is followed by an analysis of the specific effects of the proposed action on grizzly bears and grizzly bear habitat.

Effects of Access Management on Grizzly Bears Under the Revised Plan

Grizzly bear conservation is primarily described in terms of availability of secure habitat. Grizzly bear habitat security is primarily achieved by managing motorized access which—1) minimizes human interaction and reduces potential grizzly bear mortality risk; 2) minimizes displacement from important habitat where energetic requirements can be met with limited disturbance from

humans; and 3) minimizes habituation to humans; (Mattson et al. 1987; McLellan and Shackleton 1988; McLellan 1989; Mace and Manley 1993; Mace et al. 1996; Wakkinen and Kasworm 1997). This section addresses effects of roads; secure habitat; and motorized over-snow use on grizzly bears under the Revised Plan.

Effects of Roads on Grizzly Bears Under the Revised Plan

General Effects of Roads on Grizzly Bears

The presence of roads and human activity associated with roads creates some of the most pervasive and chronic effects on grizzly bears and their habitat.

Grizzly bears generally respond to (or are affected by) roads and human presence in four ways. First, they may be disturbed by human presence, responding with a relatively short term – short distance response (Mueller et al. 2004). Second, they may be displaced from highly roaded areas and areas near roads (Aune and Strivers 1982; McLellan and Shackleton 1988, p.456; Mattson et al. 1992; Gibeau et al. 2002, Mace et al. 1996), responding with a longer term avoidance response and movement to another area. When grizzly bears avoid roaded areas, they forgo the resources in these areas, which may result in under-use of key habitats. They may also be displaced into competition with other grizzly bears, or conflicts with humans. Third, grizzly bears may become habituated to human activities and roads but then expose themselves to a greater probability of encounter with humans (and hence mortality) (Schwartz et al. 2010, p.661-662). And fourth, roads facilitate human access into grizzly bear habitat, which directly or indirectly increases the risk of mortality to grizzly bears (McLellan and Shackleton 1988, p.459, Mattson and Knight 1991, p. 9, Mace et al. 1996, pp. 1402-1403). The relationship of grizzly bears and roads is further described in detail in our biological opinion on the Access Amendment (USFWS 2011a, pp. A-48 through A-55).

Effects of Roads on Grizzly Bears in the Action Area

In November 2011, the Kootenai, Idaho Panhandle, and Lolo National Forests completed the Access Amendment which set standards and guidelines for motorized access within the CYE and SE (USFS 2011a). That direction is summarized in the proposed action and described in detail in Appendix E of the USFS Terrestrial BA (2013a) and in the USFS 2010 Biological Assessment and associated Supplement (USFS 2010, 2011b). The Access Amendment established standards for core area, OMRD, and TMRD for each BMU in the affected recovery zones (SE and CYE) (USFS 2011a). These standards are calculated on a BMU basis using a GIS moving-windows routine. The status of BMUs related to the amount of core area and OMRD and TMRD within each BMU is reported to the Service annually.

The Access Amendment established timeframes within which all standards in individual BMUs in the SE and CYE would be met; the Revised Plan would not alter these timeframes. The BMUs would be in compliance with all standards by 2019. Actual accomplishment dates will depend on management priorities, funding, and the completion of required environmental analyses under NEPA. The current status of these standards in the action area by BMU is presented in Table II-10. The Access Amendment also established the amount of administrative

use that may occur on each individual gated road within the recovery zone, based on the bear year (spring, summer and fall). Each district retains a count of use that occurs by road and reports that information to the Service in the spring of each year. Lastly, the Access Amendment updated the BORZ boundaries and limits linear miles of open and total permanent roads to the existing baseline condition in BORZ. The status of roads in BORZ in the action area is included in Table II-11.

Of the two subunits in the NCDE portion of the action area, Krinklehorn meets the NCDE research benchmarks for OMRD, TMRD, and core (i.e., 19:19:68). Because the Revised Plan would limit road densities to no more than the existing baseline open and total roads in the subunit, road densities are not likely to adversely affect grizzly bear in this subunit. For the Therriault subunit, it does not meet the research benchmark for OMRD but does meet it for TRMD and core. The OMRD in this subunit is high due to one main access road that loops through the subunit providing access to campgrounds and trailheads. The subunit is 99 percent NFS lands; hence, the existing baseline condition is likely to be maintained. The high open road density (4 percent above benchmark) likely results in some level of ongoing adverse effect on grizzly bears attempting to use these areas.

The Revised Plan desired condition is to reduce the effects of roads on grizzly bears and provide large, remote areas with low levels of disturbance for grizzly bears (FW-DC-WL-02, FW-DC-WL-04 and 05), including within wilderness, special areas, and backcountry MAs (MA1a,b,c-DC-WL-01, MA3-DC-WL-01, MA5abc-DC-WL-01) (USFS 2013a, Appendix A). This is further reflected in Revised Plan through:

a) standard FW-STD-WL-02, which states the Access Amendment shall be applied;

b) standard FW-STD-WL-03, maintaining or improving road density and security for bears in the NCDE subunits; and

Under the Revised Plan, the area where roads or trails may be designated for wheeled motorized use would decrease by 39,900 acres (Table II-13). This reduction is attributed to changes in MA boundaries and may result in additional non-motorized areas beyond those required by the Access Amendment (J. Anderson 08/02/2013 pers. comm.). The acres available for cross-country wheeled motorized use would not change. Although numerous acres are available for designating roads or trails as open for motorized use, future actions would comply with the elements of the Revised Plan including the Access Amendment (FW-STD-WL-02). The requirements of the Access Amendment are supported in the Revised Plan by MA designations, which limit road construction, reconstruction, and motorized use such that 25 percent of BMU acres would allow no road construction or reconstruction and roads would be highly scrutinized in an additional 32 percent of the BMU acres (Table II-14). Additionally, up to 25 percent of the BMU acreage would not receive motorized use and use would occur on designated routes only in an additional 22 percent of BMU acres (Table II-14) (see also Table II-2, above).

Table II-13. Acres available for designated trails/routes for motor vehicle and over-snow vehicle use under the Revised Plan compared to the existing condition.

	Allow Wheeled Motor Vehicle Use[1]	Allow over-snow Vehicle Use[2]	Desired Condition for Over-snow Vehicle Use[3]
Existing Condition	1,677,200 ac (76%)	1,961,200 ac (88%)	1,961,200 ac (88%)
Proposed Action	1,637,300 ac (74%)	1,920,500 ac (84%)	1, 713,000 (77%)

Source: USFS BA 2013a, p. 92.
1. Wheeled motor vehicle use would not occur on all of these acres. This is just the total area available for the designation of routes for wheeled motor vehicle use.
2. This represents the acres where over-snow motorized use would be allowed upon approval of the Revised Plan. Not all of this acreage is in reality available for over-snow-vehicle use. Topography and vegetation limit where this activity can actually occur.
3. This represents the desired condition for over-snow motorized use across the forest as winter travel planning is completed. Not all of this acreage would be available for over-snow-vehicle use. Topography and vegetation limit where this activity can actually occur.

Table II-14. Restrictions on new roads, road reconstruction, and wheeled motorized use by MA and acres of grizzly bear habitat affected under the Revised Plan.

MA	Element Code	Percent of BMU Acreage Affected	Percent of BORZ Acreage Affected
No roads			
MA1 – Wilderness, MA2 – Wild River Segments. MA3- Zoological, Historical and Botanical Areas, MA4- Research Natural Areas	MA1a-STD-AR-04, MA1bc-STD-AR-03, MA2-GDL-AR-03 (Wild Rivers), MA3-STD-AR-01, MA4-STD-AR-03	Up to 25	<1
No reconstruction			
MA1 MA4	MA1a-STD-AR-04, MA1bc-STD-AR-04, MA4-STD-AR-04	19	<1
No roads or reconstruction unless certain criteria met.			
MA5- Backcountry	MA5abc-STD-AR-01, MA5abc-STD-AR-02	32	10
No wheeled motor vehicle use			
MA1, MA4	MA1ab-STD-AR-01, MA1c-STD-AR-01,MA4-STD-AR-01,	Up to 25	Up to 2
Wheeled motor vehicle use on designated routes only.			
MA5ac, portions of MA2	MA5ac-GDL-AR-02, MA2-GDL-AR-01 (Wild Rivers),	22	4

Any proposed motorized routes or changes in motorized access management under the Revised Plan would adhere to the requirements of the Access Amendment or require an amendment to the Plan. Hence, we anticipate that the Revised Plan's effects of roads on bears would be the same as previously analyzed in our Access Amendment Biological Opinion (USFWS 2011a, p.A-48 through A-55 and A-66 through A-68).

Under the Access Amendment and Revised Plan, of the 17 total BMUs in the KNF portion of the CYE, 4 of the BMUs would not achieve the OMRD research benchmark in the action area and 3 would not achieve the TMRD research benchmark (see Table II-10, above). For the BMUs that would not meet the OMRD and/or TMRD benchmarks in the CYE, all but one (Pulpit) meets the meets the research benchmarks for core area. We determined that maintenance of good quality core areas within the BMUs (except Pulpit BMU) may lessen the overall displacement impacts to grizzly bears related to the relatively high OMRD and TMRD outside the core by providing ample amounts of relatively secure habitat within home ranges (USFWS 2011a, p. A-67). Nevertheless, varying degrees of adverse effects are anticipated in any BMU not meeting the research benchmark for core area, OMRD, or TMRD (USFWS 2011b, p. A-83 to A-84), depending upon how far or near the benchmark each parameter lies.

For the two NCDE subunits in the action area, one (Therriault) will not meet the research benchmark for OMRD by 4 percent (i.e., the standard for OMRD is set lower than the benchmark). Hence, adverse effects associated with high road densities are anticipated in the Therriault subunit. However, these effects are likely lessened to some degree by abundant core provided in the subunit.

Another key feature of the Access Amendment was the re-evaluation of BORZ boundaries and establishment of a no-net increase in existing linear miles of open and total permanent roads in BORZ. This Access Amendment limits linear miles of open and total permanent roads to the existing baseline condition in BORZ, which limits the adverse effects of roads on grizzly bears in these areas. The status of motorized routes in BORZ is presented in Table II-11 above. The requirements of the Grizzly Bear Access Amendment related to BORZ would continue under the Proposed Action through implementation of FW-STD-WL-02.

The presence of grizzly bears in BORZ indicates that some bears have apparently acclimated to what research indicates would be less than optimal conditions as far as motorized access management. A number of grizzly bears have been documented in the Tobacco BORZ, and seem able to find and secure the resources necessary for their needs and avoid human encounters resulting in mortality. Documentation of females with cubs in these areas is significant. Females with cubs do not typically wander far from established areas of use, or home range, and so records of females with cubs in the BORZ suggests at least seasonal home range use. However, our analysis of effects of roads in BORZ on grizzly bears remains the same as that presented in our Access Amendment Biological Opinion (USFWS 2011a, pp. A-71 to A-72, A-84). Briefly, we determined that while bears are using BORZ, we expect some ongoing adverse effects on grizzly bears attempting to use portions of these areas as a result of the existing roaded conditions. We also stated that we expect that a number of grizzly bears will use these areas despite some level of adverse conditions, including females, albeit at lower densities than grizzly

bears in the recovery zones. We based this expectation upon our knowledge of grizzly bears currently using these areas, and the large number of grizzly bears expanding their range into other similarly roaded habitat outside the NCDE (Mace et al. 2011, pp.38, 39; 2012 pp. 24, 25, 27).

In summary, the Revised Plan standard (FW-STD-WL-02) for motorized access management in BORZ moderates effects of roads and maintains existing levels of security such that some bears are expected to be able to access resources and continue to use these areas. The forest-wide Food Storage Order further limits risk of conflicts between bears and humans in BORZ and thereby facilitating connectivity between the CYE and NCDE.

Effects of Secure Habitat on Grizzly Bears Under the Revised Plan

General Effects of Secure Habitat on Grizzly Bears

Because grizzly bears can conflict with humans and their land uses, grizzly bear populations require a level of safety from direct human-caused mortality and competitive use of habitat such as settlement, roading, excessive recreation, logging, mining and livestock grazing. Significant declines in expected use of preferred habitat by grizzly bears are a serious consequence of high road densities. Ideal grizzly bear habitat provides some areas isolated from excessive levels of human impact.

The IGBC Taskforce (IGBC 1994) recognized the importance of secure areas to grizzly bears. The Taskforce defined "core areas" as those areas with no motorized access (during the non-denning period) or heavily used foot/livestock trails, providing some level of secure habitat for grizzly bears. Motorized use, such as snowmobiling or that associated with timber harvest, could occur within core areas during the denning (winter) period. The Taskforce recommended the establishment of core areas in all subunits, the size of core area should depend on ecosystem-specific habitat conditions, and that a core area remain intact on the landscape for at least 10 years. As previously discussed, research suggested core areas in the CYE be at least 55 percent of the land area in a BMU. Based on the findings of Wakkinen and Kasworm (1997) and Allen et al. (2011 as cited In USFWS 2011a, p. A-65), this level and distribution of core area is likely to provide levels of secure habitat that provide for breeding, feeding, and sheltering activities for grizzly bears, including females. The research in the NCDE suggests core areas be at least 68 percent of the BMU subunit (Mace and Manley 1993).

Effects of Secure Habitat on Grizzly Bears in the Action Area

The Revised Plan would implement the requirements of the Access Amendment through FW-STD-WL-02. The current status of core and the proposed status of core under the Access Amendment are displayed in Table II-10. Under the Access Amendment, all but one BMU in the action area, Pulpit, would meet the research benchmark for core area. Several (7) BMUs would exceed (provide more than) the research benchmark for core. All together under the Access Amendment, core area would increase to 59 percent on the KNF (derived from Table II-10 and supported by the USFWS 2011b, p. A-60, which states the ecosystem will increase to

58.5 under the access amendment). Both NCDE subunits in the action area exceed the research benchmark for core area and no adverse effects on bears are anticipated.

The requirements for core under the Access Amendment are supported by the Revised Plan through Forest-wide, MA, and GA desired conditions for large, remote areas with low disturbance that would contribute to habitat security for grizzly bears within the BMUs and BORZ: FW-DC-WL-02, 03, 04; MA1a-DC-WL-01, MA1b-DC-WL-01, MA1c-DC-WL-01, MA3-DC-WL-01, MA5abc-DC-WL-01, GA-DC-WL-KOO-03, GA-DC-WL-TOB-01 and 03, and GA-DC-WL-YAK-02. Under the Revised Plan, desired conditions, guidelines and standards that limit roads, reconstruction and motorized use (Table II-14) also decrease the risk of human-bear interactions.

These elements of the Revised Plan complement the Access Amendment and decrease the risk of human-bear interactions. Core areas provide an abundant amount of grizzly bear habitat (usually over half of each BMU) that bears can exploit, free from the disturbance associated with roads. Further, because motorized access is prohibited the chance of encounters with people and therefore poaching would be less in these areas compared to those with open roads. Hence, we anticipate that the effects of core areas (secure habitat) as proposed in the Revised Plan on grizzly bears would be the same as previously analyzed in our Access Amendment Biological Opinion (USFWS 2011b, see pp. A-60 through A-65 and A-71 to A-73).

As described in the Access Amendment Biological Opinion and clarified in the Errata to the Biological Opinion (USFWS 2012b), there is one additional form of potential adverse effect that may occur on grizzly bears associated with core areas on the KNF, “The proposed Access Amendment allows for a one-time entry into core area on such roads for the sole purpose of hydrologically stabilizing the roads. To minimize the impact of such entry, the proposed Access Amendment requires that such work be completed in one bear season or less and the road is not to be entered for at least 10 years. As noted earlier, the duration of activity is limited and the activity is limited to the road prism. Therefore, we do not expect these activities to cause adverse effects to grizzly bears in most cases, although the potential cannot be ruled out entirely. We expect only female grizzly bears with cubs would be adversely affected, as they tend to be more sensitive to human disturbance. However, these adverse effects would be short term only. Further, as stated, not all female grizzly bears affected by the one-time entries would be adversely affected, nor would all adverse effects rise to the level of significant impairment of breeding, feeding or sheltering. To prevent the need for such entries into core areas in the future, the proposed Access Amendment requires that roads that are closed to provide for core grizzly bear habitat be stabilized immediately and before the underlying habitat qualifies as core.”

Under the Access Amendment, there are no provisions for core areas in BORZ and the Revised Plan does not change this. Habitat security would primarily be achieved through management of open and total linear road miles; the Revised Plan allows no increase in the baseline linear miles of open and total permanent roads. The fact that grizzly bears are using these areas indicates that some bears have apparently acclimated to the conditions within them, and seem able to find and secure the resources necessary for their needs and avoid human encounters resulting in mortality. As stated in our previous analysis (USFWS 2011a pp. A-72-A-73), we expect some ongoing adverse effects on grizzly bears attempting to use these areas as a result of the existing roaded

conditions and lack of secure habitat. We also expect that some grizzly bears will use these areas despite their sub-optimal conditions, including females, albeit at lower densities than grizzly bears in the recovery zones. We base this expectation upon our knowledge of grizzly bears currently using these areas, and the large number of grizzly bears expanding their range into other similarly roaded habitat outside the NCDE (Mace and Roberts 2012, pp. 24-28).

Effects of Motorized Over-snow Vehicles on Grizzly Bears Under the Revised Plan

General Effects of Motorized Over-snow Use on Grizzly Bears

The effects of snowmobile use on grizzly bears are examined in detail in our Biological Opinion on the Effects of the Amendment 24 to the Forest Plan on the Flathead National Forest (USFWS 2008, entire) and our Biological Opinion on the Effects of the Revised LRMP for the Beaverhead-Deerlodge National Forest (USFWS 2010, entire). In general, effects on grizzly bears from snowmobiles may occur during denning, after den emergence, and in spring habitat (USFWS 2010, pp.26-28).

As summarized above under section B. *Status of the Species*, available information regarding the effects of snowmobiles on grizzly bears is generally anecdotal, based on grizzly bear responses to various stimuli other than snowmobiles collected during research. Such reports typically lack information related to the timing of disturbance, type of den, winter conditions or other important factors necessary to assess the significance of disturbance to grizzly bears, if any. Some information collected on black bears or other *Ursids* may have some relevance, but even the data on these species is incidental and largely theoretical. Regarding effects on bears during denning, snow is an excellent sound barrier (Blix and Lentfer 1992) and impacts to denning bears would likely be less in deep snow situations than in shallow snow conditions. It is likely that hibernating bears exposed to meaningless noise, with no negative consequences to the bear, habituate to this type of disturbance (Knight and Gutzweiler 1995).

As discussed above, we believe that disturbance from snowmobiles may be most consequential shortly after den emergence of a female with cubs. Females and their cubs remain in the den site area for several weeks after emergence from dens (Haroldsen et al. 2002, p. 33; Mace and Waller 1997, pp. 37-38). Females with cubs have high energetic needs, and cubs have limited mobility for several weeks after leaving the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they will likely experience decreased fitness and the family group may be pushed to less suitable habitat.

