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September 30, 2016

Chip Weber, Forest Supervisor
Flathead National Forest
650 Wolfpack Way
Kalispell, Montana 59901
http://www.fs.usda.gov/project/?project=46286

Re: Draft Environmental Impact Statement for the Flathead National Forest

Dear Mr. Weber:

On behalf of The Humane Society of the United States ("The HSUS"), the nation's largest animal protection organization, and our supporters, please find our comments to the U.S. Forest Service ("USFS") concerning its 2016 draft environmental impact statement ("DEIS") for the Flathead National Forest. . We limit our comments solely to the adequacy of habitat-based criteria for grizzly bears (*Ursus arctos*) in the Northern Continental Divide Ecosystem (NCDE). 81 FR 35761 (6/3/2016). This comment also addresses elements of the U.S. Fish and Wildlife Service's ("FWS's") Draft 2013 Conservation Strategy for the Grizzly Bear ("GBCS") in the NCDE.

Having reviewed both the DEIS and GBSC and considering the best available science, including correspondence received from David Mattson, Ph.D., a former U.S. Geological Survey Research Wildlife Biologist and leading grizzly bear expert with more than thirty years of professional experience focusing on grizzly bear ecology and management, we assert that even with the USFWS' and USFS' proposed mitigation measures in place, ongoing threats to grizzly bears will require that they remain listed under the protections afforded to them under the Endangered Species Act ("ESA") (16 U.S.C. § 1533) for the reasons that follow. Furthermore, proposed state management schemes – including provisions allowing trophy hunting of grizzly bears – are both legally and practically inadequate to ensure the preservation of grizzly bears in the NCDE absent federal protections.

The HSUS respectfully encourages FWS to account for these factors in establishing habitat-specific recovery criteria for NCDE grizzly bears. Failure to do so will result in premature and scientifically unsound determinations regarding the status of the population.

I. Population projections for the NCDE population are too optimistic.

A. Dr. Mattson's concerns about the NCDE grizzly bear population.

The following section comes from correspondence by and discussion with Dr. Mattson concerning the NCDE's grizzly bear population and potential threats thereto:

Historically, grizzly bears who lived on the western side of the NCDE subsisted on salmon and berries, while those on the eastern side subsisted mostly on bison; now, however, both meat food sources are all but gone. Currently, bears on the western side of the NCDE are heavily reliant upon berries—meaning that meat supplies less than 25% of their diet. On the eastern side of the NCDE, grizzly bears obtain 60-90% of their dietary energy from meat, including domestic livestock and elk. It is likely that many of the grizzly bears on the eastern side of the NCDE eat army cutworm moths, but this is understudied, unlike for the GYE population.

Based upon Mace et al. (2012), the FWS suggests that the grizzly bear population in the NCDE has been growing at 3 percent per annum, but Dr. Mattson contends that this assumption is wrong largely because Mace et al. (2012) based their estimates of survival rates on an anomalous six-year snapshot of data that happened to coincide with a brief downturn in ecosystem-wide mortality. The long-term trend going back to at least 1992 (the last 20 years) is otherwise of mounting mortality and axiomatically increasing mortality rates, save for another anomalous downturn in deaths that occurred during 2013-2014.

Unlike Mace et al. (2012), Dr. Mattson, using results presented in annual reports, peer-reviewed papers, and mortality databases, contends that the NCDE grizzly bear population has more likely been stable or in decline rather than growing during the last 20 or more years. There was, in fact, a 70 percent increase in annual numbers of known and probable deaths for this grizzly bear population between 1985 and 2004, far in excess of any increase that could have been explained by even the most optimistic estimates of population increase for this period. Likewise, between 2010 and 2013, deaths increased by roughly 30 percent, which is roughly twice what could be explained by extrapolating Mace et al.'s overly optimistic estimate of 3 percent per annum population growth. In other words, death rates almost certainly increased between 1985 and 2004, and again between 2010 and 2013.

Dr. Mattson's calculations indicate that growth rate for the NCDE population has been less than—perhaps substantially less than—the 3 percent estimated by Mace et al. (2012) and the more recent 2 percent estimated by Costello. True growth rate is currently unknown, even approximately, but almost certainly less than that claimed by the FWS or MFWP. Moreover, along with Doak and Cutler (2014), Dr. Mattson believes that complex population models driven by estimates of vital rates from radio-marked animals are inherently prone to error and acutely vulnerable to biases in data collection, as seems to be the case for the NCDE.

Like Dr. Mattson, The FWS agrees that population estimates are unreliable. It writes: "Because grizzly bears are long-lived, slow-reproducing, and inherently rare, it is difficult to get enough data to accurately estimate population parameters. As data accumulates over time, estimates may become more reliable, but this can take many decades" (GBCS: 34).

The FWS also admits wide confidence intervals around lambda (intrinsic growth rate of a population) and survival rates make population estimates difficult (GBCS: 34).

According to Dr. Mattson, several factors explain the high level of mortality of the NCDE grizzly bear population. Based on the best available data from McLellan (2015) and annual reports for the Cabinet-Yaak ecosystem, between 1996 and 2010 the entirety of northwestern Montana, including the NCDE, experienced what amounted to a berry famine: the correlation between this dearth of berries and mounting numbers of dead bears in the NCDE is almost perfect. Moreover, evidence from McLellan (2015) suggests that population size in his study area declined substantially only after a lag of roughly 10 years behind declines in berry crops, which further emphasizes the crude and risk-prone nature of reliance on monitoring population size as the primary tool for judging population status—as is the case in the NCDE. Adding emphasis to this point, Fiedler and McKinney (2015) note, as does the USFS in its DEIS, that whitebark pine has severely declined in the ecosystem—with 70% of mature whitebark pine trees dead and the remaining 90% infected with blister rust; virtually every projection for effects of climate change on alpine tundra shows a 90% loss over the next century, with almost certain dire consequences for army cutworm moths; and similar projections for berry-producing species show potential major losses of serviceberry, chokecherry, and buffaloberry throughout the NCDE.

The prognosis for and history of the dietary meat resource for grizzly bears in the NCDE is mixed. On the west side of the ecosystem, white-tailed deer populations are doing well, although moose populations have uniformly declined. More importantly, the meat-reliant bears on the east side of the ecosystem have benefited from sustained increases in elk populations, which, until recent years, has manifest in a negative correlation with numbers of bears dying annually. Unfortunately, the increased outward movement of bears into agricultural lands on the East Front, along with increased exploitation of livestock and beehives, has correlated more recently with an increase in bear deaths in this region. Likewise, the increase in numbers of homes and the associated increase in numbers of domestic animals such as chickens, pigs, and goats on the west side of the ecosystem has resulted in a substantial increase in conflicts involving household animals in this area. This increased incidence of human-bear conflict organized around livestock and other domesticated animals matters because humans have historically caused roughly 90% of all deaths of adult grizzly bears in the NCDE, and does not portend well for the future of this grizzly bear population.

Inasmuch as there have been increasing challenges emerge in the NCDE related to conflict between grizzly bears and livestock producers, this ecosystem has also produced some of the most important prototypes for fostering bear-human coexistence. The Blackfoot Challenge, a multi-agency collaborative in concert with local residents, has set up phone trees, instituted electric fencing around area apiaries and calving grounds, and removed livestock carcasses (which are composted behind electric fencing). As a result of employing these commonsense solutions, since 2003, human-bear conflicts have decreased by 96% in the Blackfoot Valley and the number of grizzly bears killed in the area correspondingly declined by 80% over that same timeframe. At the same time, the People's Way, a collaborative involving the Salish-Kootenai Tribe and multiple NGOs and government agencies, has resulted in the construction of multiple over- and underpasses along Highway 93, which demonstrated benefits for grizzly bears and other wildlife along an otherwise heavily-trafficked road. The Blackfoot Challenge and People's Way are a testament to the fact that if people are willing to co-exist with grizzly bears, using common sense simple measures, they can readily be accomplished.

Given this background, we strongly recommend that the following habitat features be monitored and, at a minimum, that current conditions be established as a baseline for habitat-based recovery criteria. In addition to road densities and secure habitat, we recommend:

I. Attractants:

- Beehives
- Calving and lambing areas
- Boneyards
- Livestock allotments
- Poultry/small animal operations
- Garbage and other attractants
- Hunters afield

Not only should numbers and locations of each of these features be monitored, but also the extent to which mitigation measures have been implemented, for example, electric fencing of beehives and calving areas, carcass collection and disposal programs, bear-proof garbage disposal facilities, and regulations for carrying pepper spray and properly securing remains of hunter-killed animals.

Insofar as rote habitat conditions are concerned, a review of relevant scientific research from northwestern Montana and adjacent Canada suggests that the following features should be monitored:

II. Spatially-Explicit Indicators of Habitat Productivity:

- Remotely-sensed NDVI, greenness, and Actual Evapotranspiration (AET)
- Avalanche chutes via aerial photography and AVHRR
- Extent and location of productive berry fields
- Annual production of important berries using fixed transects throughout the ecosystem
- Army cutworm moth sites and levels of bear use of these sites
- Extent of regenerating cutblocks using USFS inventories and remotely-sensed NDVI
- Extent of closed-canopy forest using remotely-sensed NDVI and AVHRR as it becomes available.

These metrics are either directly related to current causes of most grizzly bear deaths in the NCDE or important habitat features that affect the productivity and densities of grizzly bear populations in this ecosystem. In other words, these metrics would be important proxies for birth and death rates and, through monitoring, provide signals of potentially improving or deteriorating conditions well in advance of when these changes would belatedly show up in population trend.

