IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MONTANA
MISSOULA DIVISION

HELENA HUNTERS AND ANGLERS ASSOCIATION *et al.*, Plaintiffs, vs. RANDY MOORE, in his official capacity as Chief of the U.S. Forest Service, *et al.*, Federal-Defendants.	CV 22-126-M-DWM DECLARATION OF DAVID J. MATTSON

I, DAVID J. MATTSON, state as follows:

1. I am a scientist and retired wildlife management professional with extensive experience in grizzly bear research and conservation spanning four plus decades.

2. My educational attainments include a B.S. in Forest Resource Management, an M.S. in Plant Ecology, and a Ph.D. in Wildlife Resource Management. My professional positions prior to retirement from the U.S. Geological Survey (USGS) in 2013 included: Research Wildlife Biologist, Leader of the Colorado Plateau Research Station, and Acting Center Director for the Southwest Biological Science Center, all with the USGS; Western Field Director of the Massachusetts Institute of Technology-USGS Science Impact Collaborative; Visiting Scholar at the Massachusetts

Institute of Technology; and Lecturer and Visiting Senior Scientist at the Yale School of Forestry & Environmental Studies.

3. Throughout my career I have been consulted by brown/grizzly bear managers and researchers worldwide, including from Russia, Japan, France, Spain, Greece, Italy, and, most notably, Canada. I have also given numerous public presentations on grizzly bear ecology and conservation, including talks, nationally, at the Smithsonian (Washington, D.C.) and American Museum of Natural History (New York, New York), and, regionally, at the Denver Museum of Natural History (Denver, Colorado), the Museum of Wildlife Art (Jackson, Wyoming), and the Museum of the Rockies (Bozeman, Montana).

4. I currently lead the Grizzly Bear Recovery Project, which is an organization devoted to producing materials that educate the public and synthesize research relevant to conservation of grizzly bears in North America.

5. It is my expert opinion that maintaining adequate forest cover is important for the conservation of grizzly bears on the Helena National Forest.

6. Grizzly bears benefit from widespread forest cover for several of the same reasons that elk and deer do, including the extent to which it provides foraging opportunities, thermal cover, and security from humans. Open forests often provide bears with high-quality foods such as berries, whereas dense forests offer a mix of thermal cover and visual security that can be critical during warmer weather or near where people are active.

7. *Habitat Selection.* – Several regional studies of grizzly bear habitat selection provide evidence for both the importance of forested habitats as well as some insight into the contingencies of this selection. Although studies of habitat selection have often been compromised

by lack of direct overstory measures, Aune (1994), Mattson (1997), McLellan & Hovey (2001a), and Apps et al. (2004) found evidence for positive selection of older-growth or denser forests by grizzly bears. In the many instances where there was strong evidence of grizzlies selecting for more open habitats, these were almost invariably either avalanche chutes or denser shrubfields and open forest stands resulting from wildfires typically 15-70 year earlier (Zager et al. 1983, Mace et al. 1996, Waller & Mace 1997, McLellan & Hovey 2001a, Apps et al. 2004). By contrast, all but one of these studies documented avoidance of regenerating cutblocks by grizzly bears, and none showed positive selection.

8. *Distribution of High-Quality Foods*. – These results are broadly consistent with the documented distribution of high-quality bear foods in different habitat types, with particularly important distinctions between cutblocks or mechanically thinned forests and thinned or regenerated stands resulting from wildfires. Production of both huckleberries and buffaloberries tends to be greatest on sites with 10-15% forest canopy cover roughly 10-40 years after a wildfire, especially in contraststo sites that are mechanically harvested (Martin 1979, 1983; Zager et al. 1983; Noble 1985; Hamer 1996; Barber et al. 2016; Denny 2016; Proctor et al. 2017). Anderson's (1994) evidence that berry production tended to peak in old-growth forests of the Yellowstone ecoregion suggested that, if anything, productivity can even increase with forest structure and cover.