After den emergence in spring, grizzly bears seek sites that melt snow early and produce green vegetation (Kasworm et al. 2010, p. 65). There is limited potential for snowmobiles to occur in these areas and overlap spring grizzly bear habitat for a short period of time after den emergence. The portion of the population using these habitats in early spring is most likely to be males and lone females (W. Kasworm 11/28/2013 pers. comm.). These bears are mobile and can move from disturbance (ibid).

To summarize, we have found no primary-source reports in the literature of grizzly bear den abandonment directly attributed to snowmobile activity (Hegg 2010 pp. 26-27; Servheen 2010

pers. comm. as cited *In* USFWS 2011b, p.34) USFWS 2008) nor has other substantive adverse effects on bears from snowmobile use been substantiated (Mace and Waller 1997, p.41; USFS 2006, pp.3-263 3-373).

Effects of Motorized Over-snow Use on Grizzly Bears in the Action Area

Currently, motorized over-snow access is allowed on 1,961,200 acres (88 percent) of the Forest. Upon approval, the Revised Plan would allow over-snow motorized use on 1,920,500 (86 percent) of the Forest. However, the MA desired conditions are for 1,713,000 acres (77 percent) of the Forest to be designated for over-snow motorized use – a reduction of 248,200 acres (USFS 2013a, p.93). This reduction in acres (and percent of total Forest) would be achieved through future closures following site-specific winter travel planning (ibid). Note that not all of this acreage is in reality available for over-snow-vehicle use. Topography and vegetation limit where this activity can actually occur. In the CYE on KNF lands, there are currently 53 miles of groomed trails and 58 miles of ungroomed routes (off-route). There are 7 miles of groomed routes and 4 miles of ungroomed routes on the KNF portion of the NCDE. Currently, off-route snowmobiling occurs on just five percent (18,686 acres) of grizzly bear denning habitat in the KNF portion of the CYE and 21 percent (7,905 acres) of the denning habitat in the KNF portion of the NCDE (USFS 2013a, p. 83). Including motorized over-snow use on the IPNF portion of the CYE recovery zone, approximately 9 percent of the denning habitat in the CYE recovery zone currently overlaps with motorized over-snow use. This amount would be reduced over time under the Revised Plans.

Additional elements of the Revised Plan that complement the desired condition for reduced acres of over-snow motorized use and may further reduce over-snow motorized use include desired conditions that state that dens for threatened and endangered species are relatively free of human disturbance when they are in use (FW-DC-WL-01); that all BMUs have low levels of disturbance to facilitate bear use such as denning, etc. (FW-DC-WL-04); guideline (FW-GDL-WL-01), which restricts management activities during spring emergence (4/1-5/1) where predicted denning habitat occurs; and standard (FW-STD-WL-05), which states that no grooming of snowmobile routes in grizzly core habitat would occur in the spring after April 1 of each year. In the NCDE, element GA-DC-WL-TOB-01 identifies a desired condition for low levels of disturbance for denning activities for grizzly bear and other high elevation denning species and for summer use by big game in the Ten Lakes, Thompson Seton, and Marston Face areas. All elements of the Revised Plan would be considered in the development of future winter travel plans.

We acknowledge that 79 percent and 91 percent of CYE and NCDE denning habitat, respectively, on the KNF occurs in grizzly bear core areas (J. Anderson 02/06/2013 pers. comm.). There is no winter season ending date for motorized use on the KNF. Therefore, snowmobile use of roads, trails, and open areas is allowed as long as the snow persists. Snow conditions within the action area are often suitable for snowmobiling to continue beyond April 1, the beginning of the grizzly bear non-denning period. Therefore, some level of motorized use (snowmobile only) will likely occur within core habitat and on restricted roads during the non-

denning period, compromising the effectiveness of core areas and OMRD for a short period of time.

Effects on Denning Habitat. The potential for disturbance to denning grizzly bears on the KNF does exist but is low due to the low probability of a direct encounter of a snowmobile to a den and even in that unlikely case, the excellent insulative properties of snow to mitigate the noise. As stated previously, only 5 percent (18,868 acres) of the denning habitat in the KNF portion of the CYE recovery zone (1,669,760 acres) currently receives snowmobile use and there are only approximately 42 grizzly bears in the CYE. In the KNF portion of the NCDE, 21 percent (7,905 acres) of denning habitat in the two KNF BMU subunits receive snowmobile use. As such, for both recovery zones, typical high-use snowmobile areas and potential den sites have a limited likelihood of substantive overlap. This is because grizzly bears generally den in either timbered habitat or very steep slopes, including the slopes of open basins (USFWS 2010, p. 26). Most of the heavy snowmobile use occurs on trails, roads, or open basins, and meadows – although some direct overlap may occur where denning habitat is found on steep open slopes favored for "high marking" by snowmobiles (ibid). However, most denning habitat - except for "high-marking" areas - is less favorable for snowmobile use and as such there is a reduced chance of adverse overlap between grizzly bear den sites and snowmobile traffic (ibid).

Therefore, there is a low likelihood that some grizzly bears in the CYE and NCDE may be affected during the denning season, but the Service believes that the magnitude of impacts during this time in both the recovery zone and BORZ would be insignificant and unlikely to adversely affect grizzly bears.

Effects on Emerging Females with Cubs of the Year. Disturbance from snowmobiles may affect female grizzly bears with cubs of the year shortly after den emergence. Based on a sample size of 10 bears, radio-collared female bears with cubs in the CYE emerged between the 3rd week of April and 3rd week of May (W. Kasworm 02/21/2013 pers. comm.). In the NCDE on the Flathead National Forest, female grizzly bears begin emerging from their dens about April 1, with a median date of April 7 (Mace and Waller 1997, pg 37). To date, litter abandonment by grizzlies due to snowmobiling activity has not been documented in the lower 48 States (Hegg et al. 2010 and Servheen 2010 pers. comm. as cited *In* USFWS 2011b, p.34) nor has other adverse effects on grizzly bears from snowmobile use been substantiated (Mace and Waller 1997; USFS 2006, pp.3-263 3-373). However, snowmobiles could disturb females and their cubs near the den site after emergence from dens. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs.

Under the Revised Plan, less temporal and spatial overlap of grizzly bears and snowmobiles would occur on the KNF due to the decrease in acres where winter motorized use is allowed; however, these changes would not be realized until winter travel plans are completed. Until such time, restrictions on grooming of snowmobile routes after April 1 (which is expected to deter most access and use by all but the most hard-core snowmobilers) and guideline (FW- GDL-WL-01) which restricts management activities in denning habitat between April 1 and May 1 (that is, any activity that is carried out or authorized by the Forest that would result in impacts on natural resources or change human use of the Forest would be restricted in denning habitat during this

time period) would reduce the likelihood of overlap of snowmobilers and females with cubs during den emergence (thereby improving the baseline condition). Nevertheless, winter motorized use could occur in a small proportion of denning habitat during the den emergence period under the Revised Plan, resulting in disturbance of females with cubs that could impair the fitness and safety of the female and cubs. The Service believes that the likelihood of impact from snowmobiles on emerging females with cubs is low. This is because:

- There is a low estimated number of grizzly bears in the CYE (42);
- the low proportion of female grizzly bears with cubs of the year (averaging 2.5 unduplicated observations from 2006 to 2011 [Kasworm et al. 2012, p. 14]);
- the overlap of just 5 percent of modeled denning habitat in KNF portion of the the CYE where snowmobile use currently occurs (21 percent for KNF portion of the NCDE; two of 70 subunits in the NCDE recovery zone);
- the seasonally-declining numbers of snowmobilers by April of each year (USFWS 2011a, p. A-44);
- restrictions on grooming of snowmobile routes after April 1 (which may affect the ability of off-route users to access areas at higher elevations) (FW-STD-WL-05).
- The limited ability to access higher elevations with snowmobiles since road closures are in effect after April 1; snowpack is breaking up at lower elevations; and trails are no longer groomed.
- the late den exit dates for females with cubs in the CYE (beginning the 3rd week of April [W. Kasworm 02/21/2013 pers. comm.] at which time snowmobiles are less likely to be able to access the area due to poor snow conditions at lower elevations);

Additionally, GA-DC-WL-BUL-02, GA-DC-WL-TOB-01, and GA-DC-WL-YAK-02, will reduce the probability that disturbance could occur during spring emergence due to snowmobile use. These elements specifically identify areas where the desired condition is for low levels of disturbance for grizzly bear denning and would be considered in the development of site-specific winter travel plans.

However, over the life of the Plan, we cannot entirely dismiss that a disturbance would occur or that it would not result in adverse effects on a female with cubs. However, we believe an individual female would not likely be affected for more than one denning season. Grizzly bears typically do not reuse den sites. Thus, if a female grizzly bear suffers significant disturbance at or near her den site, it is probable that she would locate a new site to den in the future and would have options for denning elsewhere.

A component of the recovery of the CYE may in the future rely on occupation of BORZ, including denning. To date, there are no records of female bears denning in BORZ. We also expect that this realization will take time to occur (see A.5). Therefore, we do not anticipate adverse effects on females with cubs in BORZ under the Revised Plan.

Effects on Spring Habitat. After den emergence in spring, grizzly bears seek sites that melt snow early and produce green vegetation (Kasworm et al. 2010, p. 65). Spring habitat use in the CYE (April and May) indicated use of low elevation sites (ibid). The portion of the population

using these habitats in early spring is most likely to be males and lone females (W. Kasworm 01/28/2013 pers. comm.). These bears are mobile and can move from disturbance (ibid). Females with cubs are more vulnerable, but are likely to remain at the higher elevation denning habitat in the early spring (effects described above). The potential for disturbance or displacement of grizzly bears from spring feeding habitat in the action area (CYE and NCDE) is influenced by the variability in snowpack and the rate of spring melt. Although snowmobiling would be permitted after April 1, spring snowmobiling areas and spring grizzly bear habitat are almost mutually exclusive in that the areas that would be suitable for spring snowmobiling (i.e. more snowpack) would not typically overlap with spring grizzly bear habitats (i.e. less snowpack). Some level of motorized (snowmobile only) use likely occurs during the spring period within core habitat and on restricted roads during the non-denning period compromising security core habitat and OMRD for a short period of time. However, these areas remain designated as security core habitat and continue to provide security core habitat during the remainder of the nondenning period. The risk of such a compromise within spring habitat is likely lessened due to the fact that if the area is accessible to snowmobiles (sufficient snowpack), then it is not likely providing spring feeding habitat for grizzly bears at the same time (as described above).

The Revised Plan would reduce the total acres available to winter motorized use, and prohibit grooming of snowmobile trails after April 1. For these reasons and based on the discussion above, the Service expects that the likelihood adverse effects to spring habitat and foraging grizzly bears is low and the magnitude of impacts during this time in both the recovery zone and BORZ would be insignificant and unlikely to result in adverse effects.

Effects of Habitat Management on Grizzly Bears Under the Revised Plan

This section describes the general effects and effects specific to the action area on grizzly bears from vegetation management, fire management, and linkage.

Effects of Vegetation Management on Grizzly Bears Under the Revised Plan

General Effects of Vegetation Management on Grizzly Bears

Vegetation management activities include timber harvest, salvage, planting, thinning, prescribed burns, and mechanical fuel treatment.

Vegetation management activities include timber harvest, salvage, planting, thinning, prescribed burns, and mechanical fuel treatment. Vegetation management (timber harvest, salvage, planting, thinning, fuels treatment, prescribed fires) may impact grizzly bears by affecting food resource availability, proximity to escape cover, human access and conflicts, or temporarily shifting grizzly bears into less secure areas.

A study by Zager (1980, p. 35) found 81.8 percent of collared grizzly bears used harvested stands in proportion to their availability in the home range. The use of harvested stands increased in the summer, when huckleberry productivity was high and decreased in the fall, as bears moved to higher elevations or unharvested areas, likely related to the opening of hunting season (ibid, p. 36). Harvested stands produced the most food resources for grizzly bears approximately 8-15 years after harvest (Zager 1980 as cited by Waller 1980, p. 36, Martin 1983). Similarly,

Lindzey and Meslow (1977) documented abundant food resources for black bears in harvest units 15 years after harvest.

Another factor to consider with regards to vegetation management is the availability and proximity of escape cover (Zager and Jonkel 1983, p. 131). A decrease in the amount of escape cover may result in different effects on grizzly bears and their habitat. If cover is limiting in the project area, either by the amount or distribution, timber harvest would likely result in negative impacts (Zager 1980, pp.75-76). However, if cover is not limiting in a project area, timber harvest may have either no effect or a positive effect in those situations where food abundance or distribution is improved. By removing or reducing overstory vegetation through harvesting, slashing and/or burning, grizzly bear food production may be increased during summer (Mace and Waller 1997, p. 120; Waller 1992, p. 36). This includes food resources such as berries and succulent forbs.

Harvest unit size and shape may have an indirect effect on grizzly bear use in that they determine the proximity of escape cover (Zager et al. 1983, p.131). Zager, in northwestern Montana found that nearly half of the harvest units used by grizzly bears were less than 40 hectares; however grizzly bear sign was also documented in units larger than 160 hectares (ibid, p. 131). In Yellowstone, Mealey et al. (1977) documented spring grizzly bear use in harvested stands less than 20 hectares that included leave trees and did not document use in larger units without leave trees, presumably due to the lack of cover.

If food production or distribution is improved with timber harvest but human activity is not controlled after the completion of harvest activities, negative impacts on grizzly bears may occur due to an increase in the potential for conflicts between humans and grizzly bears. Adequate motorized access management can support the exploitation of rejuvenated food resources in older harvested units by grizzly bears. Reduced cover may increase the visibility of grizzly bears, which could increase their vulnerability to illegal human-caused mortality. Harvested stands that are easy to access may receive an influx of berry pickers during the berry season which may limit grizzly bear use or increase human-caused mortality (Zager 1980). Waller (1992, p. 37) found that of the harvested stands that he studied in the Swan Mountains of Northwestern Montana, those with the highest grizzly bear use had limited access due to closed gates and/or over-grown roads. Grizzly bears within his study area that used harvested stands were found at higher elevations and spent little time in lower elevation harvested stands where harvest was most common (ibid, p. 37). Waller attributed this to human use of those lower, more accessible harvested stands. Waller also found that grizzly bears avoided stands where the vegetation had not recovered enough to provide security cover and preferred to use stands that were 30 to 40 years post-harvest (ibid, p. 39).

Much timber harvest is now conducted during the winter. Timber harvest in the winter has advantages for grizzly bears. It occurs when bears are denned and so disturbance is not an issue. Additionally, during winter, snow roads versus temporary roads can be constructed in some cases, thereby reducing the effects from roads. Further, understory vegetation is dormant and covered by snow and often less affected by harvest activities.

Fuels reduction is not expected to adversely affect grizzly bears. These projects remove cover for the purpose of fire prevention near residential development. These stands may be treated again to retain them as fuel breaks, and not allowed to regenerate. Given the proximity to residential developments, many fuel reduction projects occur in or very near areas where management should discourage use by grizzly bears and focus on preventing conflicts between people and grizzly bears (e.g. MS-3 habitat).

Often, temporary roads are constructed in order to access harvest units. Temporary roads built for timber harvest may remain on the landscape for several years and receive a substantive amount of use. Such roads may also cause adverse effects to grizzly bears, such as displacement from key habitats. The impacts of temporary roads were considered in our analysis of effects related to the Access Amendment.

Helicopters may also be used in vegetation management projects. Helicopter use has advantages for grizzly bears in that it can often reduce the need for road use and road construction. Thus there are no lingering effects of roads on the landscape. Helicopter use in occupied grizzly bear habitat may elicit a response in grizzly bears, but the response is variable depending on several variables. Effects may range from a simple awareness of the helicopter, short-term disturbance or flight response or displacement from an area (USFWS and USFS 2009). In timbered habitats, McLellan and Shackleton (1989, p.378) found that an overt avoidance or displacement response required high intensity helicopter activity, such as carrying equipment within 200 meters of a grizzly bear. Helicopter use that is short in duration and low in frequency, would not likely result in significant affects to grizzly bears (USFWS and USFS 2009, p.4). Extended use with multiple passes could interfere with the normal behavior patterns of grizzly bears (ibid). The effects to grizzly bears of repeated, low altitude flight paths that follow open roads may partially offset the existing under-use of habitat in the immediate vicinity of the roads due to the "avoidance" by the grizzly bears of habitat in close proximity to open roads. In many cases, the effects of helicopter logging that occurs in roaded habitat would have insignificant effects to grizzly bears as long as affected BMUs have adequate core areas and management of motorized routes. However, helicopter logging in areas that are not highly roaded could result in adverse effects similar to adverse effects caused by roads.

Effects of Vegetation Management in the Action Area

Timber Harvest – Vegetation treatments would occur at the following rates under the Revised Plan (Table II-15). Timber production (timber stands with planned, scheduled entries for the purpose of generating commercial timber products) would occur within the suitable timber base on the KNF. The suitable timber base on the KNF would increase by 51,200 acres under the Revised Plan and is mostly located in MA6 (general forest). Under the Revised Plan, there are 218,212 suitable timber acres in BMUs (16 percent of the BMUs) and 333,925 suitable acres in the BORZ (59 percent of the BORZ) (USFS 2013a, p. 95). However, all grizzly bear core habitat identified in MA6 (general forest) has been identified as not suitable for timber production (USFS 2011b, p. 358). Vegetation management in core areas would be done to meet resource needs other than timber production such as wood fiber utilization and other multiple-use purposes, including resource benefits and fuels management (USFS 2013a, p. 103). As

described above, timber harvest has varying effects on grizzly bears. The primary effect of timber harvest on grizzly bears is the disturbance resulting from people and equipment operating in grizzly bear habitat as well as the effects of roads used to access the timber stand. The effects of roads are addressed above. Timber harvest may result in temporary disturbance of bears during the time period the harvest takes place. During this time period bears would move away from the disturbance to access necessary resources. Since much harvest now occurs in winter, effects on grizzly bears from displacement would be reduced. Additionally, the Access Amendment also indirectly limits the amount of grizzly bear habitat in BMUs (and subunits) affected by vegetation management activities during the active bear year that generate noise and other disturbance (e.g. timber harvest and recreation) by limiting the road access needed for these activities. Given the healthy condition of core areas and adequate open and total route density management under the Revised Plan, we do not anticipate that this disturbance would result in adverse effects on grizzly bears that cause impairment of the ability to feed, breed, or shelter. Presently, approximately 56 to 57 percent of the CYE recovery zone serves as core areas and this would increase to approximately 59 percent under the Access Amendment (USFWS 2011a, p. A-39, A-60). Presently, 66 percent of the NCDE recovery zone serves as core area (K. Ake 07/23/2013 pers. comm.).