Furthermore, we suggest that development of NCDE recovery criteria include (a) a critical analysis of population estimate methods that accounts for the overestimation inherent in models currently relied upon by FWS; (b) as discussed in more detail below, a thorough accounting for the loss of staple food sources including berries and whitebark pine and its implications on long-term stability of the population; and (c) implementation of novel programs for reducing human-bear conflict.

B. Resource availability determines bear population size; but many staples have declined.

As Dr. Mattson explains herein, grizzly bears in the NCDE have lost their historic meat sources: bison, elk and salmon; added to that, they experienced a prolonged berry drought as well as the loss of whitebark pine. Yet, as others have found, the amount of food in an ecosystem sets the population size. Craig McLaughlin (1999, p. 24) explains the import of food in (black) bear population regulation:

> There is little evidence that bear populations are regulated by internal factors, such as behavior that controls spacing of individuals, or declines in reproductive success. It is more likely that they are limited by their food supply, which may control age of sexual maturity, proportion of adult females that reproduce, and survival of bears (primarily cubs, yearlings, and subadults) . . .

While food is certainly important for regulating bear populations, biologists now believe that apex carnivores such as grizzly bears, are capable of self-regulation; that is, they limit their populations to avoid exceeding their carrying capacity through no- to slow reproduction, low densities, extended care of dependent young and infanticide (Wallach et al. 2015).

Another mechanism for relieving pressure in an area of declining carrying capacity is dispersal. In the case of the NCDE population, some bears are likely leaving their core area in a quest of food in order to survive. But this creates the illusion–as with GYE bears– that the NCDE population has expanded, when in reality, as with GYE bears, NCDE bear populations may be in contraction (see: Mattson discussion *supra*). These dispersing bears frequently experience mortality when they leave their secure core.

Like the FWS, the USFS writes that calculating carrying capacity is difficult and imprecise: "Carrying capacity or food production cannot be calculated for an omnivorous and opportunistic species such as the grizzly bear, because they eat a wide variety of foods, with availability that is constantly changing due to factors such as wildfire, plant succession, and annual changes in production due to weather" (DEIS: 405).

Because the carrying capacity for the grizzly bears who live on the NCDE may already be in decline because of a variety of anthropogenic causes, and because these bears are slow to reproduce and even harder to count, it is far too soon for the FWS to contemplate delisting NCDE bears in the face of myriad threats; rather, recovery criteria must take into account the potential decline in carrying capacity of the NCDE and take care to avoid misinterpreting the dispersal of bears searching for food sources for an expansion in the population.

II. Given the multitude of threats that grizzly bears face or could face in the future on the NCDE, neither the USFS nor FWS's proposed secure core habitat and mitigation measures are adequate recovery criteria and may not sufficiently protect grizzly bears if they are delisted.

A. Grizzly bears are not resilient; they face multiple human threats in the NCDE.

Grizzly bears have both low reproductive and dispersing potentials, but are highly susceptible to anthropogenic threats. Grizzly bears are very slow to disperse – male offspring's home ranges are only about 18 to 26 mi from their mothers, while females will overlap or be 6-9 miles away (GBCS: 9). Bears mate in May – July, with a peak in mid-June; embryos implant in late fall – but only if the mother has enough fat to survive the winter and nurse cubs for 2-3 months in the den (GBCS: 9). Age of reproduction starts at 5.4 years in the NCDE, but can vary from 3-8 years (GBCS: 9). In fact, NCDE grizzly bears have one of the slowest rates of reproduction among large mammals due to small litter sizes and long intervals between births (GBCS: 9). ". . . it may take a single female 10 years to replace herself in a population" (GBCS: 10). Females cease productivity in the mid to late 20s (GBCS: 11).

Because of this natural history, grizzly bears are a "conservation-reliant" species; that is, they need to be cared for into perpetuity or likely face extinction. If delisted, the FWS is expected to only require a 5-year monitoring period on the NCDE. Yet, on the Flathead National Forest, the conservation measures, mitigations, and standards and guidelines for grizzly bears would only have to be in place for the remainder of the life of the forest plan or until the plan was amended (DEIS: 399). Without the protection of the ESA, grizzly bears lack any guarantee for their basic security or conservation. Without the protection from the ESA, grizzly bears on the NCDE would <u>not be protected into perpetuity</u>; if delisted, they would be extinction prone. If prematurely delisted, and because the states will not adequately protect grizzly bears as has been demonstrated by their various formal comment letters, Memorandum of Authority and statements to the media, the USFS must take up that mantle to protect grizzly bears based upon the powers Congress has bestowed it. Land managers can and should protect grizzly bears on federal public lands from a myriad of threats, including trophy hunting or trapping.

Several traits peculiar to the social structure and life cycle of grizzly bears make them particularly sensitive to human-caused mortality. They are large-bodied and only sparsely populated across vast areas; they invest in few offspring; they provide extended parental care to their young; they have a tendency towards infanticide; their females limit reproduction and social stability promotes their resiliency (e.g., Weaver et al. 1996, Wielgus et al. 2013, Creel et al. 2015, Wallach et al. 2015). Human persecution affects their social structure (Darimont et al. 2009, Wielgus et al. 2013, Bryan et al. 2014, Wallach et al. 2015) and harms their persistence (Wielgus et al. 2013, Zedrosser et al. 2013, Darimont et al. 2015). The consequence of these characteristics is that the effect of human persecution on grizzly bears is "super additive" and far exceeds what would occur in nature (Wielgus et al. 2013, Darimont et al. 2015, Gosselin et al. 2015), and climate change will harm their primary food resources (i.e., whitebark pine); their ability to forage (because grizzly bears are cold adapted, dissipating body heat during foraging activities limits their ability to forage); they fill face increasing disease-bearing insects; and snow levels will decrease (restricting the insulating properties of their dens) and more harms discussed herein.

Hunting mortality has direct effects on population growth rates because of increased mortality, but also has devastating indirect effects such as disrupting the sex and age structure of a population (Wielgus et al. 2013, Gosselin et al. 2015). Gosselin et al. state: "In species with sexually selected infanticide ("SSI"), hunting may decrease juvenile survival by increasing male turnover." These studies show that hunting mortality can harm social organization of species, because it promotes male turnover and thus increases sexually selected infanticide upon cubs of deceased males. This is especially true when – as here – carnivores are hunted as trophies, because trophy hunters tend to select for, and hunting quotas skew toward, males (Gosselin et al. 2015). "In species with SSI, harvesting males can have an indirect negative effect on the population by reducing juvenile survival" (Gosselin et al. 2015).

Compounding this harm, females with cubs generally avoid males as a strategy of avoiding sexually-selected infanticide, often leading them to choose suboptimal habitats, including habitats in closer proximity to humans, leading to increased human-bear conflict. This also affects their diet quality and reduces their reproductive potential (McDonough and Christ 2012, Gosselin et al. 2015).

Because grizzly bears are a conservation-reliant species, they require special federal protections so they are not extirpated or extinguished. Recovery criteria must recognize these unique traits and account for both the reliance of NCDE grizzly bears on federal protections and the uniquely damaging effect that the removal of these protections would have on such a conservation-reliant species.

B. The primary purpose of the DEIS and GBSC is to delist grizzly bears, but the minimal habitat protections provided will fail to conserve them into perpetuity.

In the DEIS, the proposed action is "to ensure the adequacy of regulatory mechanisms regarding habitat protection across the national forests in the NCDE in support of the de-listing of the grizzly bear" (DEIS: 2). Similarly, the goal for the GBSC is to "demonstrate the adequacy of regulatory mechanisms in order to delist this grizzly population . . . . Thus, the Flathead National Forest proposed to update its forest plan where necessary to incorporate the relevant desired conditions, standards, guidelines, and monitoring items related to habitat management on NFS land to support a recovered grizzly bear population" (DEIS: 7).

Similarly, the GBSC's objective is to maintain a recovered grizzly bear population within the NCDE, but only within the stingy confines of the primary conservation area ("PCA") and Zone 1 (GBCS: iii) Figure 1. Furthermore, the objective is to allow a "regulated" grizzly bear hunt (GBCS: 5).

Rather than managing for a robust, abundant and well-connected grizzly bear population with a goal to conserve bears including designating and protecting corridors between subpopulations, both the USFW and the FWS' plans chart what is essentially the status quo which includes human "hyperpredation" of grizzly bears and their habitats.