9. *Daytime Bedding*. – Research specific to the Rocky Mountains has shown that grizzly bears consistently select heavily-forested areas for daytime bedding (Blanchard 1983, Cristescu et al. 2013), with likelihood of bedding positively correlated with nearby human activity (Cristescu et al. 2013), overstory basal area, and instances where bears are foraging on a concentrated food source

(Mattson 1997, 2000). In stands dominated by lodgepole pine, bedding is especially common when overstory basal area exceeds 20 m^2/ha (Mattson 2000). Even though grizzly bears will sometimes bed in open areas, these instances are typically restricted to cooler alpine areas (Mattson et al. 1991) or verdant microsites during cooler times of year (Wenzeles 1998), neither of which have widespread implications for the Helena NF.

10. *Thermoregulation*. – An affinity by grizzly bears in the Rocky Mountains for bedding in dense forests is consistent with results for American black bears in North America (Unsworth 1984, Mollohan 1987, Bard & Cain 2020, Mansfield et al. 2022) and brown bears in Europe (the same species as grizzly bears, Ursus arctos; Mysterud 1983, Garcia et al. 2007, Ordiz et al. 2011, Danuta 2018, Skuban et al. 2018), and by emerging evidence that both grizzly and black bears commonly employ strategies to cool themselves when temperatures are hot. Although bears have long been known to increase levels of nocturnal activity during hotter times of the year, there is new evidence that they also employ day-time strategies focused on selecting cooler wetter sites (McLellan & McLellan 2015, Pigeon et al. 2016, Rogers et al. 2021) and bathing in standing water (Sawaya et al. 2017, Rogers et al. 2021)—all of which is consistent with preferring cool shaded sites to bed.

Benefits of Forest Cover for Grizzly Bears

11. Taken together, this body of research strongly suggests that grizzly bears not only benefit from but also may even need access to substantial areas of forest cover, some of it dense and multi-layered, and some more open but propagated by natural disturbances such as wildfire. There are similarly strong indications that widespread timber harvest has been and will continue to be determinantal to bears simply because of effects on foraging opportunities and thermal and security cover—even without considering the effects of associated road and trail access. Even though investigations of habitat selection and productivity provide no conclusive basis for

establishing specific cover thresholds for bears, it is almost certainly the case that binding standards designed to maintain hiding cover, thermal cover, and habitat security for big game species, like those included in the 1986 Helena Forest Plan (as amended), have benefited and will continue to benefit grizzly bears on the Helena National Forest, especially in areas lacking standards specifically designed to conserve grizzlies, including Management Zone 2.

12. It is my expert opinion that limiting road densities and providing core security are important to the conservation of grizzly bears on the Helena National Forest.

13. The research showing deleterious impacts of roads, highways, and even trails on grizzly and brown bears is compendious and definitive. Barring the potentially moderating effects of rich natural and anthropogenic foods that attract bears to areas near roads and the occasional emergence of tolerance for humans among grizzlies, population-level effects of roads are several-faceted, negative, and often severe. Proctor et al. (2018, 2020) provide perhaps the best current summary of these effects from research undertaken in Alberta and British Columbia focused on roads typical of those on U.S. National Forests. In what immediately follows, I review results covered in these reports, augmented by research from elsewhere in brown bear range or reported during the last 5 years.

14. *Human-Caused Deaths*. – Estimating proportional causes of death for grizzly bears is often beset by bias arising from differences in detectabilities among causes (Mattson 1998, Cherry et al. 2002). However, known fates of radio-marked animals provide a comparatively reliable basis for making such estimates, especially of deaths attributable to human versus natural causes. More to the point, of 108 radio-marked adult and adolescent grizzly bears that died during various studies in the U.S. Rocky Mountains (Wakkinen & Kasworm 2004, Schwartz et al. 2006, Costello

et al. 2016), 79% were known to have been killed by humans. If deaths attributable to unknown causes are added to this tally, the figure would increase to 88%.