Based on our history of consultation on vegetation management projects, information in our files, and the exclusion of core areas from timber production (i.e., commercial timber harvest with planned regular entries) we do not anticipate that vegetation management activities (not including associated roads) by themselves would result in effects to grizzly bears that would significantly impair breeding, feeding, or sheltering. Large core areas in each BMU and other land allocations (MA1-wilderness- no timber harvest and MA5-backcountry-limited timber harvest) with limited human disturbance would still be available for grizzly bears to meet their resource needs. Similarly, due to the availability of wilderness and core areas, nor do we anticipate significant impairment of grizzly bears' ability to feed, breed, or shelter as a result of incidental harvest outside the suitable timber base for other resource objectives such as fuels management or habitat restoration (allowed in MA2 (except wild river segments), MA3, MA5, MA6, and MA7).

In BORZ, grizzly bears would have fewer options providing undisturbed areas to select from if disturbed by timber harvest. However, we do not anticipate significant impairment of grizzly bears' ability to feed, breed, or shelter as a result of timber production or timber harvest for resource benefit. This is attributed to the occupation of these areas by grizzly bears despite the sub-optimal conditions (including existing, ongoing levels of timber harvest), the elements of the Access Amendment that limit open, total, and temporary roads, and the Access Amendment requirement in BORZ to schedule timber harvest activities that will occur within multiple watersheds in a manner to minimize disturbance of grizzly bears resulting from road use during project level consultation.

Fuels management projects in the WUI that remove vegetative layers in order to reduce fire risk may or may not affect bears. Grizzly bears may forage in the WUI where there is sufficient cover and security or distance from human developments. Projects in the WUI that remove various forest canopy layers may reduce or increase foraging opportunities for bears depending

on site-specific conditions. However, because the WUI occurs in proximity to communities and other human developments, we are less concerned about providing habitat for grizzly bears in these areas. Reduced foraging opportunities and hiding cover for grizzly bears in the WUI may help reduce the risk of grizzly bears becoming attracted to anthropogenic food sources on adjacent private lands and/or reduce the risk of grizzly bears encountering people, leading to grizzly bear mortality.

Table II-15. Anticipated rates of vegetation treatments under the Revised Plan (USFS 2013a, p.37-38 and 40).

Treatment Type	Unconstrained[1]	Constrained[1]
Vegetation Management	19,480 ac/yr	15,815 ac/yr
Prescribed Fire	10,000 ac/year	10,000 ac/year
Regeneration Harvest	4,980 ac/yr	1,828 ac/yr

1. Unconstrained budget level represents full implementation of the Revised Plan. The constrained budget, reflects a 5-year average of fund allocated to the Forest for fiscal years 2006 through 2010. (USFS 2011d, p. 39).

Opening Size / Proximity of Cover – This section addresses the effects of the desired vegetative conditions on the KNF as it relates to opening size. Opening sizes on the KNF under the Revised Plan could be increased (Table 1, Appendix A USFS 2013a) from those typically occurring as a result of vegetation management (including prescribed fires) under the Existing Plan. The USFS indicates that the vegetative component of habitat for grizzly bears has changed from historic conditions on the KNF due to a lack of disturbance (USFS 2013a p. 96). There are fewer openings and fewer stands with a semi-open canopy that promote grizzly bear forage (ibid). Larger opening size would potentially create more grizzly bear foraging habitat but at the same time these larger openings may be underused by grizzly bears due to lack of cover. Larger opening sizes may also increase the visibility of grizzly bears, which may potentially increase their vulnerability to human-caused mortality and/or contribute to displacement from preferred habitats. Lastly, larger openings may contribute to an overall reduction in cover within grizzly bear habitat on the Forest.

The KNF indicates that desired conditions for larger openings are based on natural disturbance processes and would mostly result from these processes (as opposed to vegetation management activities), which are the conditions grizzly bears evolved with in this area, and that security for grizzly bears is maintained or improved by implementing the Access Amendment (FW-STD-WL-02) and through public information and education programs that reduce the risk of human/bear conflicts. The Forest also indicates that often in a timber harvest design leave patches, thickets, riparian corridors, and/or other areas of unique habitat features are retained in the harvest unit, dependent upon site conditions, and that these features may interrupt line of sight; reduce visibility; and provide cover for bears (J. Anderson 03/12/2012 pers. comm.). The Forest also indicates that cover is abundant and would continue to be abundant in grizzly bear habitat on the KNF, because other elements of the Revised Plan would moderate the effects of this plan direction (J. Anderson 07/15/2013 pers. comm.). For example, where LAUs overlap the grizzly bear recovery zones there would be an influence from the NRLMD on “cover” for

grizzly bears due to the limits on treatments in multi-story foraging and stand initiation stage snowshoe hare habitat. Generally, if a stand has a high stem density and horizontal cover to provide snowshoe hare habitat, it likely is capable of providing cover for grizzly bears. Further, timber harvest activities are expected to be small when measured against the total size of the Forest; acres of regeneration harvest are anticipated to total approximately 18,280 acres over the first decade on the KNF (this amounts to 0.8 percent of the entire KNF). Including the acres of intermediate harvest (40,000 acres total in the first decade on the KNF) increases the total timber harvest to 58,280 acres on the KNF, which is 2.6 percent of the entire KNF. Also grizzly bear core areas are not included in the suitable timber base and are not part of the 2.6 percent that is anticipated to have regeneration or intermediate harvest over the first decade. Hence, opening sizes from timber harvest are not expected to contribute to measureable reductions in cover under the Revised Plan.

Early successional grasses and forbs provide forage for grizzly bears. Of primary concern to the Service is effect of large openings adjacent to open roads or seasonally-managed roads allowing public access into recently harvested areas. In these situations, foraging opportunities may be avoided or under-used due the presence of human use (Waller 1992, p.37). This condition may persist for some period of time post-harvest (Waller 1992, p.39) based on site conditions and stand cover types. Additionally, grizzly bears that select these areas may be at higher risk of human detection, conflict, and resulting grizzly bear mortality. These types of effects would be site-specific depending on site conditions. The Forest indicates that larger openings are more likely to result from natural disturbances than from planned vegetation management activities. Additionally, the effects from larger openings are expected to be largely reduced by measures included during site-specific project development such as:

- Retention of riparian corridors (FW-DC-RIP-04; FW-STD-RIP-04).
- Retention of untreated patches that provide for structural diversity and these may provide vegetative screening or cover in openings
- Closure of roads for public use during and immediately after vegetation management activities.
- Ensuring adequate closure devises (i.e., gates, barriers, full or partial recontouring/ripping of road) are in place and functioning properly.

The KNF indicates large openings are more likely to result from natural disturbances than project activities. Still, vegetation management projects proposing large opening sizes that would have adverse effects on bears may be proposed under the Revised Plan. These projects would be designed in consideration of MS1, desired conditions, etc. Security for bears would be provided by the Access Amendment (FW-STD-WL-02) and through public information and education programs that reduce the risk of human/bear conflicts. Therefore, adverse effects resulting in impairment of breeding, feeding, and sheltering would be infrequent and we do not expect substantial negative effects on the population.

In BORZ, there are fewer limitations on timber harvest and more human presence. Also, MS1 designation does not apply. However, there are also fewer bears in BORZ, and security for bears in these situations would be provided by the Access Amendment (FW-STD-WL-02) and through

public information and education programs that reduce the risk of human/bear conflicts. Therefore, adverse effects resulting in impairment of breeding, feeding, and sheltering would be infrequent and we do not expect substantial negative effects on the population.

Helicopter Harvest – The Revised Plan allows the use of helicopters for vegetation management projects. Helicopter operations on the KNF are designed using the *Guide to Effects Analysis of Helicopter Use in Grizzly Bear Habitat* developed by the Montana/Northern Idaho Level 1 Terrestrial Biologists Team (USFWS and USFS 2009) in order to avoid, limit, or minimize the potential for adverse effects (J. Anderson 08/20/2013 pers. comm.). The effects of helicopter use on grizzly bears are highly site-specific and variable. Still, projects using helicopter harvest with adverse effects on bears may be proposed under the Revised Plan. Based on our history of consultation on vegetation management projects with the KNF, helicopter harvest with adverse effects on bears is infrequent (J. Anderson 08/20/2013 pers. comm.). Revised Plan desired conditions would moderate effects of helicopter harvest in grizzly bear habitat (FW-DC-WL-01, 03, 04); and effects of helicopter harvest are mostly temporary - ending after the harvest is complete (versus using permanent roads which remain on the landscape). Therefore, adverse effects resulting in impairment of breeding, feeding, and sheltering would be infrequent and we do not expect substantial negative effects on the population.

Prescribed Fire – The effects of prescribed fire on bears would be similar to that of timber harvest. Prescribed fires may result in disturbance and displacement impacts to grizzly bears through presence of humans, temporary camps, and use of motorized equipment for fire containment. During this time period bears would move away from the disturbance to access necessary resources. Given the healthy condition of core areas and adequate open and total route density management under the Revised Plan, we do not anticipate that this disturbance would result in adverse effects on grizzly bears that cause impairment of the ability to feed, breed, or shelter. Presence of humans implementing prescribed fires are not expected to contribute to conflicts given the likelihood that bears would be displaced from the area, a forest-wide food storage order is in place, and there is no history of conflicts from such activities on the Forest.

Prescribed fires would reinvigorate and increase the amount or quality of grizzly bear forage species such as grasses and berry-producing shrubs. We expect the only potential adverse effect on grizzly bears from prescribed fire would be those creating large opening size. The effects would be the same as those described above. Since 2007, the KNF has treated 6,501 acres in BMUs through prescribed fire (J. Anderson 08/20/2013 pers. comm.). Given the limited acres of habitat treated with prescribed fire and security provisions for bears through the Access Amendment (FW-STD-WL-02) and through public information and education programs that reduce the risk of human/bear conflicts, , adverse effects resulting in impairment of breeding, feeding, and sheltering would be infrequent and we do not expect substantial negative effects on the population.

In BORZ, grizzly bears would have fewer options providing undisturbed areas to select from if disturbed by prescribed fire activities. However, we do not anticipate significant impairment of grizzly bears' ability to feed, breed, or shelter. This is attributed to the occupation of these areas by grizzly bears despite the sub-optimal conditions (including existing, ongoing levels of timber harvest), the elements of the Access Amendment that limit open, total, and temporary roads, and

the Access Amendment requirement in BORZ to schedule timber harvest activities that will occur within multiple watersheds in a manner to minimize disturbance of grizzly bears resulting from road use during project level consultation (prescribed fire is often implemented as a post-harvest activity).

Effects of Fire Management on Grizzly Bears Under the Revised Plan

Fire management is the process of deciding which fires to allow to burn and which to suppress along with the physical activities of suppressing wildland fires.

General Effects of Fire Management on Grizzly Bears

Fire maintains the mosaic of openings and varying vegetation successional stages on the landscape that provide the diversity of foods required by bears. Wildfires can result in short-term negative effects and/or long-term beneficial effects depending on the vegetation species and fire severity. Some foraging habitat and/or cover may be lost in the short-term. However, fire often stimulates the understory and/or increases the vegetative diversity in high quality grizzly bear habitat, benefitting grizzly bears in the long-term.

Fire suppression alters the natural development of forests and species composition and can render forests susceptible to large-scale disturbance due to increased fuels and denser stands. Higher intensity stand-replacing fires may also occur as a result of past fire suppression requiring longer to recover or requiring active management to restore.

Fire management may result in disturbance and displacement impacts to grizzly bears through presence of humans and use of motorized equipment for fire suppression. Generally, grizzly bears would leave an area on their own, in advance of an approaching fire, and therefore, be out of the area associated with fire suppression activities. However, if suppression activities were to take place prior to an approaching fire, a grizzly bear may be affected before leaving the area. There may be some effects from disturbance caused by the overall increase in human activity in a particular area. These activities may include increased vehicular traffic, aerial support, and fire camps, any of which may cause disturbance or displacement of a grizzly bear prior to or when they are moving from the area. Similarly, there may be a concentration of human activities associated with fire suppression or fire clean-up, assessment, and restoration activities that result in disturbance and open roads that displace bears, or increase the risk of human food and attractants luring grizzly bears into the area.

Indirect, long-term effects from fire suppression activities may result from opening previously closed roads, constructing new roads or temporary roads, constructing firebreaks or constructing machine lines. These actions may contribute to the open and total road densities which are limited in certain areas to protect grizzly bears or result in effects to grizzly bears similar to effect of roads on grizzly bears. The adverse impacts of roads on grizzly bears are described above (see *Effects of Roads* section above).

Effects of Fire Management on Grizzly Bears in the Action Area

To reiterate, the effects of wildland fire on bears include short-term displacement, loss of forage, and alteration of habitat use patterns. In the long-term, bears are expected to benefit from fires

from stimulated understory growth and increased vegetative diversity. The Revised Plan includes an emphasis on the use of fire to trend vegetation towards the desired condition (FW-DC-FIRE-03; MA1abc-DC-VEG-01, MA1abc-DC-FIRE-01, MA1abc-GDL-FIRE-01, MA2-DC-FIRE-01, MA5abc-DC-VEG-01, MA5abc-DC-FIRE-01, MA5abc-GDL-FIRE-01. The KNF indicates that the use of fire to trend towards the desired conditions for vegetation and restoring habitats would provide the approximate types and amounts of habitats that grizzly bears would have evolved with on the KNF (USFS 2013a, p.106). The KNF also indicates that allowing fire to play a more natural role in the ecosystem through implementation of FW-DC-FIRE-03 under the Revised Plan would maintain or improve the vegetative component of bear habitat (USFS 2013a, p.106). Early successional grasses and forbs would provide forage for grizzly bears, and the following successional stages in habitat types preferred by bears would also provide food and cover. Thus, the effects on grizzly bears of allowing unplanned ignitions to burn may result in temporary displacement of grizzly bears, a temporary reduction in foods and cover within the burned perimeter. Grizzly bears evolved with wildfire and so while the displacement effects may be adverse to individuals in specific instances, these negative effects would be offset beginning soon after the burn in many locations as regrowth of vegetation begins.

Under the Revised Plan, undesirable wildfires will continue to be suppressed where necessary to protect life, property, and key resources (FW-DC-FIRE-03). At lower elevations in the action area, fire suppression has contributed to the development of denser stands which contribute to availability of cover but renders stands more susceptible to large-scale disturbance such as insects, disease, or fire (USFS 2013a, pp.88,106). Past timber harvest that focused on larger trees, combined with fire suppression that increased fuels, created denser stands, and retarded the development of large trees, have contributed to the vegetation on the KNF being outside of historical conditions/disturbance processes (USFS 2013a, p.106) and increased the risk of large-scale fires in these locations. We anticipate that over time with implementation of desired conditions for vegetation under the Revised Plan (USFS 2013a, p. 66) these conditions would change and risks of large-scale fires may be slightly reduced.

Fire suppression activities introduce a concentration of human activity into the affected area. Even when a decision is made to allow a fire to burn, it is typically controlled within a predetermined boundary. The effects of fires suppression and fire containment activities on grizzly bears include increased vehicular traffic, aerial support, and fire camps, any of which may cause disturbance or displacement of a grizzly bear prior. However, we do not anticipate adverse displacement effects on bears from these types of fire suppression activities. This is because bears would leave an area on their own, in advance of an approaching fire, and therefore be out of the area associated with fire suppression activities. There may also be human activities associated with fire clean-up, assessment, and restoration activities that result in open roads that displace bears or increase the risk of human food and attractants luring grizzly bears into the area. All fire suppression activities would comply with the Forest-wide Food Storage and Sanitation Special Order. Still other activities associated with wildfire suppression (such as fire breaks, temporary roads, changes in open or total road densities) are variable and may result in adverse effects on grizzly bears. These types of actions are planned and conducted under

emergency situations and so the effects to grizzly bears would be analyzed in emergency consultation during and after the activities are complete (50 CFR 402.05).

Effects of Habitat Linkage on Grizzly Bear Under the Revised Plan

The following description of habitat linkage is largely excerpted from Servheen et al. (2003).

General Effects of Forest Management on Habitat Linkage for Grizzly Bears

Linkage zones are areas of habitat connectivity within or between populations of animals that foster the genetic and demographic health of the species. Often, these are specific locations on the landscape where conditions foster movement. Connectivity refers to the arrangement of habitat that allows animals to move across the landscape; patches of similar habitats are either close together or linked by corridors of vegetation. Linkage zones may be connected on the greater landscape only to be fragmented by major highways, railroads, high road densities, and human developments (i.e., fracture zones).

Habitat linkage and connectivity are important components of grizzly bear habitat (Servheen et al. 2001, 2003; USFWS 1993). The main factors generally considered to affect the quality of linkage zones are major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas (USFS 2005). Factors affecting connectivity of habitat include vegetative cover, adjacency of habitat, and habitat security. Actions that fragment habitat, either temporarily (timber harvest) or permanently (developments), or alter species composition or stand characteristics, or decrease habitat security (access) also compromise habitat connectivity and linkage zones.

For the discussion of linkage zones, we note that these areas must be maintained through consideration of three areas: 1). the highways, railroads, and developments that create the fracture zones, 2). the private lands in the valley bottoms, and 3). the public lands that serve as approach areas on the side-slopes of the valleys (Servheen et al. 2003).

Linkage areas for grizzly bears between recovery zones and Canada are key to the long-term survival and recovery of bears, particularly in the CYE since it influences population size and genetic health of populations in the U.S. recovery zones (Proctor et al. 2004). One occurrence of grizzly bear movement between the CYE and SE has been documented (W. Wakkinen 07/02/2013 pers. comm.). Additionally, linkage occurs between the Yaak bears in the CYE and Canada (USFWS 2011b, p. 11; Kasworm et al. 2010, pp. 47-58). Additional work is ongoing in the CYE recovery zone to further our understanding of linkage and movement (Kasworm et al. 2010, pp. 30-35). Presently, there has been no movement and reproduction of native bears between the Cabinet Mountains and Yaak portions of the CYE. One male grizzly bear from the Yaak recently moved to the Cabinet Mountains. Bears augmented into the CYE have returned to the NCDE and one recently completed two treks in subsequent years from the Cabinet Mountains to the Yaak to the NCDE, north to Canada and down into the CYE. This indicates some level of connectivity between the two recovery zones), no bears have yet moved on their own from the NCDE to establish in the CYE (W. Kasworm 02/04/2013, pers. comm.). Grizzly bears including females with cubs have been documented in the Tobacco BORZ, between the NCDE and CYE ecosystems Kasworm et al. 2012, p. 16).