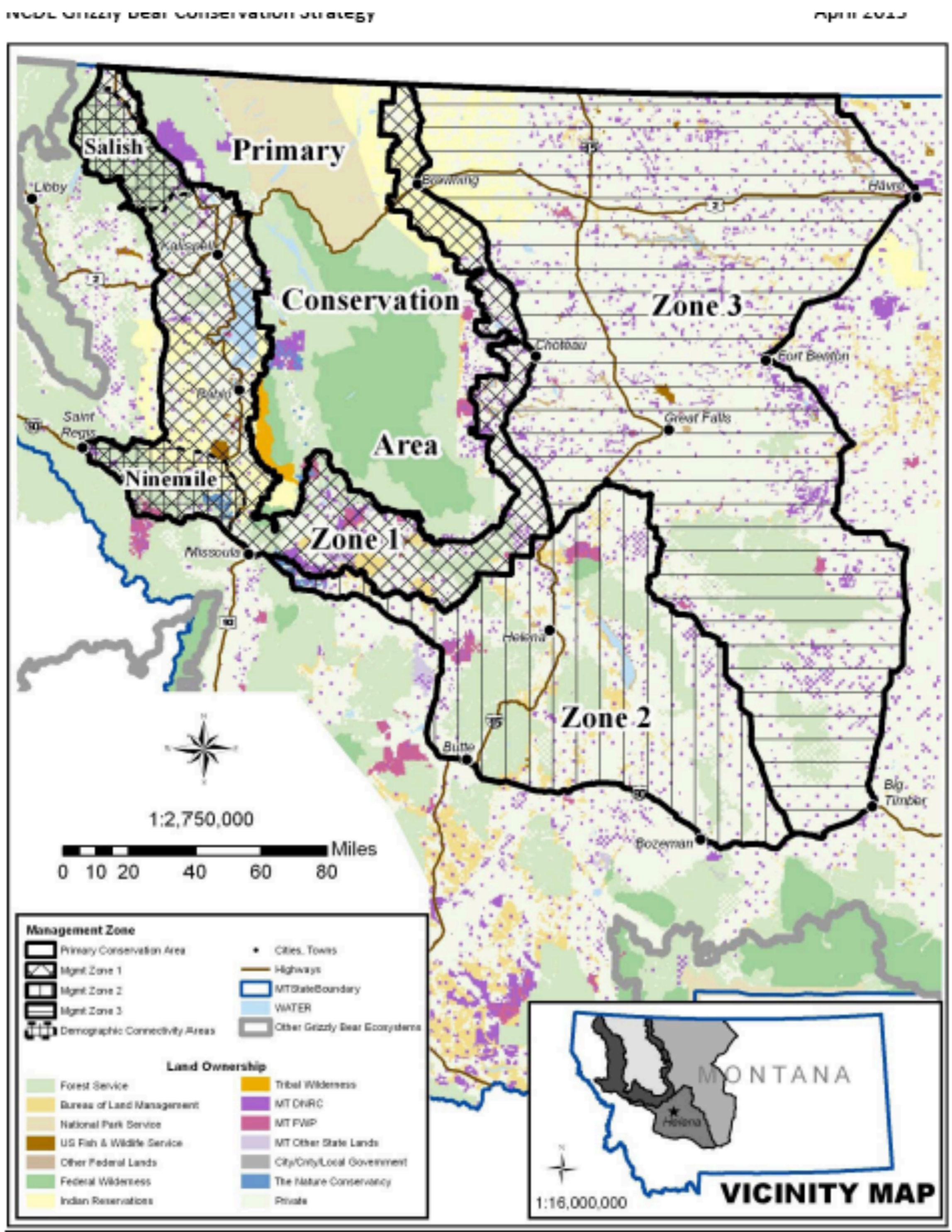
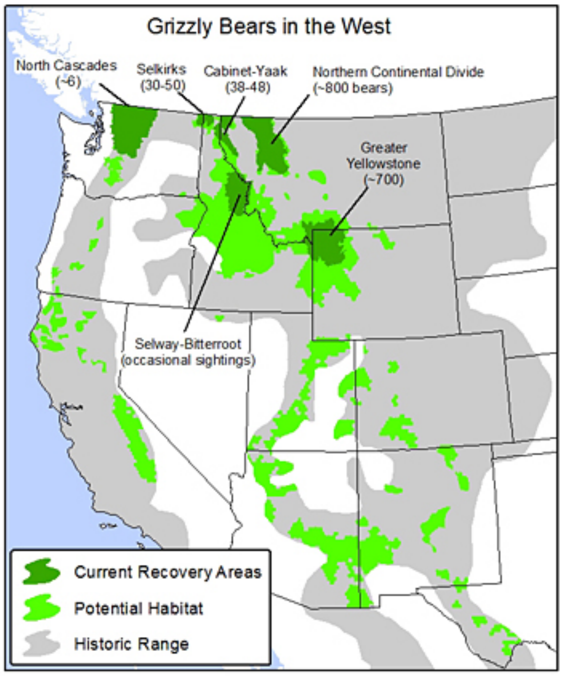


Figure 1, (Image From: FWS's NCDE GBSC 2013)

Currently, top carnivores face an extinction crisis in North America and across the earth (Berger et al. 2001, Ritchie and Johnson 2009, Estes et al. 2011, World Wildlife Fund 2014, Darimont et al. 2015). In July 2011, 23 biologists issued an admonition in the prestigious journal, *Science*, with the sobering title: “Trophic Downgrading of Planet Earth.” Authors forewarn that catastrophes will befall Earth’s ecosystems as a result of the loss of apex consumers. Estes et al. (2011: 301) write:

Until recently, large apex consumers were ubiquitous across the globe and had been for millions of years. The loss of these animals may be humankind's most pervasive influence on nature. Although such losses are widely viewed as an ethical and aesthetic problem, recent research reveals extensive cascading effects of their disappearance in . . . ecosystems worldwide. This empirical work supports long-standing theory about the role of top-down forcing in ecosystems but also highlights the unanticipated impacts of trophic cascades on processes as diverse as the dynamics of disease, wildfire, carbon sequestration, invasive species, and biogeochemical cycles. These findings emphasize the urgent need for interdisciplinary research to forecast the effects of trophic downgrading on process, function, and resilience in global ecosystems.

Figure 2, Potential Grizzly Bear Habitat



While top carnivores are integral to biological diversity and ecological function, many may forever disappear (Berger et al. 2001, Ritchie and Johnson 2009, Estes et al. 2011, Darimont et al. 2015, Ripple et al. 2016). Human-caused extinctions result from habitat loss and fragmentation, loss of dispersal corridors, overhunting, poaching, the spread of invasive species, the change in species assemblages; changes in ecosystem function, disease, sickness, and a host of other problems (Cardillo et al. 2004, Gaston 2005). Already, nearly one quarter of the world’s mammals are at “high risk of extinction” with top carnivores especially affected (Cardillo et al. 2004, Estes et al. 2011, Darimont et al. 2015).

Co-adaption between large carnivores and humans must happen, if carnivores are to persist; that means that humans must be willing to share habitat and tolerate the small level of risk they pose (Carter and Linnell 2016). Humans must curb their own “hyperpredation” of other species and their habitats (Darimont et al. 2015, Chapron and López-Bao 2016). Large carnivores, grizzly bears in particular, and their habitats are not resilient to human persecution or habitat degradation (Weaver et al. 1996, Estes et al. 2011, Ripple et al. 2014, Darimont et al. 2015). A grizzly bear needs large habitat devoid of human conflict in order to search for food, mates, cover and den sites. Mattson (1993) recommends, after conducting a thorough review of the literature, that a secure grizzly bear area contain a core of approximately 290 hectares and be situated roughly 2-4 kilometers from the nearest road or human facility. Given their particular need, it seems that plans to protect the largest grizzly bear population in the lower 48 is utterly miserly [Figure 1 and 2] and more focused on minimal habitat protections with no- to little institutionalized co-existence programs, which have a proven track record for keeping both people and bears safe, whether on the Blackfoot Valley, Montana, Yosemite National Park or across various European nations (Rogers 2014, Carter and Linnell 2016, Chapron and López-Bao 2016).

On the Flathead National Forest and on the NCDE, land and wildlife managers seek to protect only minimal amounts of potential grizzly bear habitat rather than thinking expansively [e.g., Figure 2, potential grizzly bear habitat]. Yet, as the USFS notes, protecting grizzly bears resolves issues for numerous rare and endangered species including boreal toads, lynx, wolves, bull trout and several rare avian species.

A guiding principle of conservation biology is connectivity; that is, maintaining linkages between subpopulations so that genetic material can be exchanged to keep populations vital, maintain genetic diversity, and prevent genetic drift and inbreeding depression.[1] Habitat connectivity affects grizzly bears at multiple scales: between bear ecosystems; within ecosystems and within a home range (DEIS: 418). The disruptors of connectivity are communities, highway, agriculture and more. Bears avoid highways, especially at night. Bears' presence is negatively related to volume of traffic on a road or highway (DEIS: 419).

As the USFS notes, connectivity is never static because of changes on the forest including fire, forest succession, insects and disease (DEIS: 34). While the FWS extols the virtues of the NCDE bear population's connectivity to Canada, it has failed to consider that on the Canadian border, activities such as timber cutting, oil and gas exploration, coal mining and associated human development occur as well as grizzly bear trophy hunting (DEIS: 420, GBCS: 14). This disruption results in gene loss from Canada. Furthermore, Montana has stated as part of its "consensus" comments to the Service (May 19, 2016) that it would not support mandating connectivity for grizzly bears if they are delisted (see discussion below).

A key element for grizzly bear conservation is protecting their denning sites from industrial extractive actions and winterized recreation. Having a safe and secure den is a matter of fitness or death for a grizzly bear and its site must be warm and relatively dry and not in the path of disturbance including from forest cutting; mining activities; oil and gas exploration and human recreation, because bears who have to relocate a den during their time of hibernation (and particularly for a female with cubs) pay a toll in fitness costs (Pigeon et al. 2016b). Bears prefer den sites under mature trees on slopes and in soils that drain including boulders, cobbles, pebbles, sand, silt-clay or mineral soils, which reduce spring flooding, and they require live saplings for concealment cover and to enhance insulative properties (Pigeon et al. 2016b). Bears choose sites near high-quality spring foods. To conserve grizzly bears, the USFS must protect their den sites in areas of high concealment cover from human disturbance (Pigeon et al. 2016b).

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[1] *Genetic diversity* increases a species' chances of long-term survival because negative traits (such as inbreeding) become widespread within a population when that population is left to reproduce only with its own members. *Genetic drift* refers to a populations' loss of genes, making a population less vital, more disease prone, and unable to overcome natural disasters. (Mills and Allendorf 1996).