15. Regardless of the exact percentage, it is clear that humans cause most grizzly bear deaths in the Rocky Mountains, especially among adult and adolescent bears. Levels of human-caused mortality have consequently determined—and will continue to determine—the fates of grizzly bear populations, primarily as a function of how frequently grizzlies were exposed to people (frequency of contact) and whether that exposure resulted in a bear's death (lethality of contact; Mattson et al. 1996).

16. *Human Lethality on Forest Service Lands*. – Even infrequent contact of grizzly bears with lethal people (e.g., poachers) can result in unsustainable levels of mortality—with exposure on Forest Service lands governed primarily by levels of motorized access rather than by direct control of human behaviors. Of relevance, research from the Greater Yellowstone Ecosystem has clearly demonstrated that baseline human lethality outside of National Park jurisdictions is greater than lethality inside (Johnson et al. 2004, Schwartz et al. 2010), creating an imperative for Forest Service managers to limit access as means of conserving grizzly bears.

17. *The Importance of Managing Road Access*. – Roads largely determine whether people have access to grizzly bears and grizzly bear habitat on Forest Service lands. People, in turn, often precipitate lethal encounters with grizzly bears to the extent that they are intent on poaching, bring human-associated attractants with them, or are closely associated with big game carcasses. All are prominent catalysts of grizzly bear-human conflict and resulting grizzly bear deaths on public lands in the Northern Continental Divide Ecosystem (Mattson 2019). Given that Forest Service managers have little or no control over human behaviors and intentions—i.e., potential lethality of

people to bears—their primary tools for conserving grizzly bears entail limiting access features and increasing the extent of secure road-free habitat.