Effects of Forest Management on Habitat Linkage for Grizzly Bears in the Action Area

The main areas of concern in the action area for establishing long-term linkage for movement of bears between the CYE and Canada and U.S. recovery zones as identified in Servheen et al. (2003) are as follows: U.S. Highway-2 (US 2) and the parallel railway; Montana Highway-56 (MT 56); MT-95 and the parallel railway; and US-93. Servheen et al. (2001 and 2003) concluded that linkage between recovery zones (e.g., the CYE and the SE, NCDE and BE) will rely on actions outside the jurisdiction of the Forests. In other words, actions by others including developments, poor attractant storage on private lands, and highways are the biggest impediments to linkage. Generally, habitat conditions on NFS lands within linkage zones currently contribute to connectivity and linkage within the CYE population and between the recovery zones (Kasworm 02/04/2013 pers. comm.). The recent Kootenai Valleys Conservation Easement Program maintains habitat along US 2 necessary for linkage and connectivity between the Cabinet Mountain and Yaak River bears in the CYE.

At such time that grizzly bear numbers in the Cabinet Mountains and Yaak region are high enough to pressure movements between the two population segments, wildlife crossing structures (above or below ground culverts or passages where animals can cross high volume roads without risk of being struck by a vehicle) may become necessary to maintain or restore linkage for the CYE population. The two population segments are currently separated by US Highway 2. Wildlife crossing structures may also be considered in other fracture zones in the future. There are no such structures across highways or railroads crossing through or adjacent to the KNF at this time.

If warranted in the future, the development of crossing structures for linkage is dependent on future interagency coordination and collaboration with the public, primarily because the highways and railroads that may be barriers for wildlife are not under the jurisdiction of the KNF. However, the KNF may manage lands near future crossing structures (i.e., approach areas) and has thus identified the need to manage lands near those features to maintain the effectiveness of those features. Because of the importance of linkage for grizzly bears, it is likely that they would be one of the species considered in the design of future crossing structures or maintenance or enhancement of lands near crossing areas to link blocks of habitat important to grizzly bears.

The Forest does have the capacity to ensure habitat conditions in the approach areas to linkage zones support continued use of existing areas of linkage and at future crossing structures. The KNF also manages lands on either sides of highways and can enhance the potential for bears to cross by maintaining high quality habitat, including cover, for grizzly bears. The Revised Plan includes direction for linkage on the Forest through FW-DC-WL-17, which states that Forest management contributes to wildlife movement within and between national forest parcels; movement between parcels separated by other ownerships is facilitated by management of the NFS portions of linkage areas identified through interagency coordination; and Federal ownership is consolidated at approach areas to highway and road crossings to facilitate wildlife movement. This condition would be achieved through implementation of guidelines FW-GDL-WL-12 through 14. Specifically, FW-GDL-WL-12 through 14 require that KNF coordinate with others on the development of crossing structures when major highways are reconstructed, and

that they manage lands near future structures to maintain the effectiveness of the structure and maintain Federal ownership in identified linkage areas.

To support and maintain connectivity across the Forest, the desired conditions for wildlife for MA1-wilderness and MA5-backcountry (MA1a,b,c-DC-WL-01 and MA5a,b,c-DC-WL-01) state that these areas serve as large, remote areas with little human disturbance and habitat conditions that contribute to wildlife movement. As stated above, cover and security are important components of habitat connectivity and linkage. Lastly, the GA direction and MA3-DC-WL-01 (in Special Areas) aids in maintaining grizzly habitat and connectivity across the Forest in those areas where it would have been found under natural disturbance processes (historical conditions) (USFS 2013a, p. 105). Specifically, the desired conditions in GAs that would facilitate linkage and habitat connectivity include:

> **MA3-DC-WL-01.** The Northwest Peak and Ten Lakes areas, in combination with MAs 1 and 5, contain large remote areas that contribute to movement across the Forest.
>
> **GA-DC-WL-BUL-01.** Wildlife move through the Scotchman Peaks area, particularly wide-ranging carnivores, linking the Cabinet Mountains Wilderness and Selkirk Mountains through the West Cabinets.
>
> **GA-DC-WL-BUL-04.** Wildlife move along the Idaho/Montana border and from the West Cabinets into the Yaak, in the vicinity of the confluence of the Kootenai and Yaak Rivers. Wildlife also moves north-south through the Cabinet Mountains.
>
> **GA-DC-WL-CLK-03.** Wildlife move between the Cabinet Mountains and the West Cabinets, and NFS lands south of Highway 200. Wildlife also moves north-south through the Cabinet Mountains.
>
> **GA-DC-WL-FSH-01.** NFS lands, in particular those lands in the Miller Creek, Fritz Mountain, Calx Mountain, and Syrup Redemption areas, provide for wildlife movement between the larger blocks of forested lands in these areas and for movement between the Cabinet Yaak and Northern Continental Divide ecosystems. This includes movement for big game between the Cabinet Mountains and Fisher River. Wildlife also moves between the Fisher River, Wolf Creek, and areas east of Koocanusa Reservoir, the Blue Mountain vicinity north of the Kootenai River, and north-south through the Cabinet Mountains.
>
> **GA-DC-WL-KOO-02.** Wildlife move to and from Roderick Mountain to the west of this GA. Wildlife also move to and from the Canadian border and along the Big Creek and Parsnip Mountain vicinities to and from Lake Koocanusa. To the east of Lake Koocanusa, wildlife move between the lake and vicinities or Lydia Mountain, Pinkham Mountain, Warland Peaks, and east to Wolf and Sunday creeks.
>
> **GA-DC-WL-LIB-01.** Habitat conditions are retained for wildlife movement between the Cabinet Mountains and the Yaak, in particular, the area of Flagstaff Mountain. Habitat conditions for wildlife movement are also retained in the area between Turner Mountain and Alexander Creek (the Horse Range), including NFS lands in the Gold Hill and Blue

Mountain areas. Wildlife move between the Blue Mountain vicinity, the Fisher River, and Koocanusa Reservoir areas.

GA-DC-WL-LIB-04. Wildlife move between the Cabinet Mountains and the Fisher River, as well as north-south through the Cabinet Mountains.

GA-DC-WL-TOB-02. Wildlife move between the large blocks of NFS lands across Highway 93 southeast of Murphy and Dickey Lakes. Wildlife also moves from the Lydia and Pinkham mountains vicinity and the Sunday Creek vicinity.

GA-DC-WL-TOB-05. Wildlife move to and from the border with Canada.

GA-DC-WL-YAK-01. Wildlife moves along the ridgeline between the states of Montana and Idaho from Northwest Peaks south and across the Yaak River to areas such as Grizzly Peak and Roderick Mountain. Wildlife also moves to and from the border with Canada and from Roderick Mountain across Road #68 (Pipe Creek Road).

GA-DC-WL-YAK-04. Wildlife move between the Yaak and West Cabinets, particularly in the area around Yaak Mountain, Teepee Mountain, and the confluence of the Yaak and Kootenai Rivers. Wildlife also moves across the Yaak River and Highway 508 in the vicinity of Yaak Falls.

Existing levels of fragmentation attributed to roads in BMUs would continue under the Revised Plan, and some proposed projects may cause localized adverse effects on connectivity for individual bears. However, we do not anticipate substantial negative effects on the population. This is attributed to the Access Amendment, which reduces or maintains moderate densities of open and total roads and provides large blocks of secure habitat where motorized use of roads and trails is prohibited. Notably, the KNF took into consideration connectivity issues when setting the individual BMU access management parameters (BA 2010a, p.50; Kaiser 2003 *In* USFWS 2011b, p. A-76). Additionally, the existing conditions on the KNF generally support connectivity within and between the recovery zones (W. Kasworm 02/04/2012 pers. comm.); the Revised Plan includes numerous provisions for linkage areas on the KNF, including MA and GA direction for wildlife movement; and the forest-wide Food Storage Order would reduce risk of human-bear conflicts in lower elevations with higher concentrations of human development. Therefore, we conclude that Forest Plan elements would support linkage conditions on NFS lands that are likely to foster movement of subadult and male grizzly bears which are required for genetic recovery, (see *Status of the Species* section) and in time will also likely support linkage for females with cubs needed for demographic recovery.

More recently, the importance of BORZ in linking the recovery zones has been highlighted. One female grizzly bear with a cub is known to regularly use habitat between the NCDE and CYE. Prior to dropping her collar in 2006, she and her offspring spent most of their summer in the Salish Mountains of Montana less than 2 miles east of the edge of the CYE while denning within the boundaries of the NCDE recovery zone (Kasworm et al. 2010, p.47). Additional females with cubs have also been observed in the Tobacco BORZ between the CYE and NCDE (Kasworm et al. 2012, p. 16).

Because there are more allowable uses and higher road densities in BORZ, there are more existing effects on the baseline condition of linkages and connectivity. However, bears are meeting resource needs and using these areas to make movements between the CYE and NCDE. Under the Revised Plan, we expect that these areas will continue to support grizzly bear movement and linkage on the whole, while causing some adverse effects on individual bears from site-specific projects. However, we do not anticipate substantial negative effects on the population. This is because the allowable uses under the Revised Plan are already occurring in the BORZ and yet bears are meeting resources needs, albeit at lower densities than in the recovery zones. Additionally, the Revised Plan implements the Access Amendment in BORZ which limits linear miles of open and total permanent roads to no more than the existing baseline conditions, which supports some use by grizzly bears, including females with cubs. Notably, the KNF took into consideration connectivity issues when setting the individual BMU access management parameters (BA 2010a, p.50; Kaiser 2003 *In* USFWS 2011b, p. A-76) as well as the development of the BORZ polygons (USFS 2010a: Appendix F *In* USFWS 2011b, p. A-76). Lastly, the Forest-wide food storage order in BORZ will further facilitate connectivity between the NCDE and CYE by limiting risk of conflicts between bears and humans.

These provisions to maintain baseline motorized access conditions in the BORZ and implement forest-wide food storage orders would provide for continued use of these areas by grizzly bears and eventual linkage of the CYE to other recovery zones, albeit at lower densities than areas within the recovery zones.

Effects of Management of Human-Caused Mortality Under the Revised Plan on Grizzly Bears

Encounters with people or anthropogenic food and attractants rank among the greatest risk factors for grizzly bears. Habituation to human presence and human foods can lead to increases in bear-human interactions, resulting in an elevated risk of injury or death to both (Mace and Waller 1998). Public access to NFS lands for recreational purposes, as well as use of recreation facilities, including developed recreation sites, collection of forest products, special uses, and grazing of NFS lands can lead to increased risk of habituation and bear-human interactions. The effects of public access are addressed by the Access Amendment.

The risk of direct conflict between bears/humans and habituation of bears to food sources is best addressed through limits on motorized access on the Forest, programs informing the public of ways to avoid encounters with grizzly bears, and stringent requirements for food storage and sanitation (USFWS 2011b, p.36,97). Much has been accomplished on the KNF to address the risk factors for bears related to human/grizzly bear conflicts. The Proposed Action would carry forward many of these efforts to reduce mortality risk to grizzly bears.

<u>Effects of Sanitation/Food Storage and Information and Education Programs on Grizzly Bears Under the Revised Plan</u>

Grizzly bears in the CYE are now being killed by humans at disproportionately higher numbers on non-federal lands than on NFS lands. To date, there have been no grizzly bear deaths associated with food attractants on KNF portion of the CYE or the NCDE (USFS 2013a, p. 86).

General Effects of Sanitation/Food Storage and Information and Education Programs on Grizzly Bears

Improperly stored garbage, livestock or pet foods can lure grizzly bears to areas near people and pose a significant risk of habituating bears to human presence and/or conditioning grizzly bears to seek out anthropogenic foods and attractants. Food conditioned grizzly bears enter unsecured garbage receptacles, sheds and other buildings in search of a reward. Accessibility to human related attractants and conditioning to those rewards can lead to management removal of grizzly bears and additionally, mortality of grizzly bears by people defending their life and property. Bears are particularly susceptible to anthropogenic foods and attractants during years of poor natural food production. The increase in total known mortality beginning in 1999 in the CYE is thought to be linked to poor food production during 1998 to 2004. Huckleberry production during these years was about half the 20-year average (Kasworm et al. 2012, p.33).

Information and education programs, and food storage orders are particularly important during years of poor berry production and in seasons of high nutritional and energy needs for bears. The MFWP has stated that perhaps the greatest advancement in the management of problem bears has been the development of bear management specialist positions (MFWP 2001 *In* USFWS 2011a, p. A-75). The combination of shortened response time to reports of grizzly bear conflicts, preventative actions to remove attractants, the deterrent effects of local law enforcement, and perhaps most important, building community involvement in the management and conservation of grizzly bears, has been and will continue to be invaluable in dealing with nuisance bears, preventing habituation of bears, and fostering local public support of grizzly bear conservation (Montana Fish, Wildlife and Parks 2005; Wenum 2002; Wenum 2004 *In* USFWS 2011a, p. A-75). To demonstrate, in the CYE, based on anecdotal information, there has been an increase in the number of residents seeking proactive help (e.g. fencing gardens, beehives and other attractants) to prevent conflicts prior to an incident and fewer incidents involving problem bears have occurred during recent years (Annis 2013). This represents notable progress toward reducing the potential for conflicts between people and grizzly bears, and in return reduces grizzly bear mortality. We believe the importance of these types of programs is often underestimated, as the effects of these programs work over time, in some cases many years as the attitudes and behavior of local residents and visiting public change. Through information and education, people can learn to live in a way that is more compatible with the needs and behaviors of grizzly bears. Education programs can reduce grizzly bear mortalities by instructing people to avoid situation where self-defense becomes necessary and prevent habituation of grizzly bears to unnatural foods.

Effects of Sanitation/Food Storage and Information and Education Programs on Grizzly Bears in the Action Area

There has been a concerted effort to improve sanitation on NFS lands throughout the action area and CYE as a whole, with many campgrounds now having bear-resistant garbage and/or food storage containers to reduce such encounters and the potential for subsequent habituation. Currently, 39 developed recreation sites have bear resistant garbage containers on the KNF. Thirty-four other recreation sites have food storage containers. Notably, a mandatory food

storage and sanitation order was implemented Forest-wide on the KNF in June 2011 to minimize adverse interactions between humans, bears, and other wildlife, and provide for visitor safety. The Service finds these programs (Food Storage Orders and bear resistant containers) key to avoiding conflicts associated with attractants on the KNF.

Currently, the KNF is a member of the Selkirk/Cabinet-Yaak Subcommittee of the IGBC. Through this committee, the KNF has participated in and implemented several information and education programs on the Forest including most recently using grant funding to staff two ranger districts with bear rangers responsible for giving presentation and information on food storage/sanitation in bear country (USFS 2012b Accomplishment Report). Education pamphlets are available at Forest District offices as well as other public places describing good attractant storage protocols in bear country (USFWS 2011a, p. A-75). The Forest has provided access to a video on the use of bear spray and defensive behavior (e.g. IGBC–Safety in Bear Country Video) to back country users on a limited basis (ibid). Under the Revised Plan, these programs would continue as would others continue to be pursued through guideline FW-GDL-WL-15, which implements the elements of the most recent "Interagency Grizzly Bear Guidelines."

Under the Revised Plan, Forest-wide desired conditions for recreation state that food and garbage storage do not contribute to recreation user/wildlife conflicts (FW-DC-AR-01) and Forest-wide standard for wildlife FW-STD-WL-04 requires permits and operating plans (e.g., special use, grazing, mining) to specify sanitation measures to reduce human/wildlife conflicts and mortality by making wildlife attractants (ex: garbage, food, livestock carcasses) inaccessible through proper storage or disposal. Additionally, the Revised Plan implements guideline FW-GDL-WL-15, which implements the elements of the most recent "Interagency Grizzly Bear Guidelines" that address attractants and other sources of sanitation issues on the Forest (i.e., recreation and grazing).

We expect that implementation of the Food Storage and Sanitation Special Order coupled with KNF's other efforts to inform and educate the public as well as elements of the Revised Plan (FW-STD-WL-04 and FW-GDL-WL-15) would ensure that the risk of conflicts on the Forest remains low. We do not expect adverse effects to grizzly bears on the KNF as a result of inadequate food and attractant storage.

Effects of Grazing on Grizzly Bears Under the Revised Plan

General Effects of Livestock Grazing on Grizzly Bears

Grizzly bears may be attracted to grazing operations and facilities to forage on newborn animals or carcasses of dead livestock. Grizzly bear predation on livestock can result in risks to human life, property damage, or indirectly, in mortality through habituation and removal of a bear to protect human safety. Grizzly bears can benefit from feeding on livestock carcasses in remote locations away from people. However, when dead livestock occur near human dwellings or other areas with high levels of human activity, the potential for human/bear encounters may be high, which can eventually lead to the death of the bear through management actions. Less frequently, grizzly bears learn to prey on livestock on more remote grazing lands and become repeat offenders, removed from the population through management action.

Effects of Livestock Grazing on Grizzly Bears in the Action Area

To date, no grizzly bear/livestock conflicts have occurred on the KNF. The rangeland suitability analysis for the Revised Plan identified 921,700 acres capable of grazing on the KNF; however, there are only approximately 149,000 acres on the KNF that are suitable for livestock grazing. This represents about seven percent of the KNF, and grazing is only allowed in MAs 5, 6, and 7 (Backcountry, General Forest, and Primary Recreation areas, respectively). Currently on the Forest, grazing occurs in 6 allotments that overlap BMUs (14,609 acres or 1 percent of the BMU acres on the Forest – this includes 4,880 acres in the NCDE portion of the Forest) and 13 allotments that overlap the BORZ (210,468 acres or 37 percent of the BORZ (mostly in the Tobacco BORZ and 2 allotments in the West Kootenai BORZ).

The desired condition for grazing under the Revised Plan is that grazing occurs at sustainable levels in suitable locations while protecting resources (FW-DC-GRZ-01). Therefore, under the Revised Plan, grazing allotments would continue to be permitted within suitable areas but no changes in existing allotments are expected and current use levels are expected to be maintained for the next 10 to 15 years (USFS 2011d, pp.388-389).

Notably, the Revised Plan states that for wildlife, the long-term desired condition is recovery of threatened and endangered species (FW-DC-WL-03). Therefore, any changes to existing allotments and new requests for grazing allotments would be evaluated at the site-specific level in adherence with the elements of the Revised Plan. Additionally, FW-DC-GRZ-01 states that grazing occurs at sustainable levels in suitable locations while protecting resources and all permits would include sanitation measures to reduce attractants that would cause a human/livestock/bear conflict (FW-STD-WL-04). Lastly, the IGBC Guidelines for grazing would be applied (FW-GDL-WL-15). These elements of the Revised Plan along with the expectation that current use levels would be maintained reduce the likelihood of new grazing allotments where conflicts with bears might occur or that existing allotments might contribute to conflicts in the future.

We do not anticipate that implementation of the Revised Plan will result in habituation of grizzly bears leading to conflicts in the CYE because few acres are subject to livestock grazing, current use levels are expected to be maintained and not substantially increase (USFS 2011d, p.389), the Revised Plan includes measures to address potential habituation risks to bears from livestock grazing, and there is no history of grizzly bear management actions in the CYE on NFS lands. While there are substantially more grazing allotment acres in BORZ, these allotments have existed for several decades with no history of conflicts with grizzly bears. We expect that grizzly bear numbers in BORZ will grow relatively slowly over time, and so we expect the likelihood of conflicts associated with these allotments to remain low. Hence, we do not consider this type of land use, at its current or anticipated levels, to result in adverse effects on grizzly bears in the recovery zone or BORZ.