* * *

Within the NCDE, according the GBCS, the grizzly bear habitat will be managed using a Primary Conservation Area (PCA) or the Recovery Zone. In addition, the FWS contemplates three additional zones, each with descending protections:

Zone 1: Defined as the "source" for other grizzly bear populations in the lower 48 (GBCS: ii). (Despite this lofty definition, few grizzly bears successfully disperse, with none from the NCDE recruiting in the GYE, for instance, and few bears surviving in the CYE (Haroldson et al. 2010, Kendall et al. 2016)). Zone 1 is also the buffer zone around the recovery area. In the Recovery Zone and Zone 1, bears' mortality will be tracked and monitored.

Zone 2: Like Zone 1, Zone 2 is also designated as a "source" population (GBCS: ii) that is designed to allow bears, particularly males, to move between the NCDE and adjacent ecosystem including GYE (see our concerns above). In Zone 2, the emphasis is on human-bear conflict and response to interactions, some of which will invariably be lethal.

Zone 3: While on the one hand acknowledging that grizzly bears are a habitat generalist, the FWS has determined that Zone 3 does not have enough suitable habitat to support population growth (GBCS: ii). That is because the "traditional food sources" in this zone, elk and bison, have been displaced with cattle, sheep, chickens; goats, pigs and beehives (GBCS: 20), resulting in a high potential for conflict.

While the most expansive of all the alternatives for grizzly bears, as Figure 2 indicates, only a fraction of the NCDE would be actually protected for grizzly bears. In management Zones 2 and 3, grizzly bears would enjoy little security.

On the Flathead National Forest, the USFS has developed a new DEIS with four alternatives. They too vary in degree of protection for grizzly bears, as follows.

Alternative A, Amended. Under Alternative A, the preferred alternative, 518 miles of roads would be reclaimed; 57 miles of trails would no longer allow wheeled motor vehicles (DEIS: 258) and 98,388 acres would be recommended for wilderness designation (DEIS:82).

Alternative C. The most conservation-minded alternative, Alternative C would reclaim no additional roads, although it emphasizes protecting the most acres in wilderness (506,919 acres for recommended wilderness) and backcountry. It also emphasizes more non-motorized values than the other alternatives (DEIS: 26). Motorized transport and travel would not be permitted in recommended wilderness (DEIS: 28). In this alternative, roads open to public motorized use could not exceed baseline levels and those densities may actually decrease to allow for the highest level of habitat security and connectivity of any alternative.

Alternative C would not permit surface area occupancy for any oil and gas leases in the primary conservation area and Zone 1 (see Figure 2 below) (including connectivity areas). Roads in the grizzly bear secure core could not be opened temporarily (DEIS: 27). New or re-authorized permits for ski areas would have to include mitigation measures to reduce grizzly bear-human conflicts. This alternative would have greatest benefits to water quality and quantity because of the limited land management activities (DEIS: 83).

This alternative would have the lowest risk of disturbance or displacement of bears–especially for females with cubs during den emergence because they would be protected by the largest amount of wilderness (DEIS: 428-9). Under this alternative, areas now opened to over-snow vehicles would be closed during den emergence (the so-called "late-season play areas": Challenge-Skyland; Lost Johnny; and Six Mile) would be eliminated under the WA (DEIS: 429).

* * *

The Flathead National Forest has proposed a new management plan for the forest. The DEIS proposes four alternatives, with Alternative C offering the most protections for grizzly bears and all other species of concern.

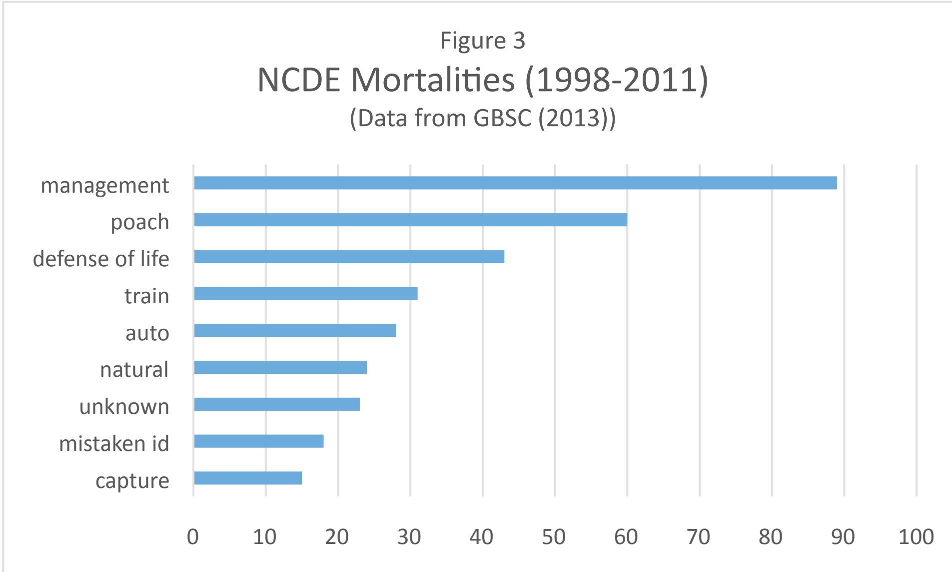
The USFS' Alternatives B and D utterly fail to sufficiently protect grizzly bears, and especially Alternative D, which emphasizes industrial extraction and human winter "playgrounds" over conservation in the last best place for grizzly bears in the lower 48 on a national forest.

Because of the extinction crises facing large-bodied carnivores, the best available science indicates that humans must be willing to share the planet with them and accept the small amount of risk they pose, or these species could forever disappear. Given the historic range that grizzly bears once roamed, they are now penned into tiny reserves, and land and wildlife managers plan to manage them at what appears to be the most nominal levels so as to appease a minority of people who do not want large carnivores on the landscape. To ensure recovery and sustained survival, FWS and USFS must consider Zones 2 and 3 as secure habitat, rather than giving away huge areas to for purposes of industry or recreation.

III. Grizzly bears face a myriad of threats that hamper their recovery and must be addressed in recovery criteria.

A. Direct mortalities from humans cause a large number of grizzly bear deaths.

FWS notes that grizzly bears are highly susceptible to human-caused mortality from a variety of sources including anthropogenic fragmentation; proximity to human populations; small, isolated populations, which are vulnerable to extinction from genetic drift; and decreased birth rates (GBCS: 13). In the NCDE, highways and rail lines are barriers that prevent genetic interchange to other subpopulations, because both cause high mortalities (GBCS: 13). According to the FWS, the greatest source of NCDE grizzly bear mortality is from management removals, secondarily from poachers, and thirdly from hunters killing bears for "defense of life". Figure 3.



In a newer document, the USFS notes, citing Costello et al. (2016, in press) that poaching/malicious kills are the highest percentage of grizzly bear mortality on the NCDE (as least 27%); management removals (16%); illegal defense of property (11%); and natural causes (9%). Grizzly bears are also killed mistakenly for black bears (DEIS: 420). It makes sense that the number of bears killed by poachers were undercounted by the FWS in its GBCS because these kills are difficult to count, and for that reason, the FWS must recognize this ongoing threat in its recovery criteria.

i. FWS must work to abate the ongoing threat posed by grizzly bear poachers.

FWS must consider the ongoing threat that poaching poses on the NCDE grizzly bear population and work to abate it – before delisting can be considered—including prosecuting poachers even if they claim mistaken identity. While poaching is an ongoing threat, if bears are delisted, poaching could actually increase. While FWS and others suggest that if human-bear conflicts are resolved quickly, people will exhibit less negative behaviors towards grizzly bears (GBCS: iv). Yet, a new study suggests that poaching is not diminished when governmental programs kill nuisance bears, despite agencies' best intentions (Chapron and Treves 2016). FWS and others cannot operate under assumptions. Instead, what drives intolerance is people's orientation including education levels, social and cultural norms and emotional factors – not just material interactions (Treves and Bruskotter 2014, Carter and Linnell 2016).

Poaching is a major mortality factor in large carnivore populations, and a major, if not primary cause of mortality for NCDE grizzly bears. This prevents grizzly bears, a low density species, from recovering (Andren et al. 2006). Poaching, even in small numbers, can harm populations if a species occurs in low densities (Saether et al. 2010). Approximately half to two-thirds of grizzly bears killed by humans go unreported (Schwartz et al. 2003). Without radio collars, grizzly bear management agencies would be unaware of one-half (46 to 51 percent) of the killings that occur (McLellan et al. 1999).

Researchers in Washington discovered that approximately 20% of hunters in Washington failed to report the black bear they killed (Koehler and Pierce 2005). Additionally almost 25% of bears killed by hunters were lost in vegetation (Koehler and Pierce 2005). Park boundaries are the places where grizzly bears experience high rates of mortality compared to the areas where they are fully protected (McLellan et al. 1999). Furthermore, The HSUS has tracked poaching numbers of gray wolves by state during the periods when wolves were delisted. Minnesota wildlife managers tracked zero poachers during the period when the Western Great Lakes population of gray wolves lost their federal protections and were subject to hunting.[2] In short, studies indicate that if states are permitted to hold a trophy hunting season on grizzly bears, far more bears will be killed by poachers than if they retain their federal ESA protections. Moreover, given the high incidence of known poaching mortality of NCDE bears, the agencies must not only enforce codes and laws, they must build institutionalized education programs that help people understand not only the importance of grizzly bears, but how to co-exist with them (Slagle et al. 2013, Carter and Linnell 2016, Chapron and López-Bao 2016).