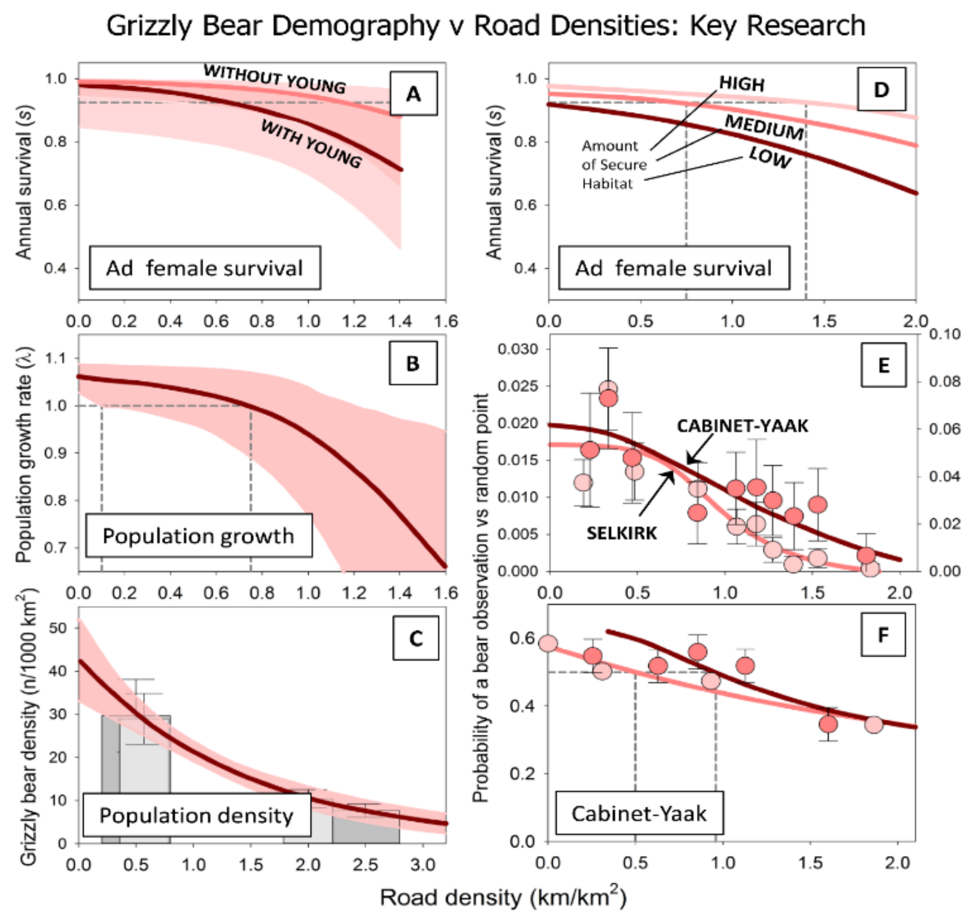

Figure 1. The panels in this figure summarize key results from various research projects in the Rocky Mountains that have investigated relations between grizzly bear demography and densities of roads open to human access. Demography here is represented in terms of adult female survival rates (A & D), population growth rate (B), population density (C), and odds that grizzly bears would be present (E & F). Where relevant, key demographic thresholds related to the growth or decline of grizzly bear populations are shown by dashed lines denoting corresponding road densities. Annual survival rates (*s*) for adult females <0.95 are a widely documented threshold for population sustainability, whereas a population growth rate (λ) <1.0 axiomatically denotes decline. Thresholds for the Cabinet-Yaak Ecosystem were calibrated to the odds that observing grizzly bears was less than what one might expect by chance. Results featured in (A) are from Schwartz et al. (2010); in (B) from Boulanger & Stenhouse (2014); in (C) from Proctor et al. (2020) and Lamb et al. (2019); in (D) from Schwartz et al. (2010); in (E) from Merrill et al. (1999); and in (F) from Mattson & Merrill (2004). In all instances, demographic conditions progressively deteriorate as road densities increase, with key density thresholds ranging from 0.1 to 1.4 km/km^2, depending on whether or how parameter uncertainty is accounted for (A & B) and also whether overall habitat security is considered (D). Densities in miles/mile^2 are 1.6-times greater than km/km^2.

18. *Impacts of Roads on Bear Demography*. – The research showing severe negative demographic effects of roaded habitats on grizzly bear populations is definitive and unambiguous, especially in industrial or multiple-use jurisdictions such as the Helena National Forest. Figures 1

and 2 summarize results from key studies of relevance to this point; sources are referenced in the figure caption. Figure 3 provides visual emphasis for the point that, aside from agricultural lands to the east of the Northern Continental Divide Ecosystem, most grizzly bears die on lands actively managed for timber extraction, which are typified by comparatively high densities of open roads.

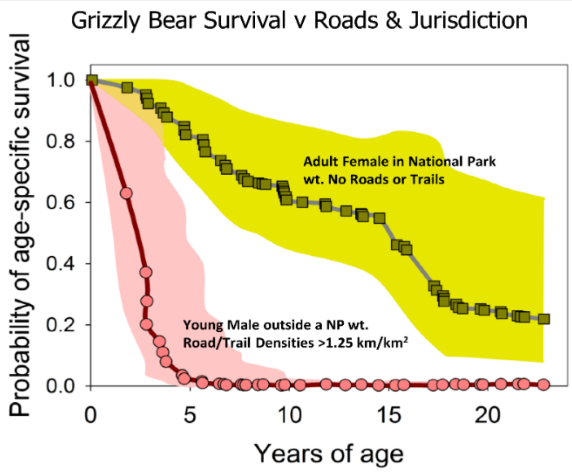

Figure 2. This figure shows a key result from Johnson et al. (2004) highlighting the dramatically different fates of bears depending on sex, age, and whether the bears lives inside or out of a protected area (i.e., National Park) with or without comparatively high densities of roads and trials. Pink denotes the likely fate of a young male living outside a National Park in an area with >1.25 km/km^2 of roads and/or trails; yellow denotes the likely fate of an adult female living inside a National Park in which no human access is accommodated. Densities in $miles/mile^2$ are 1.6-times greater than km/km^2; i.e., 1.25 km/km^2 = 2 $miles/mile^2$.

19. There are several key points from the relations shown in these figures. First and perhaps most important, demographic conditions, no matter how measured, progressively worsen as road densities increase. Regardless of whether this deterioration results in population decline, survival rates of individuals are impacted, with predictably negative consequences for dispersing or colonizing bears trying to survive in a roaded landscape.