Similarly, we do not anticipate that implementation of the Revised Plan will result in habituation of grizzly bears leading to conflicts in the NCDE subunits in the action area because few acres are subject to livestock grazing, existing allotments are not expected to change (i.e. increase), the Revised Plan includes measures to address potential risks to bears from grazing action, and there

is no history of bear management actions in these subunits related to grazing. Hence, we do not consider this type of land use, at its current or anticipated levels, to result in adverse effects on grizzly bears.

Effects of Other Potential Actions on Grizzly Bears Under the Revised Plan

Other actions on the forest with the potential to affect grizzly bears include mining, collection of forest products, and operations associated with special use permits.

Effects of Mining on Grizzly Bears Under the Revised Plan

Mining encompasses: 1) the location and extraction of mineral materials (e.g., sand, gravel, rock), 2) the location and extraction of locatable minerals (e.g. gold, silver, copper), and 3) mineral leasing for oil, gas, coal, geothermal resources, potassium, sodium, phosphates, oil shale, and sulfur, which includes exploration and surface occupancy (extraction).

Mining projects may result in loss of habitat within the footprint of the mine, or associated roads. Disturbance to grizzly bears from road use and mining activities and displacement from habitat from road use or mine development may also occur as well as impacts to habitat connectivity. New roads leading to mining sites may provide access to grizzly bear habitats.

The disposal (removal) of mineral material (salable minerals such as sand, rock, gravel, etc.) under the Proposed Action is allowed in the General Forest MA6 and in other limited locations (Chapter I, Table I-16), but is not allowed on 772,000 acres of the KNF (USFS 2013a, p.91).

Under the Revised Plan, the majority of KNF lands, with the exception of MA1a and 1c (Wilderness and Wilderness Study Areas – Chapter I, Table I-16) would be available for mineral leasing (e.g. oil, gas, coal, geothermal resources, potassium, sodium, phosphates, oil shale, and sulfur). This is also the case with locatable minerals with the exception of 264,000 acres that are recommended to be formally withdrawn from mineral entry under the Revised Plan. Hence, future mining activities could occur in grizzly bear habitat under the Revised Plan.

The range of effects of future mining activities on grizzly bears is expected to be similar to those occurring at existing mining sites (Troy Mine). Such effects may include loss of habitat within the footprint of the mine, disturbance to grizzly bears from road use and mining activities, displacement from habitat from road use or mine development, or impacts to habitat connectivity.

The extent of these effects would be limited by elements of the Revised Plan. Any mining proposal on the Forest would be considered in terms of Forest-wide desired conditions that trend the Forest toward providing remote areas for species with large home ranges, recovering Federally-listed species, facilitating denning and habitat use through low levels of disturbance, and managing motorized access to promote recovery (FW-DC-WL-01 through 05). At the project level, Forest-wide guidelines and standards would address potential effects of mining proposals on connectivity and linkage areas (FW-GDL-WL-15 through 17), food storage and attractants (FW-STD-WL-04, Food Storage Order), disturbance of grizzly bears (FW-GDL-WL-01), and access management (FW-STD-WL-02 and 03). Site-specific project development and mitigation plans (like those developed for the Troy Mine and Rock Creek Mine) would avoid,

minimize, or compensate for any adverse effects associated with the mining proposal. This includes substantial mitigation plans that addresses the risk factors for grizzly bears associated with the particular mining site including changes in wheeled motorized vehicle access, potential for displacement, and potential for conflicts associated with attractants.

Combined, the Revised Plan elements and required mitigation plans would reduce or limit the impacts of mining activities on grizzly bears. Nevertheless, some adverse effects on bears are anticipated if future mining activities are proposed, but we expect that the potential for adverse effects would be reduced or minimized through Revised Plan requirements and standards and guidelines applied at the project level as well as the development of appropriate mitigation plans where needed as in the case of the Troy Mine and Rock Creek Mine.

Effects of Collection of Forest Products on Grizzly Bears Under the Revised Plan

The primary effects on bears associated with collection of forest products include disturbance to grizzlies due to human activities or risk of human/grizzly bear conflicts, resulting in grizzly bears avoiding the area. Existing areas of use are often tied to historical knowledge and patterns of use. The most popular special forest and botanical products on the Forest include huckleberries, firewood, Christmas trees, and boughs. Mushroom picking is a popular activity following wildfires. In recent years, requests from the general public for commercial and free use collection of special forest and botanical products have increased (USFS 2011d, p.394).

Special forest and botanical products may be collected Forest-wide, unless an area has been closed for a specific reason. In total, under the Revised Plan, 325,300 acres are excluded from collection of forest products. Commercial use of special forest and botanical products is not allowed in designated wilderness; recommended wilderness; wilderness study area; wild, scenic and recreational rivers; special areas; or RNAs. The opportunity for collecting special forest and botanical products is also affected by the amount of motorized access to the Forest. Areas with no motorized access (i.e., core areas) limit opportunities and reduce the ability to collect products since most of these activities occur along roads (USFS 2011d, p. 396; 2013a, p.109).

As previously stated, the primary effect on bears associated with collection of forest products is disturbance and risk of human/grizzly bear conflicts, and we expect that these risks are low. Generally, the collection of forest products occurs in close proximity to roads and the density of people engaged in this activity diminishes with increasing distance from a road or trail (USFS 2013a, p.109). Human presence for collection of forest products may disturb or displace bears, but we anticipate this effect would likely be short-term, temporary and for the most part, relatively low in intensity. We expect that grizzly bears would avoid the area while people are collecting products, but are likely to return after people leave the area. The Revised Plan adequately manages roads and core area, so if displaced by human presence and activity, grizzly bears would have options to find needed food and shelter elsewhere. There would be areas on the Forest that would have very little or no collection of forest products due to limited accessibility. In addition, the information and education programs, Food Storage Order, IGBC Guidelines, and access management would reduce the risk of conflicts. Forest-product collection

activities are subject to these measures and so we expect no adverse effects to grizzly bears as a result of Forest-product collection.

Effects of Special Uses on Grizzly Bears Under the Revised Plan

Special use authorizations permit occupancy and use on NFS lands by federal, state and local agencies, private industry, and individuals. Non-recreation special uses vary from low-intensity, often short-term actions such as filming or locations for scientific instruments, to larger developed facilities such as roads, communication sites, dams, and utility/energy transmission infrastructure (USFS 2011d, p.289-290). Special use permits may allow activities that cause disturbance to grizzlies due to human activities or risk of human/grizzly bear conflicts, resulting in grizzly bears avoiding the area. Special uses can also alter some habitat, such as a ski area or utility corridor.

Under the Revised Plans, future proposals would be considered in terms of Forest-wide desired conditions that trend the forest toward providing remote areas for species with large home ranges, recovering Federally-listed species, facilitating denning and habitat use through low levels of disturbance, and managing motorized access to promote recovery (FW-DC-WL-01 through 05). At the project level, Forest-wide guidelines and standards would address potential effects of special use permits on connectivity and linkage areas (FW-GDL-WL-12 through 14), food storage and attractants (FW-STD-WL-04, FW-GDL-WL-15, and the Food Storage and Sanitation Special Order), and access management (FW-STD-WL-02 and 03).

Based on Revised Plan desired conditions and implementation of the standards and guidelines at the project level, we not anticipate adverse effects on grizzly bears from most special use permits. There are no existing proposals for permits that would remove habitat from or alter large areas. However, in the 10-15 year term of the Revised Plan, large-scale proposals may arise that result in adverse effects on individual grizzly bears. However, for the reasons described above, and the fact that the Revised Plan implements the IGBC guidelines for MS 1 (see Section A.2), which encompasses all of the CYE and NCDE recovery zones and favors the needs of grizzly bears when grizzly habitat and other land use values compete, we do not expect substantial negative effects on the population.

3. Species' Response to the Proposed Action

Species Response in the CYE Portion of the Action Area

The CYE grizzly bear population has a slightly declining, but improving trend since 2006. Beginning in 2006, the rate of change in the population (lambda) has improved and moved closer to stability (Kasworm 2013 unpublished data.); this is an indication that the status of the CYE grizzly bear population is improving. Telemetry data and sightings, including females with cubs, confirm occupancy of some BORZ by grizzly bears (Kasworm et.al 2012, p. 16, Table 2).

The overwhelming majority of adverse effects from Forest management projects arises from roads and associated high road densities and motorized access resulting in disturbance and displacement of grizzly bears. High motorized route densities provide people with easy access into grizzly bear habitat, which contributes to potential increased risk of human-bear conflicts

resulting in human-caused grizzly bear mortality – one of the primary factors affecting the CYE population. We conclude that the Revised Plan, grizzly bear Access Amendment, and Forest-wide food storage order would continue to substantially reduce adverse impacts to grizzly bears from Forest management activities within the action area.

Grizzly bears are given high priority in Forest management inside the Recovery Zone; grizzly bears are not the primary management consideration in Forest land management in the action area outside of the recovery zone. Grizzly bears outside the recovery zone probably experience a higher level of adverse impacts due to land management actions than do grizzly bears inside. However, a number of grizzly bears are apparently able to live in habitat on the KNF outside of the recovery zone as evidenced by telemetry data and confirmed sightings or grizzly bears occupying BORZ (Kasworm et.al 2012, p. 16, Table 2). We expect this occupancy, including female grizzly bears, to continue as the grizzly bear population in the NCDE continues to grow, and grizzly bears move further west, albeit at lower densities than expected in fully functioning habitat. Outside the BORZ, grizzly bears may occur infrequently and is most likely to be males who have larger homed ranges and make bigger home range, dispersal, and exploratory movements. Because occurrence would most likely be bears and occurrence would be infrequent along with the elements of the Revised Plan, we do not expect substantive adverse effects.

Existing and proposed road densities authorized under the Revised Plan have the potential to adversely affect some grizzly bears in some portions of the action area. However, the Access Amendment moderates effects of roads on bears by limiting the density of open and total roads and maintaining core areas within the recovery zone over time (standards expected to be achieved by 2019). Fourteen of the 17 BMUs would achieve the research benchmark for core areas, OMRD, and TMRD. All but one of the 4 BMUs would achieve the research benchmark for core, thereby reducing the effects in 3 of the 4 BMUs where either OMRD or TMRD research benchmarks would not be met. The maintenance of good quality core areas within 3 BMUs may lessen the overall displacement impacts to grizzly bears related to the relatively high OMRD and TMRD outside the core by providing ample amounts of relatively secure habitat within home ranges (USFWS 2011a, p. A-67). Pulpit BMU does not meet research benchmark for core and may never be capable of providing the full suite of home range needs of the average adult female grizzly bear due to small size and/or private ownership and /or other constraints. Thus, sub-optimal conditions may persistent in the long-term for this BMU. Additionally, we expect some bears to continue using BORZ, including adult females, despite suboptimal conditions, albeit at lower densities than grizzly bears in the recovery zones.

As described in detail earlier in this biological opinion, the primary adverse effect that may result in impairment of feeding, breeding, and sheltering activities by grizzly bears under the Revised Plan is attributed to the effects of high road densities. The implementation of the Access Amendment through 2019 would lessen these adverse effects including those that are likely to impair breeding, feeding and sheltering. As characterized in the Access Amendment biological opinion and reiterated in this biological opinion, the Access Amendment significantly reduces incidental take attributed to high road densities but does not reduce the possibility of incidental take in all BMUs.

Over the life of the plan, adverse effects may result from displacement of a very few female grizzly bears with cubs by snowmobile activities during the den emergence period. The Revised Plan would not increase this adverse effect, and overtime, it may decrease the adverse effects. As characterized in the effects analysis above, there is a low likelihood of effect on 18,868 acres (9 percent) of denning habitat in the CYE (5 percent of the CYE on the KNF) and the risk of effect would be limited to the period of time between female and cub den emergence (3rd week of April) through spring snow melt (these dates would vary year to year). Once winter travel plans are in place, the Revised Plan could decrease the acres of overlap between grizzly bear denning habitat and snowmobile activities.

Under the Revised Plan, other projects may result in adverse effects to individual grizzly bears. These projects would primarily include: vegetation management activities (timber harvest or prescribed fire) creating larger opening sizes; potential mining proposals; large-scale special use permits; and use of helicopters during vegetation management activities. As discussed in the analysis of effects, we expect these activities would occur infrequently and associated adverse effects would be reduced by the elements of the Revised Plan such that we do not anticipate substantial negative effects on the population.

As stated, the grizzly bear population is slightly declining, but trend is now approaching stability. Since 2006, the rate of decline in the CYE grizzly bear population has slowly, steadily improved. Further, the number of grizzly bears in the Cabinet Mountains has increased through augmentation and reproduction, and a number of grizzly bears are occupying habitat in the BORZ. Since 2011, the KNF has fully addressed two of the three primary sources of human-bear conflict and grizzly bear mortality on NFS lands: motorized access and attractant/food storage conflicts. There have been no grizzly bear mortalities on the KNF related to the third primary source of mortality: livestock grazing conflicts. Hence, the anticipated adverse effects of the Revised Plan may affect a few individual bears but are not expected to have appreciable negative effects on the CYE population of bears.

Species Response in the NCDE Portion of the Action Area

The NCDE grizzly bear population trend is currently increasing (Mace and Roberts 2011, 2012). Current levels of human-caused mortalities appear to be sustainable. The population has been increasing since 2004 and the Service considers this population to be robust and nearing recovered levels. More than 17 percent of this ecosystem is private land and the majority of bear-human conflicts and bear deaths occur on these private lands. Therefore, efforts by MFWP and other agencies and NGOs to work with private landowners to minimize these conflicts remain important for this population of grizzly bears.

Lands within the KNF portion of the NCDE comprise 3 percent of the entire NCDE recovery zone (2 subunits of 70 subunits in the recovery zone). Adverse effects on bears attributed to the Revised Plan may occur in the Therriault BMU subunit where OMRD does not meet the research benchmark. Adverse effects would be limited since this subunit provides more than the research benchmark of core area. Additional adverse effects may result from premature displacement or disturbance of a female grizzly bear with cubs by snowmobile activities during the den emergence period. As characterized in the effects analysis above, there is a low likelihood of

effect on 7,905 acres of denning habitat in the NCDE. Further, the risk of effect would be limited to the period of time from female and cub den emergence (2nd week of April) through spring snow melt (these dates would vary year to year). Once winter travel plans are in place, the Revised Plan could decrease the acres of overlap between grizzly bear denning habitat and snowmobile activities.

Under the Revised Plan, other, site-specific projects may result in adverse effects to individual grizzly bears primarily associated with vegetation management activities creating larger opening sizes; potential mining proposals; large-scale special use permits; and use of helicopters during vegetation management activities. Overall, we expect these activities to occur infrequently and associated adverse effects to be reduced by the elements of the Revised Plan. Any remaining adverse effects would be addressed through project-level consultation.

As stated above, the grizzly bear population in the NCDE is robust and is over 764 grizzly bear, and is increasing and expanding its range. Hence, the anticipated adverse effects of the Revised Plan may affect a few individual bears but are not expected to have appreciable negative effects on the NCDE population of bears.

E. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Past and present impacts of non-Federal actions are part of the "environmental baseline" as are the impacts of Federal activities that have undergone section 7 consultation.

Due to the broad geographic scope of the Revised Plan and, therefore, the action area, it is difficult to comprehensively assess all of the future, non-Federal activities reasonably certain to occur in the action area that may affect the grizzly bear. This analysis of cumulative effects is based on an assessment of land ownership and use patterns, and the patterns of grizzly bear mortality caused by non-Federal activities, as discussed above in the Status of the Species and Environmental Baseline sections.

State and private lands comprise approximately 10 percent of the CYE recovery zone. For the period from 1999 through 2010, mortality on private lands in the U.S. has become the largest source of human-caused mortality in the CYE (W. Kasworm 2010a as cited *In* USFWS 2011a p. A-26). In other words, grizzly bears are now being killed by people at disproportionately higher numbers on private lands than on Forest lands. Within the action area there are 99,781 acres of private lands encompassed in the CYE BMUs, BORZ, and NCDE BMU subunits (derived from Tables II-9,10, and 11). This represents approximately 5 percent of the action area. While this is a relatively small proportion of the action area, the statements above indicate that decisions made by non-Federal landowners regarding management of their lands are affecting this ecosystems' ability to meet its recovery goals. Mortality on private lands is primarily attributed to poaching and incidents during the hunting season, although mistaken identification and self-defense

outside the hunting season, management removal, and trains also contributed to mortality on private lands (W. Kasworm 02/04/2013 pers. comm.).

The effects on private lands are addressed through numerous programs. The Grizzly Bear Management Plan for Western Montana (MFWP 2006) outlines the States' role in responding to and managing grizzly bear/human conflicts, continuing its public information and education programs, black bear identification training for hunters, managing grizzly bear habitat, monitoring bears and habitat, and conducting research through 2016.

Montana Fish, Wildlife and Parks' grizzly bear specialist program is recognized as successful in fostering public awareness and support of grizzly bear conservation. The program is aimed at resolving conflicts between bears and people, but also reducing the potential for conflicts to arise though education and information regarding attractant storage. In the CYE, based on anecdotal information, there has been an increase in the number of residents seeking proactive help (e.g. fencing gardens, beehives and other attractants) to prevent conflict prior to an incident and fewer incidents involving problem bears have occurred during recent years (K. Annis, MFWP, ##/##/2013 pers. comm.). This represents notable progress toward reducing the potential for conflicts between people and grizzly bears, and in return reduces grizzly bear mortality. The results of bear specialist programs are summarized biannually at IGBC Subcommittee meetings and in annual reports, such as the annual "Yellowstone Grizzly Bear Investigations", and annual reports from the MFWP grizzly bear specialists in the NCDE (Madel 1996; Wenum 2002; Wenum 2004; MFWP 2005 *In* USFWS 2006, p.A-43). Montana's bear specialists report annually on progress that can be measured. For example, conflict reports detail the number of grizzly bear conflicts before and after construction of electric fencing around attractant sites (see Agency Summaries *In* Schwartz and Haroldson 2001). The grizzly bear management program on the NCDE Rocky Mountain Front began in 1988. Since that time, records indicate that the presence of grizzly bears in the region, including females with cubs, has remained stable to slightly increasing, but the level of known human-caused grizzly bear mortality has declined (M. Madel, MFWP, 2002 pers. comm. as cited *In* USFWS 2006, p. A-43). Hence, these efforts partially offset the cumulative effects of activities on private lands that increase the risk of human-bears conflicts.