Because of the extremely vexing problem of grizzly bear poaching on the NCDE, the FWS must account for this ongoing threat in its recovery criteria, including abating this illegal activity.

ii. The FWS must acknowledge the high number of "management kills" account for them in recovery criteria, and work to reduce human-bear conflicts.

A majority of grizzly bear mortalities come from management removals (DEIS, GBSC). USFS must account for these ongoing, but preventable threats to grizzly bears. Management removals are associated with human-caused problems such as poor domestic animal husbandry practices, unguarded apiaries, or exposed human food sources including birdseed, ripening fruits, chickens, compost, orchard fruits, livestock carcasses, boneyards and unsecured garbage and BBQ grills (DEIS: 403). Illustratively, the Blackfoot Challenge has demonstrated that if agencies and communities work together, these threats can be almost entirely diminished by employing commonsense measures and changing social norms. Implementation of these and similar measures should be built into USFS' recovery criteria.

While the literature on grizzly bear co-existence is sparse, a considerable literature concerning abating human-black bear conflict exists, which is informative here. Community-based education programs that emphasize the benefits of bears (Slagle et al. 2013), combined with avoidance, aversive conditioning and stringent law enforcement are effective means of reducing human-bear conflicts (Masterson 2006). Yosemite Park reported a 92% decrease in conflicts after it both educated the public and enforced special codes (Rogers 2014). USFS must consider institutionalizing grizzly bear co-existence using the highly successful Blackfoot Challenge as its model. This is particularly crucial because as USFS suggests, Montana's *homo sapiens* population is expected to expand, recreational use is expected to increase, and greater habitat loss and fragmentation will also increase

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[2] Personal communication between DNR Steve Merchant and Wendy Keefover of The HSUS (Jan. 15, 2015) (on file with The HSUS).

contributing to greater human-bear conflicts, which exacerbate grizzly bear mortalities - especially on private lands (GBCS: 33).

Grizzly bears are more likely to die when they come in proximity to humans and their facilities; bear deaths are not homogenously distributed on the landscape (Steyaert et al. 2016). Citing other studies, Steyaert et al. (2016) found that roads and human presence may shield vulnerable grizzly bears against predation or infanticide. Grizzly bears' social organization is despotic, meaning that adult males claim the best territories (such as most rugged terrain to avoid hunters) (Elfström et al. 2014, Steyaert et al. 2016). Adult males pose safety risks to both subadult bears and females with young (Elfström et al. 2014, Steyaert et al. 2016). Subadults and females with young-of-the-year cubs are more likely to come near human habitations to avoid adult males and because subadult bears are naïve, they are the demographic most likely to be killed as nuisance animals (Elfström et al. 2014, Steyaert et al. 2016). Solitary adult females and adult males avoid human presence; subadults come to human areas because they want to avoid intraspecific aggression while dispersing; authors believe they seek out human habitations primarily for safety reasons rather than to obtain food (Elfström et al. 2014).

Trash management, animal husbandry practices (using electric fencing, sanitary carcass removal, using lambing or calving sheds), public education, code enforcement and hazing could alleviate human-bear conflicts as the Blackfoot Challenge has effectively demonstrated. In addition to stepping up education/co-existence programs for homeowners and recreationists, USFS must also monitor and account for these ongoing threats such as tracking the numbers and locations of bear attractants and working to minimize conflicts to avoid overzealous grizzly bear mortalities as a result of management removals.

iii. The USFS must recognize the ongoing threat that hunters afield pose to grizzly bears and work to reduce unintended kills for "defense of life" reasons or mistaken identity.

A majority of unnecessary grizzly bear mortalities in the NCDE come from "self-defense" kills by hunters afield. These kills are avoidable. Hunters can reduce the risk of a bluff charge or attack if they travel in groups and use pepper spray rather than shooting bears. Also, far too many black bear hunters mistakenly kill grizzly bears. Species identification can be readily learned. If a hunter does not know his quarry, he should not pull the trigger. One of the first tenets of ethical hunting is knowing one's prey. If a hunter does mistakenly pull the trigger, he should accept the consequences of his actions and lose privileges and rights. The USFS must recognize the threats that hunters pose to grizzly bears and work to reduce these threats. Implementation of accountability for hunters who take grizzly bears must be built into the recovery criteria.

iv. Vehicles and trains strike large numbers of grizzly bears resulting in mortalities which the USFS must work with allies to abate; safe passages between subpopulations must be restored.

Vehicle- and train-bear collisions cause distressingly high numbers of grizzly bear mortalities, including, in recent days, "Snowy": the cub of Grand Teton National Park's famous mother Bear 399 (one of three bears killed on roads this year alone).[3] The USFS must consider this ongoing threat to grizzly bears and work to address it in its recovery criteria. Vehicle-wildlife collisions can be avoided if sufficient over- and underpasses are built on roads and highways.

Habitat connectivity affects grizzly bears at multiple scales: between bear ecosystems; within ecosystems and within a home range (DEIS: 418). Roads reduce that connectivity on all three of those scales. Largely on account of this phenomenon, grizzly bears' genetic health is at stake in the lower 48 states.

Haroldson et al. (2010) using DNA evidence, found no connectivity between the NCDE and GYE grizzly bear populations, the largest two grizzly bears populations in the lower 48. They noted that the quest to document connectivity between these two subpopulations has been conducted since 1959; yet, despite 50 years' of study, no natural movement has been documented (Haroldson et al. 2010). Haroldson et al. (2010) noted that Walker and Craighead (1997) suggested that the best pathways for connectivity are: 1) the Big Belt-Bridger-Gallatin mountain ranges; 2) the Boulder-Tobacco Root- Gravelley-Taylor-Hillard ranges; and 3) Selway-Bitterrot-Lemhi-Centennial-Madion ranges. Grizzly bears need forest cover and low road densities in order to successfully move between populations (Haroldson et al. 2010). They also need not to be killed. Long-distance dispersal is dominantly conducted by male grizzly bears and connectivity by males (at a minimum) is necessary to maintain the genetic health of both the GYE and NCDE grizzly bear populations (Haroldson et al. 2010).

As part of its recovery criteria, the USFS must consider the large numbers of mortalities as a result of vehicle and train strikes. Because of this problem, connectivity for grizzly bears from the NCDE to the GYE and other subpopulations is hindered. This is an ongoing threat to grizzly bears in the lower 48 that the USFS must consider; but it is one that could be resolved if safe passages were institutionalized for grizzly bears. One solution is building highway-crossing structures.

Vehicle-animal collisions are both ecologically and economically expensive, and can even result in human mortalities (DOT 2008, McCollister and van Manen 2010). The cost of vehicle-animal collisions is multi-dimensional, but can be mitigated with the construction of highway structures that are designed to draw specific species such as mountain lions across them, preventing not only vehicle strikes, but protecting species and people while saving millions of dollars annually.

In one study, the construction of three underpasses cost more than three million dollars, but that figure represented less than two percent of the entire cost of a new section of highway (McCollister and van Manen 2010 citing Jones et al. 2010). The benefits of creating safe passages across highways and interstates, however, are well worth the investment, because of the much higher costs borne by society when drivers hit animals.

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[3] http://news.nationalgeographic.com/2016/06/grizzly-bear-399-cub-snowy-killed-hit-and-run-grand-teton-national-park/; three grizzly bears killed on highways this year: http://www.localnews8.com/news/grizzly-cub-killed-by-car-on-highway-in-northwest-wyoming/40818890.

While most animal-vehicle collisions in the United States involve deer (87%) many other species are struck on roadways (DOT 2008). The vehicle strikes are expensive to society. According to the U.S. Department of Transportation (DOT), the estimated average cost of a single animal-vehicle collisions is $6,126 per incident, and that includes property damage, human injuries or more rarely, fatalities (DOT 2008). For the years 2001-2002, an estimated 26,647 injuries occurred as a result of animal-vehicle collisions (DOT 2008). But those are not the only costs. Others losses include:

- the suffering and distress of injured animals;
- the costs to rehabilitate animals including X-rays and veterinary care by non-profit organizations;
- the loss of expenditures involved in conservation efforts for threatened or endangered species by governments and organizations;
- the clean up and disposal costs of tens of thousands of animal carcasses to municipalities;
- the loss to businesses from loss of transportation, lodging and meals costs that would have been spent by wildlife recreationists of all types;
- the emotional distress of people involved accidents; and
- the cultural losses to groups [such as wildlife watchers, mountain lion advocates] and Native Americans (DOT 2008).

Not only do safe passage make economic sense, they are ecologically optimal too. Large carnivores like grizzly bears and mountain lions are highly mobile and therefore subject to road effects (Gloyne and Clevenger 2001). Highways fragment their habitats and can contribute to multiple problems for them. With fragmentation, species face both genetic inbreeding problems and direct mortality from vehicle collisions (Downs et al. 2014, Riley et al. 2014). Most obviously, vehicle collisions reduce the viability of small populations such as experienced by Florida panthers (*Puma concolor coryi*) and the tiny subpopulations of mountain lions marooned by highways in southern California or isolated populations of grizzly bears in the lower 48 (McCollister and van Manen 2010, Downs et al. 2014, Riley et al. 2014). Planners must keep in mind that not all crossing structures are suitable for all species alike. While deer, elk and grizzly bears prefer wide-open space, both black bears and mountain lions prefer to cross structures with forest cover (Clevenger and Waltho 2005).

B. In the NCDE, projects and roads harm grizzly bear persistence and USFS must consider these threats in its recovery criteria.

As Figure 2 shows, the land base that could potentially provide habitat to grizzly bears could be quite robust if agencies were not so quick to engage in "hyperpredation"; that is the degradation of former habitats (Chapron and López-Bao 2016). On Western public lands, hyperpredation of habitat comes from, but is not limited to, hard rock mining, grazing, logging, oil and gas exploration and drilling, coal mining and ski area expansions.

In their study of grizzly bears in the Cabinet-Yaak Ecosystem ("CYE"), Kendall et al. (2016) note that "excessive" human-caused mortalities to the CYE population has prevented it from expanding and has inhibited recovery. Because of the high density of roads and competing activities on the Cabinet and Yaak forests, these grizzly bears struggle to survive (Kendall et al. 2016). The failure of this subpopulation to persist should make wildlife and land managers cautious about opening up the Flathead National Forest and other lands on or near the NCDE to roads, timber, mining, recreational development and other projects, and failing to restore habitat from these ongoing threats on the NCDE.

Grizzly bears are an umbrella species. If managers would protect them, many other species could also persist as the USFS noted throughout its 2016 DEIS:

- Reducing roads in grizzly bear habitat would also benefit **boreal toads** (DEIS: 300-1).
- Because of grizzly bears require a secure core, the lack of developed recreational sites would benefit **bald eagles**, who are easily disturbed (DEIS: 303).
- Limiting motorized access in grizzly bear habitat would benefit **mountain goats** (DEIS: 316).
- By reducing livestock grazing for the benefit of grizzly bears, the risk for **invasive species** would be **reduced** (DEIS: 322).
- Road access restrictions would benefit **flammulated owls** for nesting because snags would be retained (DEIS: 341).
- Securing habitats for grizzly bears would also make them safer for **gray wolves** and thus "reducing the risk of excessive wolf mortality" (DEIS: 359-60).
- Plan components to benefit grizzly bears and wolves would also benefit **white-tailed deer, mule deer and moose** (DEIS: 360).
- Access management to benefit grizzly bears would also help **fisher** who prefer large snags and downed trees that are often taken by wood cutters (DEIS: 383-4).
- "Watersheds with bull trout and **westslope cutthroat trout** populations which are, or are nearly genetically pure, match up nicely with the Primary Conservation Area for grizzly bear which will also limit the road network" (DEIS: 116).

While acknowledging that protecting grizzly bears would protect a host of imperiled species, the USFS and FWS also recognize that potential "projects" on the NCDE would disturb or harm grizzly bears including salvage logging, timber cutting, and increasing road density and road occupation, recurring low-level helicopter flights, mining operations and oil and gas exploration (GBCS: 51).

These harms occur because, if aroused, bears will abandon den sites. Causes of arousal include seismic or mining activity (GBCS: 11), which could cause females in the NCDE to lose cubs, because they are the most vulnerable while in the den or upon emergence (e.g., DEIS: 413). Despite the threats and potential for long-term habitat damage, USFS has suggested toothless mitigation measures, particularly if projects are considered "temporary", but even "temporary" projects are given liberal latitude to expand so long as project managers get extensions from the NCDE coordinating committee (GBSC: 52). The USFS should consider that if habitat for grizzly bears is protected, a whole host of species would also be protected.

i. Hard rock mines, coal, or oil and gas development on the NCDE could pose irreversible threats, including loss of critical habitat that USFS must account for in its recovery criteria.

As FWS and USFS have noted, mining and oil and gas exploration can cause a myriad of problems for NCDE grizzly bears (GBCS: 27, DEIS: 417, 427), some of which are irreversible, but must be accounted for before the USFS can assume NCDE bears are recovered, or will be conserved into perpetuity:

- Land surface and vegetative disturbance;
- Water table alterations;
- Loss of fragile riparian zones and wetlands;
- Construction of facilities: impoundments, rights of way, roads, pipelines, canals, transmission lines, drill pads or other structures;
- Food storage and sanitation issues at mine and campgrounds;
- Keeping domestic pet (attractants) at camps;
- Road-kill attractants that lure grizzly bears to roadways;
- Non-native seed mixes expanding invasives;
- Wildlife feeding;
- Increased road densities that attract traffic and expand the reach of hunters and poachers;
- Personnel carrying firearms, but not mandated to carry pepper spray.
- Human-bear conflicts;
- Permanent habitat loss;
- Fragmentation and displacement from surface disturbance…

Given that the NCDE might be the best remaining habitat in the lower 48 states for grizzly bears, FWS and USFS must consider conserving the NCDE ecosystem to the greatest extent possible. It must not permit mines and oil and gas exploration in the one last great grizzly bear refuges. At some point, the hyperpredation of habitats must cease if large-bodied carnivores are expected to persist on our planet. Because mining and oil and gas exploration and drilling pose an ongoing threat to grizzly bears, the USFS must account for this harm in its recovery criteria.

ii. Roads are insidiously harmful to grizzly bears and wildlife in general.

One of the greatest threats to grizzly bear vitality is the incursion of motorized activity in their habitats (Craighead 2002). Grizzly bears generally avoid roads; they can cause direct mortality (collisions) and disturbance (GBCS: 21); indirect mortality from ecosystem degradation and especially riparian/wetland degradation. Roads increase access for big game hunters, trophy hunters and poachers (Craighead 2002), all of whom could kill grizzly bears. Because of roads are such an insidious ongoing threat to grizzly bears, the USFS must account for this ubiquitous harm in its NCDE grizzly bear recovery criteria.

The USFS does not presently know the extent of roads on the Flathead National Forest. It writes: "The USFS does not have complete knowledge of its old road system or the status of all roads on adjacent private lands" but it can update this information through aerial images as data become available (DEIS: 401). This information must be updated and made public as soon as possible so that comment regarding the actual extent of harm caused to the NCDE may be solicited.

a. Roads cause direct mortalities to grizzly bears or cause avoidance or disturbance, among other issues.

Watershed restoration over the past 20 years on the Flathead National Forest has focused on culvert removals, road decommissioning, road relocation and slump stabilization including the removal of 900 miles of road in grizzly bear habitat (DEIS: 116). For this work, USFS must be commended. While previous guidance on the forest, ("INFISH"), has improved riparian zones management for many streams on the Flathead (DEIS: 35), some of the greatest harms to watersheds and aquatic systems still come from roads because they can cause runoff, soil erosion, alter sediment composition and delivery to streams, and change channel morphology (DEIS: 47). Many miles of roads on the Flathead were not designed to meet BMP resulting in continuing decline of these systems: "these roads either continue to affect watersheds through chronic erosion or are at risk from mass failure from undersized stream crossings or locations on sensitive lands types" (DEIS: 47).

The importance of riparian areas and wetlands cannot be emphasized enough. Montana, part of the arid West, frequently faces drought and yet riparian areas and wetlands provide the greatest biological diversity of any habitats and so these species habitats must be conserved. The USFS states that riparian ecosystems are "rich in bear foods such as skunk cabbage and other herbaceous plants with nutritious bulbs" and grizzly bears and other species of concern are often associated with riparian habitats (DEIS: 56). Given that many of grizzly bears historic foods are on the decline or have vanished, this aquatic ecosystems must be conserved for grizzly bears and other species. Failure to do so will add to the ongoing threats the USFS must consider as part of its grizzly bear recovery criteria.

USFS must do more to reclaim and decommission roads on its forests and other habitats on the NCDE. Moreover, the ongoing loss of these important habitats must be a consideration USFS uses as part of its recovery criteria for grizzly bears on the NCDE.

iii. Vegetation projects could improve or harm grizzly bears.

With logging or salvage operations, the forest canopy is reduced – sometimes drastically in the event of clear cuts. Canopy reduction may create areas with enhanced grizzly bear forage, but only if nearby roads have no traffic (DEIS: 416, 426 GBCS 27). With logging, comes roads and traffic that could harm or displace grizzly bears, and destroy riparian, wetlands and other fragile habitats. Also, during logging operations, the potential for human-bear conflicts could arise as a result of unsecured attractants, thereby increasing mortality of bears (GBCS: 27). As USFS and FWS have failed to note in their planning documents, roads increase access for big game and trophy hunters as well as poachers (Craighead 2002).

On the Flathead National Forest, invasive weed removal would likely need to occur during the springtime when grizzly bears are emerging from their dens, but this work could disturb them (DEIS: 256). Like with winterized recreation and mining projects, this project could even lead to den and potentially to cub abandonment.

The reduction of invasive-weed spread would reduce in the long-term from road closures intended to protect grizzly bears. But work to close roads, such as ground disturbance needed to decommission roads, would cause weeds to spread unless treated in disturbed areas. Road closures then make it harder to treat invasive species in some areas of the forest (DEIS: 258).

Because of the ongoing threats from vegetation projects on the NCDE, the USFS must fully account for these projects as part of grizzly bear recovery criteria on the NCDE.

iv. Recreation on the NCDE could result in habitat loss, increase human-bear conflicts and cause other troubles for grizzly bears.

Sites developed for public recreation on the NCDE include campgrounds, trailheads; lodges, rental cabins; summer homes, restaurants, visitor centers, boat launches and ski areas. With more people on the forest, the potential for negative human-bear encounters increases, particularly because of human food attractants. USFS suggests that habituation or food conditioning is low because food storage orders across the Flathead National Forest exist – although it is unclear to the extent those order are enforced because USFS provided no law enforcement data (DEIS: 425). On the other hand, USFS suggests that the Whitefish Mountain Resort located on the PCA doesn't permit overnight stays, but the ski area likely causes disturbance or displacement to grizzly bears during their non-denning season (DEIS: 430).