The work of MFWP bear specialists to reduce human-caused grizzly bear mortality occurs concurrently with its augmentation of grizzly bears into the CYE. Since 1990, 13 female grizzly bears have been augmented in the Cabinet Mountains portion of the CYE. Four of these bears returned to the NCDE. Three were killed and one died of natural mortality. The fate of many bears is unknown due to loss of signal or collar drops. However, one female is known to have produced 9 offspring who in turn have produced 8 offspring. The augmentation effort appears to be the primary reason that grizzly bears are increasing in the Cabinet Mountains (Kasworm et al. 2012). Research indicates that augmentation of small grizzly bear populations combined with a reduction in human-caused mortality has both short- and long-term positive effects on growth rates (Proctor et al. 2004). Hence, these combined efforts (state grizzly bear specialists and the augmentation program) are essential to meet recovery goals in the CYE and to continue to reduce human-cause mortality and enhance the population.

Other activities on private lands that contribute to effects on bears include access, recreation, timber harvest, and developments. These actions on private or State lands may also affect connectivity and linkage within the action area. As described in the Status of the Species, the Montana DNRC HCP addresses 6,174 acres in the CYE and would help provide secure habitat, facilitate connectivity, and reduce risk of conflicts on those covered lands. Implementation of the MFWP State Wildlife Conservation Strategy (2005) on non-NFS ownerships should complement habitat improvement /maintenance on NFS lands. Concerns and conservation strategies for grizzly bears listed in the Strategy include reducing road related impacts, reducing human-bear conflicts due to attractants, and protection of important habitats. Recreation is likely to increase on all land ownership types in the action area, if for no other reason than human population growth. From 1980 until 2009 the population increased in all of the counties that overlap the KNF, with the exception of Lincoln County (USFS 2011b, p. 400). Increases in population and new or improved technologies (e.g. mountain bikes, snowmobiles, etc.) have led to more crowded recreation experiences during peak use times and increased levels and range of demands on resources on the KNF (USFS 2011b, p. 281-282) and adjacent state and private lands, particularly those providing access or similar recreational experiences. Increases in recreational use in the action area on non-federal lands may contribute to disturbance and cause the portions of NFS lands that have lower human disturbance to become more important for grizzlies. Additionally, along with increased human presence on all land ownerships along with progress toward our goal of increasing grizzly bear numbers in the CYE comes an increase in the chance of human/bear conflict and resulting grizzly bear mortality.

The Grizzly Bear Access Amendment established management direction for roads and secure habitat on NFS lands within the action area. However, the BMUs in the action area also include some state and private lands and decisions made on State and private lands could potentially result in cumulative disturbance or displacement effects on grizzly bears. The calculations used for determining road densities and core areas on NFS lands include roads on state and private lands within the BMUs considered in this action, even though standards set by the Access Amendment apply only to NFS lands..

The State of Montana allows regulated hunting for black bears, as well as other wildlife species, within and around the CYE. Hence, grizzly bear mortality as a result of mistaken bear identification and self-defense are expected to continue within the action area and possibly decrease through hunter education programs outlined in the Grizzly Bear Management Plan for Western Montana (MFWP 2006).

Climate change could have varied impacts on grizzly bears and their habitats, especially when combined with fire (or fire suppression), insects, and disease effects on habitat. Past fire suppression has led to an increase in fuels, denser forests that are more susceptible to insects and disease, and forests that are less resilient and sustainable. Large, stand-replacing disturbance would be more likely and may be exacerbated as the climate changes. All lands in the action area would be susceptible to these events, although non-Federal landowners are unlikely to allow these areas to burn and would likely aggressively attempt to control such fires. Large-scale disturbances could convert a large area of grizzly habitat from forested to open in one event. This

would alter the availability of grizzly bear foods and cover, potentially changing how bears use the landscape.

In summary, timber activities, recreational use and roads on state and private lands in the action have the potential to result in cumulative effects on grizzly bears in the action area. Potential effects include disturbance and displacement, fragmentation of habitat, and human/grizzly bear conflicts resulting in mortality of bears. Ninety percent of the CYE recovery zone (95 percent of the action area) is NFS lands, yet a disproportionate number of bears are killed on private lands. Therefore, the role of state and private lands, and the support of the local public, is critical to the recovery of the CYE bears. Montana Fish, Wildlife and Park's augmentation plan fulfills one high-priority conservation need for grizzly bears in the CYE. The implementation of the Access Amendment on Federal lands, which takes into account actions on private lands; the MT DNRC HCP; State MFWP augmentation program, grizzly bear specialist program, and hunter education programs all address other conservation needs for the species and contribute to offsetting cumulative effects of mortality on private lands. At this time, the cumulative effects on grizzly bears on state and private lands contribute to the inability to meet the demographic criteria for human-caused mortality and mortality of female bears in the CYE. However, the CYE population is now increasing and the programs described above to offset these effects appear to be contributing to that change in population trend. Therefore, the cumulative effects are not expected to result in substantial negative effects on the population. Given the robustness of the NCDE population and its increasing population trend, cumulative effects on state and private lands in the NCDE do not appear to have negative effects on the population.

F. CONCLUSION

After reviewing the current status of the grizzly bear, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is the Service's biological opinion that the effects of the proposed Revised Plan are not likely to jeopardize the continued existence of the grizzly bear. No critical habitat has been designated for this species therefore none will be affected.

Regulations implementing section 7 of the Act define "jeopardize the continued existence of" as: "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The best information suggests that implementation of the Revised Plan would not appreciably reduce the likelihood of both survival and recovery of grizzly bears in the CYE or the NCDE. Our conclusion is based on the literature and information referenced in this document, the information in the biological assessment prepared for the Revised Plan (USFS 2013a), the information in the Draft EIS on the Revised Plan (USFS 2011b), meetings and discussions with KNF, discussions with grizzly bear experts, and information in our files. The *Effects of the Action* section analyzed and summarized key factors in detail.

The Service's section 7 handbook explains that adverse effects on individuals of a species generally do not result in jeopardy determinations unless that loss when added to the environmental baseline, is likely to result in an appreciable reduction of the likelihood of both survival and recovery of a listed species in the wild by reducing the reproducing, numbers, or distribution of that species. In our analysis for grizzly bears, we first conduct such an analysis relevant to the CYE and NCDE grizzly bear populations, and then use those determinations to determine the impact of the proposed action on the species.

The proposed Revised Plan incorporates the 2011 Access Amendment. This direction results in an increase in core area and reduces motorized route densities. Thus, the proposed action will reduce adverse effects on grizzly bears, including significant impairment of breeding, feeding and sheltering of female grizzly bears, related to displacement of grizzly bears from roads. In the CYE and NDCE, Revised Plan management of core area and motorized access also indirectly limits the amount of grizzly bear habitat in BMUs (and subunits) affected by Forest management activities that generate noise and other disturbance (e.g. timber harvest and recreation) by limiting the road access needed for these activities. Motorized access management also reduces the potential for conflicts between grizzly bears and people by limiting motorized access into grizzly bear habitat. In the CYE recovery zone, the Revised Plan would result in an overall improvement in motorized access conditions in grizzly bear habitat, and in the CYE and NCDE, would avoid or minimize incidental take of grizzly bears related to displacement from roads; support and sustain habitat for female home range use and reproduction; limit disturbance from project related activities; and reduce mortality risk to grizzly bears, benefitting the grizzly bear population. As a result, overall, the adverse effects of roads prior to and remaining once the access direction is fully implemented are substantially outweighed by the benefits of access management to grizzly bears, and so are likely to have only negligible effects on the CYE and NCDE grizzly bear populations. Thus, we conclude that Forest Plan direction supports recovery and survival in both ecosystems.

The Revised Plan precludes permanent increases in either open or total linear road miles above baseline conditions in the action area that is outside of the recovery zones but inhabited by grizzly bears (BORZ). Therefore, the level of adverse effects related to displacement from roads in these areas, including impairment of breeding, feeding, and sheltering of females, would not increase in the BORZ. In addition, the recent Forest-wide Food Storage Order would reduce the potential risks of habituation and human-caused mortality of bears in the BORZ. In the Tobacco BORZ, these circumstances result in conditions that support use by grizzly bears, including occupation by females with cubs, albeit at lower densities than within recovery zones. Outside of the 10 – mile buffer around the recovery zone, demographic information from grizzly bears in the KNF BORZ is not used to assess CYE grizzly bear population status, and the Recovery Plan indicates that habitat within recovery zones, managed for grizzly bear use, is adequate to recover bear populations. Further, even at low densities, grizzly bear use of areas between recovery zones, including females with cubs, would promote the likelihood of both genetic and demographic recovery of the CYE grizzly bear population in the future. Even with the existing high road densities that likely adversely affect bears, a number of females with cubs have established seasonal home range use in the area. Therefore, we conclude that the Revised Plan

direction for access management would support continued use of the area by grizzly bears, especially as the NCDE grizzly bear population expands its distribution to the west.

The Revised Plan motorized access direction thus increases conditions that support and sustain female home range use for reproduction in the recovery zone, maintains conditions supporting grizzly bear use in the BORZ, reduces mortality risk to grizzly bears in both areas in combination with the Forest-wide food storage order, and promotes linkage between the CYE and NCDE, so benefitting both populations. Thus, Forest Plan direction supports recovery and survival of grizzly bears.

Snowmobile use in the CYE and NCDE subunits may result in adverse effects, including the potential for a very low amount of impairment of breeding, feeding and sheltering of females. Adverse effects resulting in such impairment are expected to occur only infrequently, affect very few females, and would be limited to a short period during spring in limited areas where late season snowmobile use currently overlaps with denning habitat. This overlap where denning habitat is available for snowmobiling could decrease under the Revised Plan as Winter Travel Plans are completed; the desired condition calls for a Forest-wide decrease in of 248,200 acres available to snowmobiling. Our analysis indicates that Revised Plan direction would not increase adverse effects associated with snowmobiling. Adverse effects on grizzly bears under the Forest Plan, prior to completion of the Winter Travel Plan, are very limited and further reduced by guidelines and standards that are immediately in place and limit grooming of snowmobile routes after April 1 and restrict management activities in denning habitat from April 1 to May 1. Therefore, any effects from snowmobiling during the den emergence period are unlikely to result in substantial adverse effects to the CYE or the NCDE grizzly bear populations.

The biological opinion also analyzed a number of other project or activity types allowed under the Revised Plan, some of which could result in adverse effects and less frequently, impairment of breeding, feeding and sheltering. These include the creation of larger opening sizes, mining proposals, large-scale special use permits, and use of helicopters for vegetation management activities. As detailed in the opinion, Revised Plan desired condition trends the forest toward a system of large, remote areas with limited human disturbance for wildlife, and trends the forest toward the recovery of listed species over the long-term. The Revised Plan would also reduce the likelihood of adverse effects from these actions, and/or would minimize the impacts of many adverse effects on grizzly bears. As such we conclude that although some individual bears may be adversely affected, these effects (including potential take), would not rise to the levels that would have substantive impacts on either the CYE or grizzly bear populations.

Thus, when added to the environmental baseline, and considering the status of the species and cumulative effects in the action area, the Revised Forest Plan would not appreciably diminish the likelihood of survival and recovery of the CYE or the NCDE grizzly bear populations.

Our non-jeopardy conclusion is further supported by the following factors, as detailed earlier in this biological opinion

Factors Related to Access Management

It is the Service's opinion that the level of open and total road densities and security core area within the action area, as directed by the Access Amendment and incorporated into the Revised Plan, adequately conserves effective grizzly bear habitat and promotes the recovery and survival of the CYE grizzly bear population. It is our opinion that the Revised Forest Plan direction for access management promotes the likelihood of both the survival and recovery of grizzly bears in the CYE, BORZ, or NCDE subunits.

- In the CYE, motorized access management under the Revised Plan conserves and/or increases habitat for female home range use in the majority of BMUs, and so supports the distribution and reproduction of grizzly bears. Thirteen of 17 BMUs in the CYE would meet (or be better than) the research benchmarks for OMRD, TMRD, and core area. These BMUS each would provide levels of secure habitat adequate to support breeding, feeding, and sheltering activities for grizzly bears, including females (USFWS 2011a, p. A-65). Adverse effects of road densities would be avoided.

- Through 2019, a low amount of adverse effects and impairment of breeding, feeding and sheltering would occur in those BMUs not yet meeting research benchmarks. Once research benchmarks are met in a BMU, we anticipate no adverse effects to grizzly bears as a result of motorized access. The plan would increase core area to 58.5 percent of the CYE recovery zone by 2019 (USFWS 2011a, p. A-60). Thus the Revised Plan direction for motorized access supports recovery in the CYE.

- The Revised Plan standards for OMRD and/or TMRD in the four remaining BMUs do not meet research benchmarks. Three of the four BMUs meet the core benchmarks; one would not. Overall, displacement impacts to grizzly bears related to the high road densities would be lessened within the 3 BMUs meeting core benchmarks by the availability of ample amounts of secure habitat available for home range use (USFWS 2011b, p.A-67). Core areas in these four BMUs also contribute to providing secure habitat across the recovery zone overall since female home ranges are not expected to follow the boundaries of BMUs. Therefore, we expect these four BMUs to continue to provide habitat available for grizzly bears, albeit in less amounts than in fully functional BMUs. Given the Revised Plan direction for the CYE recovery zone overall, the adverse effects related to road densities (access management) in these four subunits would likely be insignificant to the grizzly bear population.

- In the KNF NCDE subunits, we expect no adverse effects as a result of high road densities in one subunit. The maintenance of motorized access baseline conditions in the Krinklehorn subunit would provide levels of secure habitat needed to support female grizzly bear home range use, and so would support grizzly bear distribution and reproduction. The Therriault subunit would not meet road density benchmarks, but meets the benchmark for core. This core area would lessen overall displacement impacts to grizzly bears in the BMU (USFWS 2011a, p.A-67) and would also contribute to overall amounts of secure habitat for grizzly bears in the recovery zone. The NCDE recovery zone has abundant core area, encompassing 66 percent of the ecosystem (K. Ake, USFS,

2013 pers. comm.). Therefore, the adverse effects related to road densities (access management) in this one subunit would be insignificant to the NCDE population. This Revised Forest plan direction supports recovery.

- In BORZ, we anticipate that high linear miles of road are likely causing adverse effects on grizzly bears. However, grizzly bears, including females with cubs, are using some BORZ for seasonal home ranges. The KNF had not specifically managed these areas for grizzly bear habitat relative to road standards outside of the recovery zones until implementation of the Access Amendment. In 2011, the Access Amendment limited motorized access to no more than the existing baseline linear miles of open and total permanent roads in BORZ. The Access Amendment does allow temporary increases in linear miles of total roads, but these roads must be closed to public access and total roads returned to baseline after the project is complete. Overall, these provisions limit the adverse effects of roads on grizzly bears in these areas. The Revised Plan would retain the motorized access conditions in BORZ; conditions that currently allow some use by grizzly bears.

- The Proposed Action direction would not increase the existing level of adverse effects on grizzly bears in the CYE and NCDE resulting from use of snowmobiles. Individual grizzly bears may be adversely affected where late season snowmobile activities occur in denning habitat, including 18,868 acres (5 percent of total denning habitat) in the CYE portion of the KNF and 7,905 acres in the NCDE subunits on the KNF (19 percent of denning habitat in the action area and less than one percent in the NCDE). The likelihood of adverse effects to individual grizzly bears is very low for all the reasons described in the Analysis of Effects, including Revised Plan elements (FW-DC-WL-01; FW-DC-WL-04; FW-GDL-WL-01; and FW-STD-WL-05). We anticipate adverse effects would be so infrequent and affect so few females that effects of snowmobile use would not be likely to have substantial impacts on the grizzly bear population in CYE or NCDE.

Factors Related to Attractants and Food Storage

It is the Service's opinion that the 2011, mandatory Forest-wide Food Storage and Sanitation Special Order promotes the likelihood of both the survival and recovery of the CYE and NCDE grizzly bear populations. There have been no grizzly bear mortalities on the KNF related to livestock grazing allotments or food storage/attractants. The KNF has taken numerous actions to minimize the risk of habituation/food conditioning to grizzly bears. We expect that continuation of these programs as well as elements of the Revised Plan that address attractants and food storage would ensure that the risk of conflicts related to attractant storage on the KNF remains low.

- The Revised Plan implements the IGBC Guidelines to minimize grizzly bear-human conflicts in accordance with the grizzly bear Management Situation designations on the KNF (FW-GDL-WL-15). The KNF will follow the IGBC Guidelines for nuisance bear management. The Guidelines are embedded in the Revised Plan (FW-GDL-WL-15).

- The KNF's existing livestock grazing program has avoided adverse effects on grizzly bears. No changes in existing allotments are expected and current use levels are expected to be maintained for the next 10 to 15 years (USFS 2011b, pp.388-389). Thus, we do not consider this type of land use, at its current or anticipated levels, to result in adverse effects on grizzly bears in the recovery zones or BORZ.

- There is a Forest-wide food storage order on the KNF (USFS 2011d). The order applies to all dispersed and developed recreation sites and activities. Notices are posted at all visitor centers, information centers, and kiosks. Campground hosts inform campers and make inspections to ensure campers are following the order.

- Revised Plan requires permits and operating plans (e.g., special use, grazing, mining) to specify attractant storage measures to reduce human/wildlife conflicts and grizzly bear mortality by making wildlife attractants (ex: garbage, food, livestock carcasses) inaccessible through proper storage or disposal (FW-STD-WL-04).

Other Factors Affected by the Revised Plan

The Revised Plan desired conditions and standards and guidelines (in addition to and/or other than those related to motorized access management) applied at the project level would avoid, reduce, or minimize adverse effects on grizzly bears. Adverse effects that could result in impairment of breeding, feeding or sheltering would be infrequent and affect few bears. We conclude that this direction in the Revised Plan adequately conserves effective grizzly bear habitat and substantially reduces the risks of conflict between people and bears, and so promotes the recovery and survival of the CYE and NCDE grizzly bear populations. We do not anticipate that project-level adverse effects on grizzly bears would appreciably reduce the likelihood of both the survival and recovery of grizzly bears.

- The desired condition under the Revised Plan is to provide large, remote areas with low levels of disturbance for grizzly bears and to ensure access management promotes recovery of grizzly bears (FW-DC-WL-02 through 05 and MA1a,b,c-DC-WL-01, MA3-DC-WL-01, MA5abc-DC-WL-01, GA-DC-WL-BUL-02, GA-DC-WL-KOO-03, GA-DC-WL-TOB-02, and GA-DC-WL-TOB-03). The Revised Plan reduces the area where roads or trails may be designated for wheeled motorized use by 39,900 acres. These conditions complement the Access Amendment and could result in additional non-motorized areas beyond those required by the Access Amendment (USFS 2013a).

- The Revised Plan limits the suitable timber base to 16 percent of the total area within all BMUs. Additionally, the Access Amendment also indirectly limits the amount of grizzly bear habitat in BMUs (and subunits) affected by vegetation management activities during the active bear year that generate noise and other disturbance (e.g. timber harvest and recreation) by limiting the road access needed for these activities.

- The Revised Plan's desired condition for patches which includes a range of larger opening sizes may result in adverse effects if lack of cover leads to under use of foraging habitat or increased risk of human-grizzly bear conflicts causing mortality of a grizzly bear. Openings created by timber harvest, depending on site conditions, may retain features that interrupt the line of sight and provide cover for bears (J. Anderson 03/12/2012 pers. comm.). These measures could improve security and so promote foraging by bears in areas away from open motorized routes. Based on our history of consultation and proposed plan direction - specifically, road closures and restrictions directed by the Access Amendment - as well as public information and education programs that reduce the risk of human/bear conflicts, we anticipate that in most instances, the size of harvest units would not result in adverse effects on grizzly bears. Over the life of the Revised Plan, we anticipate that a few individual bears would be adversely affected by opening size, but we expect these instances would be infrequent, and significant impairment of breeding feeding and sheltering even more infrequent. Thus, we conclude that opening size would have no substantial impacts on the grizzly bear populations in the CYE or NCDE.

- In BORZ, grizzly bears would have fewer options providing undisturbed areas to select from if disturbed by timber harvest and prescribed fire activities. However, we do not anticipate significant impairment of grizzly bears' ability to feed, breed, or shelter. This is attributed to the occupation of these areas by grizzly bears despite the sub-optimal conditions (including existing, ongoing levels of timber harvest), the elements of the Access Amendment that limit open, total, and temporary roads, and the Access Amendment requirement in BORZ to schedule timber harvest activities that will occur within multiple watersheds in a manner to minimize disturbance of grizzly bears resulting from road use during project level consultation (prescribed fire is often implemented as a post-harvest activity).

- Helicopter use associated with timber harvest would be designed using the *Guide to Effects Analysis of Helicopter Use in Grizzly Bear Habitat* (USFWS and USFS 2009). Use of this guidance in planning activities would help avoid or reduce adverse effects on grizzly bears from helicopter use, including timber harvest. Based on our history of consultation on Forest management activities, we anticipate that helicopter use that may adversely affect grizzly bears would be relatively infrequent. Most projects would be designed to avoid or minimize adverse effects since the recovery zone is under MS1 designation where the needs of grizzly bears are favored when grizzly habitat and other land use values compete. Adverse effects on grizzly bears would likely occur only infrequently and many would be of short duration, and impairment of breeding, feeding and sheltering even more infrequent, and so these effects would not have substantial negative effects on the grizzly bear population.

- If future mines are proposed, the potential for adverse effects would be reduced or minimized through Revised Plan desired conditions FW-DC-WL-01 through 05; linkage

guidelines FW-GDL-WL-12 through 14; food storage and attractant requirements (FW-GDL-WL-15, FW-STD-WL-04, Food Storage Order); and standards for access management (FW-STD-WL-02 and 03) as well as the development of appropriate mitigation plans where needed, as in the case of large scale operations such as the Troy Mine and Rock Creek Mine on the KNF.

- The Revised Plan incorporates elements to maintain habitat connectivity and linkage areas for movement of bears between U.S. and Canada and between U.S. recovery zones through desired conditions for large, remote areas with low levels of human disturbance that contribute to movement across the Forest and GA direction specifically directed at movement (FW-DC-WL-02, 03, 04; MA1a-DC-WL-01, MA1b-DC-WL-01, MA1c-DC-WL-01, MA3-DC-WL-01, MA5abc-DC-WL-01, GA-DC-WL-BUL-01, GA-DC-WL-BUL-04, GA-DC-WL-CLK-WL-03, GA-DC-WL-FSH-01, GA-DC-WL-KOO-02, GA-DC-WL-KOO-03, GA-DC-WL-LIB-01, GA-DC-WL-LIB-04, GA-DC-WL-TOB-01, GA-DC-WL-TOB-02, GA-DC-WL-TOB-03, GA-DC-WL-TOB-05, GA-DC-WL-YAK-01, GA-DC-WL-YAK-02, and GA-DC-WL-YAK-04). The KNF took into consideration connectivity issues when setting the individual BMU access management parameters (BA 2010a, p.50; Kaiser 2003 *In* USFWS 2011b, p. A-76).

- Under the Revised Plan, BORZ will continue to support grizzly bear movement and linkage on the whole, while causing some adverse effects on individual bears from site-specific projects. However, we do not anticipate substantial negative effects on the population. This is because the allowable uses under the Revised Plan are already occurring in the BORZ and yet bears are meeting resources needs, albeit at lower densities than in the recovery zones. Additionally, the Revised Plan implements the Access Amendment in BORZ which limits linear miles of open and total permanent roads to no more than the existing baseline conditions, which supports some use by grizzly bears, including females with cubs. Notably, the KNF took into consideration connectivity issues when developing the BORZ polygons (USFS 2010a: Appendix F *In* USFWS 2011b, p. A-76). Lastly, the Forest-wide food storage order in BORZ will further facilitate connectivity between the NCDE and CYE by limiting risk of conflicts between bears and humans.

- The desired condition under the Revised Plans is that forest management contributes to wildlife movement within and between national forest parcels; movement between those parcels separated by other ownerships is facilitated by management of the NFS portions of linkage areas identified through interagency coordination; and federal ownership is consolidated at these approach areas to highway and road crossings to facilitate wildlife movement (FW-DC-WL-17). This would be achieved at the project or site-specific level through guidelines FW- GDL-WL-12 through 14.

Factors Related to the Grizzly Bear Populations

The current estimate for the CYE grizzly bear population is approximately 42 bears. The population trend for CYE grizzly bears is declining slightly (by less than one percent annually),

but has improved since 2006. Since 2006, grizzly bear numbers in the CYE have been slowly, steadily increasing (Kasworm et al. 2012, p. 38, Figure 9). The rate of change in the population (lambda) has also improved and moved closer to stability (Kasworm 2013 unpublished data). These are indications that the CYE grizzly bears population status is improving. Telemetry data and sightings, including females with cubs, confirm occupancy of BORZ by grizzly bears (Kasworm et. al 2012, page 16, Table 2). From 1999 to 2010, in the U.S. grizzly bears were killed by humans at disproportionately higher numbers on private lands than on Forest lands (n=13 vs. n=6 on NFS lands). For that time period, mortality on private lands in the U.S. was currently the largest source of human-caused mortality in the CYE (W. Kasworm 2010a as cited *In* USFWS 2011a p. A-26). For the past two years, 5 additional mortalities have occurred: 4 were on NFS lands and 1 was on private lands. The proportion of mortalities on private lands still remains higher than on public lands.

The NCDE population trend is currently increasing and expanding its range (Mace and Roberts 2011, 2012). Current levels of human-caused mortalities appear to be sustainable. The population has been increasing since 2004 and the Service considers this population to be robust and nearing recovered levels. More than 17 percent of this ecosystem is private land and the majority of bear-human conflicts and bear deaths occur on these private lands.

- Demographic Criteria - In the CYE, one of the four 1993 demographic recovery criteria was met in 2012 (Kasworm et al. 2013). The six-year running average for females with cub was 2.8, compared to the criteria of 6. The distribution criterion has not been met with only 13 of 22 BMUs occupied by females with young. Total human-caused mortality limits were not met in 2012, but had been met each year for the past four years (2008-2011) (Kasworm et. al 2012, p.18). The running 6-year average (2007-2012) of total human-caused mortality was 1.7 animals per year, compared to the sustainable limit of no more than 1.6 (ibid). Female mortality (0.5) meets the recovery goal of no more than 30% (0.5) of total mortality criteria. Due to the current small population size (estimated at 42), the mortality *goal* remains zero. Nonetheless, given the importance of female grizzly bears to the population, the current 6-year average level of human-caused female mortality is a positive sign for the status of this population.

- In 2011, the grizzly bear population estimate in the Cabinet Mountains was 21 bears. The estimate for 1998 was 15 bears or fewer. The augmentation effort results are encouraging thus far. The grizzly bear population in the Cabinet Mountains is increasing primarily as the result of an augmented female that is known to have produced nine offspring who in turn have produced eight offspring (Kasworm et al. 2012). The MFWP intends to continue the augmentation effort into the future with plans to relocate two grizzly bears for the coming season (depending on suitability of captured bears) (J. Williams 06/12/2013 pers. comm.).

- The Service has telemetry data and verified sightings of grizzly bears, including females with cubs, occupying BORZ (Kasworm et al. 2012, p. Table 3). With continued

implementation of the Access Amendment, which maintains baseline open and total roads in BORZ, we expect these areas to continue to support grizzly bears. Grizzly bear use of BORZ would support movement of bears between recovery zones, which would support the genetic and demographic health of the CYE population.

- In the NCDE, demographic recovery goals are being met. The grizzly bear population was estimated at 765 grizzly in 2004 (Kendall et al. 2009) and research suggests an increasing (3 percent annually) population trend since 2004 (Mace and Roberts 2011). This population is robust, increasing and approaching recovered levels. The KNF manages 3 percent of the lands in the NCDE grizzly bear recovery zone.

Factors Related to the Conservation Needs of the CYE Grizzly Bear Population

Finally, the six primary conservation needs for the CYE grizzly bear population are each addressed, fully or in part, by the Revised Plan:

1. Augment the Cabinet Mountains and Canadian Selkirks populations – The KNF would continue to support MFWP's grizzly bear augmentation program in the Cabinet Mountains.
2. Limit human-caused mortality – The KNF implements extensive programs to limit the risk of human-caused grizzly bear mortality (Access Amendment; Food Storage and Sanitation Order; Ongoing Information and Education Programs; IGBC guidelines - FW-GDL-WL-15; and food storage/sanitation requirements for special use permits - FW-STD-WL-04). To date, there has been no grizzly mortality associated with food or attractants on NFS lands in the CYE recovery zone, nor has there been a grizzly bear/livestock conflict.
3. Enhance population linkage across Highways 2, 56, and 200 – The Revised Plan supports opportunities to install wildlife crossing structures and to maintain important habitat at crossing locations through desired condition FW-DC-WL-17 and guidelines FW-GDL-WL-12 through 14.
4. Address the needs of bears outside the recovery zone line – Through the Access Amendment, the KNF and Service established BORZ areas. Within the boundaries of BORZ, linear miles of open and total permanent roads are limited to no more than the 2011 baseline conditions, the Forest-wide Food Storage and Sanitation Order is applied; the Access Amendment r requires the USFS to schedule timber harvest activities that will occur within multiple watersheds in a manner to minimize disturbance of grizzly bears resulting from road use during project level consultation; and the KNF took into consideration connectivity issues when developing the BORZ polygons (USFS 2010a: Appendix F *In* USFWS 2011b, p. A-76).
5. a) Inside the recovery zone, complete access management in most important areas – The KNF currently implements the Access Amendment (USFS 2011a); the Revised Plan incorporates the Access Amendment in its entirety (FW-WL-STD-02).
   b) Inside the recovery zone, improve sanitation standards on public lands – The KNF implemented a Forest-wide Food Storage and Sanitation Order in 2011; the Revised Plan implements Food storage/sanitation measures in permits and plans of operation

(FW-STD-WL-04). The Order is posted at visitor centers and information kiosks at trailheads and developed recreation sites.

6. Increase outreach and public involvement - Existing public outreach and education programs will continue, including the KNF's role in the Selkirk/Cabinet-Yaak Subcommittee of the IGBC.

In summary, the proposed action conserves and increases the amount of grizzly bear habitat in conditions that support female grizzly bears and reproduction on KNF lands in recovery zone. Forest Plan access management and the food storage order would support continued use of habitat by bears in BORZ. Forest-wide, access management and the food storage order reduce the potential for conflicts between grizzly bears as a result of excessive road access and food and attractant storage, which in turn reduces human-caused mortality risk to grizzly bears. Finally the Revised Plan adequately minimizes the impacts of adverse effects of Forest management on grizzly bears. We conclude that the Revised Forest Plan would not appreciably diminish, but would increase the likelihood of recovery of both the CYE and NCDE grizzly bear populations. Therefore, the proposed action is not likely to jeopardize grizzly bears.

G. INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

The measures in an incidental take statement are non-discretionary and must be undertaken by the action agency so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The action agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the action agency (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the action agency must report the progress of the action

and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

1. Amount or Extent of Take Anticipated

This biological opinion considered the effects to grizzly bears from implementation of the Revised Plan direction as guided by the Revised Plan elements (goals, objectives, desired condition, standards, and guidelines). It includes specific elements for the conservation of grizzly bears and grizzly bear habitat, but does not authorize specific actions.

Our analysis of the Revised Plan is a broad-scale examination of the types of projects and activities conducted under the Revised Plan that could potentially occur in grizzly bear habitat and result in effects on grizzly bears. The Revised Plan contained sufficient specificity to determine that the extent of adverse effects does not rise to levels that are likely to jeopardize grizzly bears.

In this biological opinion, we documented how the Proposed Action reduces the potential for adverse effects and incidental take to occur as a result of Forest management. However, the potential remains for specific projects and activities to result in adverse effects and incidental take of grizzly bears. The mere potential for future take from these actions is not a legitimate basis for providing an exemption for take. The KNF is responsible for section 7 consultation on all future projects (conducted under the Revised Plan) that may affect the grizzly bear or its habitat, even if those projects are consistent with Revised Plan. Subsequent consultation, as appropriate, on the specific actions developed pursuant to the Revised Plan will serve as the basis for enumerating the incidental take and determining if an exemption from the section 9 take prohibitions is warranted. If so, the Service will provide Reasonable and Prudent Measures and Terms and Conditions, as appropriate, to minimize the impacts of the taking on the grizzly bear in accordance with 50 CFR 402.14(i).

Two exceptions to this approach are related to the effects of motorized access route densities and over-snow motorized use on grizzly bears. For motorized route densities, the science is clear that above certain densities, bears suffer adverse effects that can lead to significant impairment of the ability to feed, breed, or shelter. Further, the Forest carefully examined, monitored and reported motorized access route densities in each BMU (and NCDE subunit), set access standards for each BMU and provided a timeframe for achieving BMU access standards. In the BORZ, the Forest examined, monitored and reported linear motorized road miles and adopted a prohibition on increasing the existing road miles. Hence, we are able to ascertain the level of adverse effects and provide surrogate measures of incidental take of grizzly bears related to road densities and that analysis, previously conducted in our consultation on the 2011 Access Amendment, was brought forward in this document.

For over-snow motorized use (i.e. snowmobile use) the Forest analyzed and reported the amount of denning habitat that was impacted by late season snowmobile use. The best available science and information suggests that recently emerged females with cubs would be vulnerable to adverse disturbance effects of snowmobile use near densities during late spring. The Forest provided both acres of denning habitat and an estimate of late season snowmobile use in denning

habitat. Thus, we are able to ascertain the level of adverse effects and provide surrogate measures of incidental take of grizzly bears related to late-season snowmobile use. These two types of incidental take are examined below.

Access Management –The Service analyzed the amount or extent of incidental take of grizzly bears anticipated as a result of the Access Amendment on the KNF in our 2011 biological opinion and incidental take statement (USFWS 2011a). As detailed in the KNF's Draft EIS for the Revised Plan (USFS 2011b), the associated BA (USFS 2013a) and this biological opinion, the Revised Plan incorporates the Access Amendment in its entirety and would result in no additional adverse effects on grizzly bears related to motorized access management.

The proposed Revised Plan will establish grizzly bear habitat management standards for all 22 BMUs in the CYE. Within the action area, the proposed standards for 20 of 22 BMUs in the CYE will meet or exceed (be better than) the benchmarks for core area; 15 of 22 in the CYE will meet or be better than the benchmark for OMRD; and 16 of 22 in the CYE will meet or be better than the benchmark for TMRD that research suggests provide conditions necessary to support the home range use and habitat needs of an average adult female grizzly bear (Table A8, page A-68 *In* USFWS 2011b). The grizzly bear access management benchmarks identified through research specific to these ecosystems are as follows: home ranges were comprised of 1) an average 55 percent core area; 2) an average of 26 percent TMRD greater than 2 miles per square mile; and 3) and average of 33 percent OMRD greater than 1 mile per square mile.

As described in the accompanying biological opinion, the effect of roads upon grizzly bear behavior and habitat use has been well documented in the scientific literature. We anticipate that incidental take of grizzly bears is likely to occur in the form of harassment of adult female grizzly bears in highly roaded areas (through displacement caused by road-related disturbance in areas of high open road densities). We also anticipate harm of adult female bears (through significant habitat modification or degradation caused by high open or total road densities). Both harassment and harm cause actual injury to female grizzly bears by significantly disrupting normal behavioral patterns, including breeding, feeding, or sheltering.

The take we anticipate would be caused by displacement (i.e. significant underuse) of female grizzly bears from key habitat areas in highly roaded areas, which may result in decreased fitness that impairs a female's inherent reproductive potential. In other words, some adult female grizzly bears wary of humans and human-generated disturbance may fail to breed at their potential frequency or they would fail to complete gestation due to decreased fitness. We do not expect all adult female grizzly bears affected by displacement or by alteration of habitat caused by the proposed action to suffer impairment of breeding, feeding and/or sheltering. We do not anticipate incidental take of male and subadult grizzly bears, which are independent and thus more mobile and do not have the physiological or nutritional requirements of pregnant or lactating females.

Currently, the Service is unaware of scientific or commercial information that could be used to quantify the exact level of incidental take of female grizzly bears as a result of such impacts to or degradation of their habitat, disturbance, or displacement. Reduced reproductive success of

females as a result of displacement effects could include grizzly bear cub injury or mortality, but it is more likely to occur through failure to breed or complete gestation. The amount of take is difficult to quantify for the following reasons:

1. The amount of take would depend on the number of adult female grizzly bears impacted by high road densities. We lack specific information on the precise number of adult female grizzly bears that use the action area, but due to the amount of habitat meeting acceptable habitat parameters, we reasonably assume very few adult females would be affected.
2. Individual grizzly bears would react differently to the disturbance. Not all adult female bears that are exposed to disturbances from roaded areas would be adversely impacted to the point of take.
3. Individual female grizzly bears that initially may be sensitive to disturbances may over time become accustomed to the routine disturbances generated by routine forest road use. Therefore, determining the precise amount of take, as defined by impaired reproductive potential, is difficult.

Therefore, as detailed in this biological opinion, the Service anticipates some low level of incidental take of female grizzly bears would occur in the form of harm or harassment from the displacement effects of road densities.

The amount of take would be also difficult to detect for the following reasons:

1. Grizzly bears are not easily detected or observed in the wild.
2. Reproductive rates of individual female grizzly bears vary naturally due to environmental and physiological causes.
3. A reduction in “normal” reproductive success of an individual female is not easily discernible in the wild.
4. The reasons a grizzly bear fails to breed and/or failure to complete gestation are not discernible in the wild.