USFS also contends that no evidence exists that mechanized transport (bikes) disturb or displace grizzly bears any more than hiking (DEIS: 428). Yet, for cougars, erratic movements are more likely to provoke attacks (Mattson et al. 2011). Unfortunately, a USFS law enforcement officer was killed by a bear he surprised while mountain biking with a friend near West Glacier National Park.[4] It would be beneficial to decision makers and the public alike if USFS or FWS could provide a rigorous analysis of grizzly bear attacks to determine if certain human behaviors exacerbate attacks as Mattson et al. (2011) have done for mountain lions before drawing conclusions about the effect of mechanized transport on bear populations.

v. **Snowmobile Use in the Primary Conservation Area can harm grizzly bears - particularly breeding females.**

USFS identifies the "official" denning season in Flathead National Forest as spanning from December 1 to March 31, but documented emergence occurring between April 16 to May 29 (DEIS: 413). USFS then states that in 2015, with lower than average snowfall and earlier den emergence, male bears came out April 23 and females on April 28 in order to justify the Forest's recreational guidelines that permit snowmobiling in the primary conservation area (DEIS: 414).

Bears, if aroused, will abandon den sites (GBCS: 11). According to the FWS, in the NCDE, females with cubs generally emerge from early April to early May (GBCS: 11); motorized, winter recreation could potentially cause females to abandon cubs. While the FWS notes that snowmobiles have the potential to disturb grizzly bears in their dens after emergence, and that disturbance results in energetic costs to grizzly bears including increased activity; elevated heart rates and possibly den abandonment and even potentially cub mortality (GBCS: 23-4), the USFS in its DEIS dismisses this concern. It concludes: "there is no known or discernible impact from current levels of winter motorized creation evidence of the population of grizzly bears in the NCDE" (DEIS: 31). Yet, while claiming that snowmobiles

[4] http://flatheadbeacon.com/2016/06/29/grizzly-bear-kills-person-near-west-glacier/

won't harm grizzly bears, the USFS notes that winter recreation effects on den sites is not well studied, and snowmobiles causing bears to abandon dens is only "anecdotal" (DEIS: 412). Those positions are not only contradictory but allow for a disturbance of a "threatened" species under the ESA which is a "take." Because of the potential for one female to abandon one cub, or one bear to be disturbed from hibernation, the USFS must immediately cease allowing snowmobiles in the primary conservation area of the NCDE.

The USFS states that the Flathead has only limited snowmobile access to portions of the forest – areas outside of favored den sites within the primary conservation area at Canyon Creek, Challenge –Skyland, Lost Johnny and Six Mile. The USFS justifies this recreational activity despite suggestions by Haroldsen et al. (2002) and Mace and Waller (1997) who indicate that snowmobiles could harm females and particularly their cubs either before den entry or after emergence. The USFS states that this phenomenon has not been documented in a scientific study (DEIS: 413). Yet, this is just common sense; and "take" of an ESA-protected species is against the law, and "take" includes the definition of "harass", which is what snowmachines inherently do—even to cross-country skiers.

C. Invasive species cause direct and indirect harms to grizzly bears that must be accounted for in recovery criteria.

i. Livestock indirectly cause grizzly bear mortalities and compete for their forage.

While only limited grazing for cattle is permitted on the forest and is in decline, livestock are the class of species most likely to result in management removals - the cause of a majority of grizzly bear mortalities. (More than one-half of the Flathead National Forest's allotments have been closed and vacated, and cattle grazing is delayed until after July 1 to further reduce conflicts (DEIS: 426)).

Because of the conflicts caused by livestock including chickens, pigs, and apiaries, the USFS must account for this ongoing threat to NCDE grizzly bears as part of its recovery criteria.

While the USFS suggests that grizzly bears generally leave adult cattle alone, smaller animals such as calves, chickens, sheep and goats are their prey and predation events on these small animals continues to result in conflicts. Luckily, the USFS notes that a number of NGO's are working on reducing the conflicts to reduce GB mortality (DEIS: 415). But that is not enough – agencies that manage grizzly bears or their habitat must get involved.

Not only are grizzly bears killed because of invasive livestock, bears compete with livestock for their forage (GBCS: 25). For all of these reasons, the USFS must account for these ongoing threats to grizzly bears in its recovery criteria.

ii. Blister rust and pine beetles have devastated whitebark pine.

Whitebark pine lives in montane and subalpine forest areas in the West and is a keystone species (Hansen et al. 2016). It helps to increase cover, protect the snowpack, and prevent runoff, while supplying seeds to multiple wildlife species including grizzly bears (Hansen et al. 2016). This keystone tree species is experiencing "a steep decline because of the combined effects of mountain pine beetle (*Dendroctonus ponderosae*) outbreaks, fire exclusion management policies, and the introduced disease white pine blister rust (causal agent *Cronartium ribicola*)" (Hansen et al. 2016: 2).

Prior to the loss of whitebark pine, grizzly bears living on the NCDE fed on whitebark pine seeds from late summer through the fall. Because of the loss of this food, more grizzly bears on the NCDE eat meat – both animals and hunters' gut piles (DEIS: 405). Males eat more than females, 32% and 21%, respectively—which exposes more bears to poaching and or "defense of life" kills. Bears' compensatory predation on wild ungulates has caused poachers to target bears because they believe that they are in competition for elk (Carter and Linnell 2016). Moreover, the loss of this key staple – whitebark pine – harms grizzly bear persistence by forcing them to switch to eating meat, exposing them to conflict with other predators (wolves and other bears) and humans (livestock growers, elk hunters, and people living and recreating in the grizzly bear habitat). This exposure has led to an increase in grizzly bear mortalities over the past two decades on the NCDE.

a. Whitebark Pine Conservation Strategy

The "vast majority of whitebark pine forests occur on public lands" so the federal government must ensure its survival – which the Flathead proposes to do under all its management plan alternatives. The goal is to replant rust-resistant seedlings from mature trees. The lack of seeds in sufficient quantities to support Clark's nutcracker has reduced natural potential for regeneration. The Flathead has replanted 840 acres, using approximately 168,000 seedlings of rust-resistant whitebark pin across the forest since the late 1990s. Nevertheless, a warming climate favors blister rust (DEIS: 231-2).

Fire-burned areas are the best havens for whitebark pine seedlings because fires create the best growing conditions with the least amount of competition from other vegetation. Thus thinning and fuel reduction in whitebark pine stands are important elements for restoration—particularly in areas where live, rust-resistant stands still live. These activities remove competing trees, improves tree vigor and resistance to stressors – especially for mature, cone-bearing trees that could survive fire. The Flathead has conducted thinning projects to benefit whitebark pine on about 100 acres.

The DEIS discusses the benefits and negative aspects of tree thinning to restore whitebark pine on Wilderness Areas (noting the decline of a keystone species because of unnatural conditions, but recognizing that this heavy type of habitat manipulation is not normally permitted on WAs (DEIS: 232-3). The loss of this keystone species is alarming, not only for grizzly bears but also Clark's nutcrackers and other dependent species. This is a major ongoing threat the USFS must account for as part of its recovery criteria for grizzly bears.

iii. Mountain pine beetle harms multiple coniferous species.

The mountain pine beetle harms lodgepole pine, ponderosa pine, western white pine and whitebark pine (DEIS: 138). The "epidemic" levels of beetles, particularly found in lodgepole pines, is spreading to other trees (DEIS 138-9). Tens of thousands of acres of trees have been killed off by mountain pine beetle on the Flathead since 1979 (DEIS: 139). Because of the devastating effects from mountain pine beetles to forests, and particularly to whitebark pine, the USFS must account for this ongoing threat to grizzly bears as part of its recovery criteria.

iv. Tick-borne pathogens could harm grizzly bears.

A recent study in Europe observed that tick-borne pathogens may pose a novel risk to grizzly bears as carrier species migrate (Paillard et al. 2015). This 18-year study of Scandinavian brown bears (*Ursus arctos*) showed that ticks and tick-borne diseases are moving northward as a result of a warming climate (Paillard et al. 2015). This trend is likely already occurring with many parasites in the United States. Indeed, ticks readily feed on bears, including on black bears (*Ursus americanus*), a well-studied phenomenon in the U.S. (Paillard et al. 2015 citing Leydet and Liang (2013) and others). According to the U.S Center for Disease Control and Prevention, the Rocky Mountain region is now a common area for infected ticks.[5] Because tick-borne pathogens could harm grizzly bears, the USFS must account for this ongoing threat as part of its recovery criteria.

D. Climate change will profoundly harm grizzly bears' recovery.

The USFS notes that grizzly bears' habitat is changing in the face of global warming including a reduction in snow pack; shifts in denning times; a shift in the abundance and distribution of natural foods; and changes in fire regimes due to summer droughts (DEIS: 420). The warming climate in the NCDE will decrease snowmelt run off, lesson soil moisture, which will further decrease food availability and change plant community distributions. Plants will attempt to shift both higher and further north. With decreased snowpack, there will be decreased avalanche chutes, reducing food for grizzly bears during their springtime emergence. The denning season will shorten too because food will become available later in the fall and earlier in the spring (time in the den is influenced by food availability and weather). Increased time outside the den could result in greater human-bear conflicts, resulting in an increase management removals. At the same time, wildfires could pose future devastating problems as the Forest has not had fire for the last 100 years (DEIS: 74).

On the NCDE, grizzly bears dig dens on steep slopes at elevations usually above 6,400 feet where the wind and topography cause an accumulation of deep snow and where the snow is unlikely to melt during warm periods; they occupy the den for 4-6 months, beginning in October or November (GBCS: 11).

While fire can reduce canopy and make some berry crops more abundant, reduction of canopy can increase sun intensity, lower moisture contents and expose berry plants to more wind/sun and frost. Fire frequency is likely to increase in severity. Fires reduce hiding cover and delay regrowth of vegetation—but one study found an increased production of forb foliage and root crops as a result of the Yellowstone fires of 1988 (Blanchard and Knight 1996) (GBCS: 31-32).

A recent study by Roberts et al. (2014) examined food shifts for grizzly bears in the Canadian Rocky Mountains and found that bears' foods are migrating to higher elevations.

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[5] http://www.cdc.gov/niosh/topics/tick-borne/.

This exposes low-elevation grizzly bears to greater human-bear conflicts, and these alterations from climate change “may reduce [grizzly bear] survival rates” (Roberts et al. 2014).

A warming climate limits grizzly bears’ foraging abilities because they are subject to hyperthermia, that is, the inability to dissipate heat from their bodies to stay sufficiently cool (Pigeon et al. 2016a). Grizzly bears have adapted to cold climates by developing thick hides and abundant insulation, which makes it difficult for them to dissipate heat and larger, male bears had the greatest issues (because they are up to twice as large as females having a lower surface area to volume ratio), but lactating females, because of high energy requirements, might be warmer than other bears and therefore more at risk from a warming climate than other demographics of bears (Pigeon et al. 2016a). Bears adjusted to the heat by seeking to forage in habitats that had sufficient canopy cover in order to stay cool, but these adjustments could affect their abilities to forage as efficiently (Pigeon et al. 2016a). Because of a warming climate, land managers must consider effects of eliminating dense thermal cover in grizzly bears’ habitat. Authors suggest that land managers mixing dense stands with thermal cover adjacent to lands that are open to high-quality food patches (Pigeon et al. 2016a).

Bojarska and Silva (2012) conducted a seminal worldwide review of grizzly bear food selection relative to their geography (latitude, longitude, altitude) and a multitude of environmental variables such as snow depth and duration. They found that “temperature and snow conditions” constituted some of the “most important factors affecting the feeding ecology of the brown bear.” (Bojarska and Selva 2012). Their conclusions demonstrate that USFS must treat climate change impacts on grizzly bears with the utmost gravity:

> . . . [I]t may be expected that climate change will greatly affect brown bear food habits through changes in food availability, hibernation patterns, nutritional and energetic demands, and foraging behaviour. Globally increasing temperatures are yielding shorter winters with less snow, especially in northern latitudes and higher elevation areas (Sagarin & Micheli 2001, Wilmers & Post 2006). Early snow melt substantially reduces the amount of late-winter and early-spring carrion, which is vital for bears after hibernation and until other food resources become available (Wilmers & Post 2006). Climate change may affect brown bear feeding habits also through changes in plant distribution and phenology. As a response to warmer temperatures, Rodríguez et al. (2007) documented a long-term decrease in the contribution of boreal and temperate food items in brown bear diet during the hyperphagic season, when brown bears typically consume high amounts of fruit to accumulate fat for winter dormancy and for successful reproduction. Changes in the timing and intensity of fruiting and ripening of fruit and mast, and declines in the availability of high-quality fruits . . . may have important consequences for brown bear population dynamics (Rodríguez et al. 2007). If key brown bear food resources disappear without the corresponding change in the timing of alternative food resources, a serious food bottleneck could develop.

Bojarska and Silva (2012: 133-4). The best available science is clear: climate change has and will continue to threaten NCDE grizzly bears by detrimentally altering their habitat.

This will result in further loss of staple foods and an increase in human-bear and inter- and intra-specific conflict as bears attempt to adapt to new food sources. Further study of the effects of climate change on NCDE grizzly bears, particularly as it relates to the availability of food due to adverse effects on the quality of habitat, must be conducted and the results built into recovery criteria for grizzly bears.

E. Degraded riparian areas and wetlands on the Flathead National Forest harm habitats and therefore, indirectly harm grizzly bears.

As a result of human manipulation over the past 100 years, including changing stream channels, timber cutting, road building, dams, changing fire regimes (DEIS: 50-1) and livestock grazing, the water quality on the Flathead has been degraded harming fish and other aquatic species–and resulting in sand, silt, sedimentation and pollution (DEIS: 52). Pollutants on the NCDE include PCBs, mercury, nitrogen, phosphorus. Wetlands and riparian corridors are key habitats that support grizzly bears. Because they are degraded in places on the Flathead National Forests and portions of the NCDE, the USFS must account for these ongoing threats to grizzly bears as part of its recovery criteria.

IV. States will not provide adequate protection if NCDE grizzlies are delisted; state management programs must be critically analyzed in any recovery criteria

USFS suggests that, if NCDE bears are delisted, hunting will be conducted using "the best available science" and part of "established public process" and "consistent with demographic standards in this Conservation Strategy" (GBCS: 40). But the history of predator management at the state level, and current state proposals regarding GYE grizzly bears, rebut this assumption. USFS must require a firm, legally binding commitment to the health and long-term sustainability of NCDE grizzlies at the state and local level as a precondition to declaring them recovered.

When the FWS delisted Rocky Mountain gray wolves, Idaho, Montana and Wyoming immediately commenced trophy hunts designed to slaughter wolf populations to the federally-mandated minimum. Wyoming designated over 80% of the state as a "predator zone", permitting unlimited wolf hunting using any manner conceivable, including running over wolves with snowmobiles. Idaho still permits hunters and trappers to slaughter up to 5 wolves per person per year in during overly-long seasons that harm wolf packs. Idaho even permits wolf hunting during the denning season. Montana permits long seasons and trapping with cruel leghold traps that frequently non-target species.

Given the precedent these set for gray wolf management with an emphasis on killing but not conservation, it is of little surprise that they have postured themselves similarly regarding GYE grizzly bears. The tri-states contend in their May 2016 "consensus" comment letter (and in recent media) that they have been *forced* by the FWS to reveal their hunting framework *before* grizzly-bear delisting can occur, while simultaneously and duplicitously posturing for the trophy hunt—as recorded in their own documents:

1) The Tri-State Memorandum of Agreement allocated bears for the purposes of "discretionary mortality available for regulated harvest" within the DMA as follows: Wyoming may authorize hunting for 58% of the quota, Montana 34% and Idaho 8%;

2) Wyoming's draft Grizzly Bear Management Plan states that a proposed season and hunting regulations will be left entirely to the discretion of its game commission pursuant to state statutes; and
3) Montana's Draft Season Structure Proposal for grizzly bears proposes seven game management units for GYE bears, with both spring and fall hunting seasons.

Equally alarming, in their comment letter, the tri-states contend that grizzly bears are not a "conservation-reliant species", who do not need to be managed into "perpetuity". The tri-states comments even chided the FWS for its suggestion in the Proposed Rule that the states stipulate lasting, conservation mandates instead of allowing states to manage grizzly bears using an unspecified and meaningless "adaptive management" framework (p. 3-4). The tri-states even complain that they should not have to consider genetic connectivity and exchange with other subpopulations; their comments even going as far to argument that the GYE population's genetic health is "very strong", despite its isolation from all other subpopulations.

Also of concern are the states' complaints about coming up with mandates to reduce human-bear conflicts. 1) As part of its comments regarding Wyoming's elk reduction program, the states balk at the notion that hunters would be mandated to carry pepper spray–rather than carry on with the status quo which involves high numbers of grizzly bears killed because of "defense of life" reasons (Tri-State p. 10) (or that the numbers of elk and bison have declined and have been supplanted by invasive species such as livestock (Tri-State p. 14)); and 2) the states balked at the FWS's common-sense that mandatory food storage orders, that is, safely making bear attractants off-limits will fail to reduce human-bear conflicts, and subsequent bear mortalities (Tri-State p. 15) – even as management removals of bears is the greatest source of grizzly bear mortality and even though there is an enormous literature on human-bear conflicts.

The GBCS notes that the Lacey Act will protect grizzly bears from trafficking and in the "absence of ESA protection, other State, Federal and Tribal laws remain that endeavor to protect grizzly bear or regulate[] the hunting of bears" (GBCS: 112). But the Lacey Act is limited in its scope, only covering inter-state movement of bears that are taken illegally, and in any case is dramatically under-enforced.

More importantly, the Lacey Act does nothing to protect grizzly bears from hostility permitted by state governments that do not share USFS' commitment to conservation. Rather than abdicating responsibility for management of this conservation-reliant species to state governments that have historically proven indifferent - if not outright hostile - to large predators, USFS should build requirements for meaningful, binding, and enforceable state- and local-level protections into its recovery criteria.

V. Conclusion.

Since first measured in 1978, the public's values towards mammalian carnivores has grown substantially more positive (George et al. 2016). Those negative few are "'drowned out'" by the vast majority of Americans who hold a growing concern for animal welfare, which should translate into innovative wildlife management (George et al. 2016).

Because of declining available habitat necessary for large carnivores, co-adaption between large carnivores and humans must occur, if carnivores are to persist; that means that humans must be willing to share habitat and tolerate the small level of risk they pose (Carter and Linnell 2016), and humans must curb their own "hyperpredation" of other species and their habitats (Darimont et al. 2015, Chapron and López-Bao 2016).

The HSUS appreciates this opportunity to comment. For the reasons stated above, we respectfully urge USFS to consider the dire, ongoing threats to NCDE grizzly bears as it develops habitat-specific recovery criteria. Doing so is the only way to ensure that, as required by law, any determination as to the recovery of the population is made in accordance with the best available science and in order to ensure the long-term viability of the population.

Sincerely,

Wendy Keefover
Native Carnivore Protection Manager
The Humane Society of the United States
wkeefover@humanesociety.org

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