In instances where incidental take is difficult to quantify or detect, the Service uses surrogate measures of take. Here, we use the research benchmark levels of OMRD, TMRD, and security core as our surrogate measure of incidental take. These benchmarks were discussed in detail in this biological opinion. Where individual BMU road densities are higher than benchmark levels of OMRD or TMRD, or where core is less, we conservatively anticipate some level of impaired habitat use, resulting in impaired breeding or feeding for some adult female grizzly bears.

Based on the best available research and information, we anticipate that some level of incidental take of female grizzly bears will occur within individual BMUs as long as: 1) OMRD exceeds one mile per square mile in more than 33 percent of a BMU; 2) TMRD exceeds two miles per square mile in more than 26 percent of a BMU, and/or 3) core area makes up less than 55 percent of a BMU. Within those BMUs achieving the research benchmarks, incidental take of grizzly

bears is unlikely to occur. Through 2019, KNF actions will reduce motorized route densities to achieve Revised Plan standards in each BMU. Thirteen of 17 of the proposed BMU standards meet research benchmarks. Until these benchmarks are met, we anticipate some level of incidental take of female grizzly bears in these BMUs, and that the likelihood and level of take will diminish over the next eight years as BMUs attain the benchmark levels for access management.

In four of the 17 CYE BMUs on the KNF, one or more of the Revised Plan's standards do not meet all three of the research benchmarks. In these BMUS, we anticipate incidental take of female grizzly bears is likely to occur, and that the level and likelihood of take will diminish as open and/or total road densities are lowered, and/or core area increases nearer to benchmark levels. However, the likelihood of incidental take would not be entirely eliminated in these BMUs. We anticipate a low level of take because 2 of the four BMUs in the KNF portion of the CYE have standards near the research benchmark for OMRD and TMRD (Table A8, p.A-68 *In* USFWS 2011a), 3 of the 4 KNF CYE BMUs will eventually provide 55 percent core area or more (Table A8, p.A-68 *In* USFWS 2011a), and because of the three reasons listed above related to quantification of take.

One of BMUs (Pulpit) on the KNF may never be capable of providing the conditions that research has indicated needed to support an average female home range. Therefore, for this BMU, the proposed action establishes grizzly bear habitat management standards at levels that may not be capable of providing the full suite of home range needs of the average adult female grizzly bear. Thus, female grizzly bears with home range use in this area may significantly avoid key habitat in this BMU, and so incidental take in the form of harm may be a persistent long-term condition.

Using this surrogate measure of incidental take, by the end of 2019, all BMUs shall meet the Revised Plan (Access Amendment) standards (shown in blue in Table II-10 above), or the amount of take we anticipated and analyzed here would be exceeded, and reinitiation of consultation would be required.

In the BORZ (areas outside the recovery zones within the action area), we anticipate some level of incidental take of female grizzly bears. We base our opinion on the facts that: 1) linear miles of road are relatively high in these areas; and 2) the KNF has not specifically managed for grizzly bear habitat relative to road standards outside of the recovery zones. Thus, given these facts, in conjunction with the cited research pertaining to the effects of roads on grizzly bear behavior and habitat use, we anticipate that linear miles of road are likely causing incidental take of grizzly bears and this will continue. This is a conservative conclusion. Since grizzly bears moving into these areas did so under prevailing conditions, it is also possible that incidental take is not occurring for every female. Grizzly bears are known to tolerate a range of conditions; some apparently adjust to high levels of human activity without apparent consequence. Further, because few grizzly bears occupy this area, intraspecific competition is probably not significant. Those grizzly bears using the BORZ likely have options related to home range selection and use. Similar to the incidental take likely occurring within BMUs, we anticipate a low level of incidental take of female grizzly bears in the BORZ in the form of harassment, and /or harm through significant habitat modification or degradation as a result of high road densities and

associated disturbance, which causes actual injury to grizzly bears by significantly disrupting normal behavioral patterns, to the extent that a female's normal reproductive potential is impaired.

In the BORZ, we use the surrogate measure of the linear miles of road in each BORZ polygon as of 2010. In the BORZ, permanent increases in linear miles of open road and/or permanent increases in linear miles of total road beyond the standards shown in Table II-10 of this biological opinion will result in levels of take that exceed the amount of incidental take we anticipate here, and reinitiation of consultation would be required.

Through 2019, the KNF may conduct a one-time entry (i.e., one season of construction activity) of core within a BMU, for the sole purpose of completing needed road decommissioning and stabilization activities on existing closed or barriered roads in core area (i.e., legacy roads that were closed to create core before this issue was identified), that shall occur during one bear season. Such management is in the interest of creating long term secure habitat for bears and in protecting aquatic habitats for bull trout and other species. Roads that are closed in the future will be hydrologically stabilized so as not to need such maintenance. Motorized use of such previously closed roads in core may in some cases result in incidental take of female grizzly bears in the form of harassment (displacement) or harm (significant habitat modification or degradation), which causes actual injury to grizzly bears by significantly disrupting normal behavioral patterns to levels that impair reproduction. Adult female grizzly bears that have established habitat use patterns within a core area may experience significant displacement from an area if a road(s) were entered for decommissioning. We anticipate a low level of take, as we do not expect take would occur if entries were limited in duration and actions taken were of relatively low impact. Further, not all females impacted by such entries and actions in core would suffer significant displacement.

For reasons stated above, this take is difficult to quantify. Here, we use the following surrogate measures to quantify and measure incidental take of female grizzly bears related to such entries into core: If more than one entry of core occurs prior to the end of 2019 within any block of core, or occurs for more than one bear season, or occurs for reasons other than completing road decommissioning/stabilization activities on existing closed or barriered roads in core area habitat (see Part I.B.2.a *In* USFWS 2011b, p. 13), the level of incidental take anticipated here would be exceeded and reinitiation of consultation would be required.

Similarly, after all BMUs have reached standards (i.e. 2019), adverse effects on grizzly bears may occur over the short-term through any permanent loss of core area from existing conditions within any individual BMU currently exceeding (being better than) the research benchmarks. Adult female grizzly bears that have established habitat use patterns within a core area may experience significant displacement from an area if a road(s) were built or upgraded, and used. The Revised Plan (with incorporation of the Access Amendment), in and of itself, does not permit permanent reductions in core area; but rather establishes some BMU core standards at levels less than the existing condition. The KNF commits to no permanent reductions in core area in such BMUs until all the BMUs within their jurisdiction in the respective recovery zones are up to standard. Once all BMUs achieve standards, grizzly bear habitat across multiple BMUs, as well as within, will be more conducive to supporting female home ranges across the

landscape. Adult females impacted by new roads in core would likely have options within their home range to find alternate suitable habitat over time, and adjust habitat use patterns accordingly. These projects would occur in the future, where the environmental baseline, status of the species, and cumulative effects may be substantially different than now. Further, each project would have specific design elements related to scale and timing. Thus we lack information needed to enumerate the amount of take associated with these actions. As explained earlier, these projects would undergo independent section 7 consultation (as appropriate) and will be analyzed given the prevailing conditions and information at the time, including grizzly bear population and habitat indices. *Thus, any incidental take that may result from future permanent reductions of core area to standards is not exempted here.*

In the NCDE, incidental take attributed to high road densities may occur for the Therriault BMU subunit where OMRD exceeds the research benchmark. For this subunit, we similarly use the research benchmark levels of OMRD, TMRD, and security core (for the NCDE – 19:19:68) as our surrogate measure of incidental take. These benchmarks are discussed in detail in this biological opinion. In the Therriault BMU subunit, where total road densities are higher than benchmark levels for OMRD, we conservatively anticipate some level of impaired habitat use, resulting in impaired breeding or feeding for some adult female grizzly bears. We anticipate a low level of take for this subunit since it is only a few percentage points from research benchmark for OMRD (4%) and exceeds (is better than) the benchmark for TMRD and core (see Table II-10, above).

Over-snow Motorized Use – In the CYE and NCDE, incidental take may occur where late season snowmobiling overlaps with grizzly bear post-denning habitat. The incidental take is expected to be in the form of harassment to individual female grizzly bears and/or cubs caused by premature den emergence or premature displacement from the den site area, resulting in reduced fitness of females and cubs. We expect the amount and extent of take would be very low. Late season snowmobile use would affect very few individual females with cubs over the life of the plan, as adult females with cubs occur at very low numbers compared to the amount of denning habitat available. As spring season ends, the amount of snowmobile use decreases. Finally, an individual female would not likely be affected for more than one denning season. Grizzly bears typically do not reuse den sites. Thus, if a female grizzly bear suffers significant disturbance at or near her den site, it is probable that she would locate a new site to den in the future and would have options for denning elsewhere.

In the CYE, female grizzly bears with cubs emerge around the 3rd week of April. By May 31, we anticipate conditions would no longer be conducive to snowmobile use. Therefore, in the CYE, we conservatively anticipate some low level (infrequent) of incidental take on 18,868 acres (5 percent of the denning habitat in the CYE recovery zone portion of the KNF) between April 15 and May 31 where snowmobile use currently occurs in denning habitat.

In the NCDE female grizzly bears with cubs emerge around the 2nd week of April. By May 31, we anticipate conditions would no longer be conducive to snowmobile use. There, we conservatively anticipate some low level (infrequent) of incidental take on 7,905 acres of denning habitat (21 percent of denning habitat across the two subunits) in the two KNF BMU subunits between April 7 and May 31 where snowmobile use currently occurs in denning habitat.

Thus in this case, we use the acres of denning habitat that overlap with areas currently receiving snowmobile use as our surrogate measure of incidental take. The dates of overlap represent the second surrogate measure of incidental take.

The surrogate measure of take is the amount of potential denning habitat currently overlapped by known snowmobiling use. In the CYE recovery zone: 18,868 acres. In the two NCDE subunits: 7,905 acres. If the KNF detects late season use (post-April 15) on more than this amount of denning habitat in either recovery zone, then the amount of take we anticipated in this biological opinion would be exceeded.

Finally, although it is not Revised Plan direction, a food storage order is in effect for the entire KNF (USFS 2013a, Appendix C). Additionally, contracts and permits in the action area include food storage requirements under the Revised Plan. Lastly, there has been a concerted effort to address sanitation on NFS lands throughout the action area and CYE as a whole and on the NCDE portion on the KNF, with many campgrounds and developed recreation sites now having bear-resistant garbage and/or food storage container. Additionally, dispersed recreationists are informed of the Forest-wide food storage order through trail-head signs and pamphlets at visitor centers and developed recreation sites, For reasons detailed in the biological opinion, we anticipate no incidental take as a result of habituation and food conditioning of grizzly bears related to improper food or attractant storage on the KNF over the life of the Revised Plan and so no take is exempted. Further, for reasons detailed in this biological opinion, we do not anticipate incidental take of grizzly bears as a result of habituation and food conditioning as a result of grazing under the Revised Plan, and so no take is exempted.

2. Effects of Take

Effects of Take in the CYE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the grizzly bear. The best information indicates the overall status of the Cabinet-Yaak grizzly bear population is probably decreasing, by about -0.8 percent per year. However population trend has improved; since 2006 the numbers of bears have increased and population is now is nearing stability. The rate of increase in the population has also improved. As detailed in this biological opinion, the proposed action may cause localized and short- or long-term adverse effects, but would result in overall ecosystem-wide improvements.

Notably, the Forest Plan incorporates the 2011 Access Amendment, which would reduce the amount of incidental take related to high motorized route densities. Motorized access densities in BMUs would be reduced, and core area would increase, to standards in the plan, reducing the amount of take related to motorized access management. Most BMU standards require access levels that research indicates would support an average female home range and reproduction. Core area across the recovery zone would increase to 58.5 percent. The Revised Plan would preclude permanent increases in either open or total linear miles of permanent road in the BORZ

areas outside of the recovery zones, which would not increase the existing amount of take related to motorized access in these areas. Grizzly bear use of BORZ, including females with cubs, has been documented.

As also detailed in this biological opinion, the Revised Plan includes a suite of Desired Conditions (FW-DC-WL-02, 03, 04; MA1a-DC-WL-01, MA1b-DC-WL-01, MA1c-DC-WL-01, MA3-DC-WL-01, MA5abc-DC-WL-01, GA-DC-WL-BUL-02, GA-DC-WL-KOO-03, GA-DC-WL-TOB-01 and 03, and GA-DC-WL-YAK02) that describe a forest trend toward large, remote areas with low levels of human disturbance and thereby complement the requirements of the Access Amendment.

Revised Plan direction reduces the incidental take of grizzly bears related to motorized access to a low amount in the recovery zone, and limits the amount in the BORZ. Thus this amount of incidental take is unlikely to result in substantial negative impacts on the CYE population. The net effect of the access management direction supports survival and recovery of the population by supporting the numbers, distribution and reproduction of grizzly bears, including females, across the ecosystem.

The biological opinion determined that some low amount (low number, and short-term impact) of incidental take is anticipated where late season snowmobiling currently overlaps with denning habitat. We determined that the anticipated amount of incidental take is limited to the disturbance of a low number of females with cubs, during a short period of snowmobile use in a small portion of available denning habitat. This level of take is unlikely to result in substantial negative impacts on the CYE population. The net effect of Plan direction would not increase the level of this take, and may decrease it in the future. Thus the take would not substantially negatively impact the survival and recovery of the population reducing the numbers, distribution and reproduction of grizzly bears across the ecosystem.

Finally, the opinion determined that a low amount of incidental take associated with helicopter harvest, large opening sizes, mining proposals, or special use authorizations could occur. This take would be infrequent and affect few individuals. Forest Plan direction would be unlikely to increase the level of this take, and elements of the Plan would avoid, reduce, or minimize the impact of any take. Thus, the take would not substantially negatively impact the survival and recovery of the population reducing the numbers, distribution and reproduction of grizzly bears, including females, across the ecosystem.

Effects of Take in the NCDE

In the accompanying biological opinion, the Service determined that the anticipated level of incidental take is not likely to result in jeopardy to the species. The Revised Plan would maintain high open road density in one of two BMU subunits in the NDCE. Nevertheless, we expect grizzly bears to continue to use the BMU subunit; maintenance of good quality core area within the BMU subunit lessens the overall displacement impacts to grizzly bears. Additionally, as in the CYE, only a very low amount of incidental take is anticipated where snowmobiling currently overlaps with denning habitat. The NCDE grizzly bear population was estimated at 765 bears in 2004, and has been increasing by three percent per year since then. This population is robust, is

increasing and is near or has achieved recovered levels. Therefore, impacts on individual grizzly bears, including anticipated levels of incidental take as a result of proposed access levels and timeframe within which they are attained and as a result of snowmobiling in denning habitat, will not appreciably reduce survival or the recovery of the species.

3. Reasonable and Prudent Measures

Biological opinions typically provide reasonable and prudent measures that are expected to reduce the amount of incidental take. Reasonable and prudent measures are those measures necessary and appropriate to minimize incidental take resulting from a proposed action. Reasonable and prudent measures are nondiscretionary and must be implemented by the agency in order for the exemption in section 7(o)(2) to apply.

The Service concludes that the Forest has incorporated all practical measures possible into the proposed action to minimize the impacts of take on grizzly bears. For that reason, the Service has not identified any Reasonable and Prudent Measures necessary to further minimize the impacts of such take on the grizzly bears. However, the Service has identified mandatory reporting and monitoring requirements below as Terms and Conditions that must be complied with in order for the take exemption in this Incidental Take Statement to be valid.

It is critical to understand that the conclusion of this opinion is based on those features being implemented as part of the proposed action; if they are not implemented, our analysis may not remain valid and this opinion may be subject to reinitiation (50 CFR 402.16(3)).

4. Terms and Conditions and Reporting Requirements

The Forest shall conduct monitoring and reporting of incidental take as follows:

1) By April 15 each year, the KNF shall submit an annual report to the Service that details the progress made toward achieving and maintaining the standards for percent Core Area, OMRD, and TMRD within the Recovery Zones.
2) The annual report shall provide an ongoing list detailing the locations, dates, duration, and circumstances for invoking the Access Amendment allowance for entering core area for the purposes of road decommissioning or stabilizations.
3) The KNFs shall coordinate with State and Federal agency biologists to collect credible grizzly bear observations that occur outside of the Recovery Zone boundaries and add this information to the 6th-order HUC database for inclusion into the annual report.
4) During the first year of implementation of the Revised Forest Plan, the Forest and the Service shall cooperatively develop a plan to monitor the scope and magnitude of late-season snowmobiling (post April 15) as it relates to effects on post-den emergent grizzly bears (see Incidental Take Statement). Within five years of implementation of the Revised Forest Plan, the Forests shall complete a winter travel plan, which will include considerations for grizzly bear and other federally listed species.
5) The Forest shall notify the Grizzly Bear Recovery Coordinator or Service's Montana Field Office within 24 hours of any bear-human conflicts that occur on the Forest, regardless of cause or season.

H. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service provides the following conservation recommendations for the grizzly bear:

1. Continue to install grizzly bear information signs at major access points advising the public of grizzly bear presence, proper sanitation/food storage techniques, and providing information on distinguishing characteristics between grizzly bears and black bears.
2. The Forest develops, in coordination with the Service and the IGBC, a strategy addressing point source disturbances (e.g., helicopter logging, mining, etc.).
3. The Forest works cooperatively with the Service to identify linkage areas that may be important in providing landscape connectivity within and between geographic areas, across all land ownerships for grizzly bears and Canada lynx.
4. Within linkage areas, the Forest provides for landscape connectivity by participating in the development and implementation of a management plan to protect and restore habitat connectivity within these areas on federal lands.
5. The Forest plans recreational development, and manages recreational and operational uses to provide for grizzly bear and Canada lynx movement, and to maintain effectiveness of grizzly bear and Canada lynx habitat.
6. The Forest identifies and prioritizes roads for reclamation or seasonal restrictions within watersheds with relatively high road densities so as to improve habitat quality and/or security for grizzly bears, Canada lynx, and bull trout, as well as other listed and non-listed fish and wildlife species.

I. REINITIATION NOTICE

This concludes formal consultation on the KNF Revised Plan and its effects on grizzly bears and grizzly bear habitat. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this opinion; (3) the proposed action is subsequently modified in a manner that causes an effect to the listed species that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Reinitiation is required if, at any time during the course of the action, the level of take occurring exceeds that anticipated in this incidental take statement:

- The BMUs on the KNF in the CYE exceed the standards contained in Table II-10 if this biological opinion.
- The Therriault and Krinklehorn BMU subunits in the NCDE exceed the standards contained in Table II-12 of this biological opinion.
- The BORZ exceed the permanent linear miles of open road and/or permanent linear miles of total road depicted in Table II-11 of this biological opinion.
- 18,868 acres of potential denning habitat that overlap with areas currently receiving snowmobile use on KNF lands in the CYE recovery zone
- 7,905 acres of potential denning habitat that overlap with areas currently receiving snowmobile use in the two NCDE subunits on the KNF: Therriault and Krinklehorn

Such incidental take requires reinitiation of consultation and review of the incidental take statement. In instances where the amount or extent of incidental take is exceeded any operations causing such must cease pending reinitation.

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