20. Second, road densities associated with demographic thresholds vary depending on the sex, age, and reproductive status of bears (Figures 1a and 2); with amounts of secure habitat well away from roads (Figure 1d); with whether and how parameter uncertainty is accounted for (Figure 1b); and with the study area (Figures 1e and 1f). Given these considerations, thresholds could

range from 0.2 to 1.4 km/km^2 (0.3 to 2.2 mi/mi^2), with the weight of this range falling below historical standards applied to the NCDE Primary Conservation Area. There is clearly no single standard that serves all purposes or attends to all considerations, with the proviso that higher road densities are invariably more deleterious than low road densities.

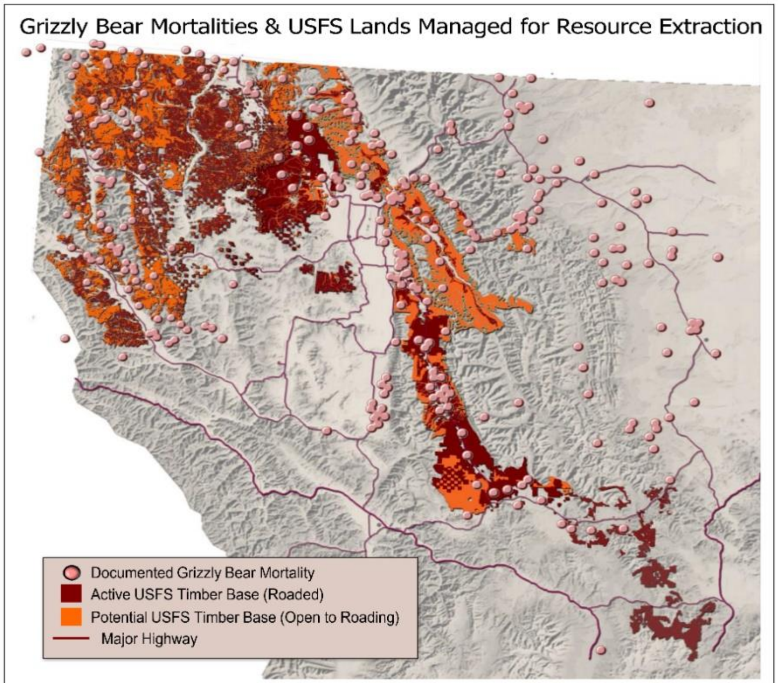

Figure 3. This map shows areas suitable for timber harvest (in burgundy) and harvestable for other resource objectives (orange), for the Kootenai National Forest, Flathead National Forest, and Helena National Forest based on maps in existing or draft revised Forest Plans for each. Locations of documented grizzly bear mortalities are shown as pink dots – for 1998-2018 in the Northern Continental Divide Ecosystem and for 1983-2018 for the Cabinet-Yaak Ecosystem. Locations of mortalities are from databases covering 1983-2014 (CYE) and 1998-2014 (NCDE) obtained through federal Freedom of Information Act requests and Montana Open Documents requests. Locations from these databases were augmented by map locations from *Northern Continental Divide Ecosystem Grizzly Bear Population Monitoring Team Annual Reports* and *Cabinet-Yaak Grizzly Bear Recovery Area Research and Monitoring Progress Reports* for 2015-2019. Lands managed for some level of timber harvest are featured because of the close spatial correlation with road systems and associated disproportionate concentration of grizzly bear mortalities.

21. Third, Figure 2 highlights the plight of dispersing/colonizing grizzly bears, which are key to establishing genetic if not demographic connectivity between our extant grizzly bear populations. Importantly, most dispersing grizzlies are younger males (McLellan & Hovey 2001b, Proctor et al. 2004, Stoen et al. 2006, Zedrosser et al. 2007, Norman & Spong 2015, Lamb et al. 2020). Figure 2 clearly shows that prospects for a dispersing young male are bleak, especially in

areas on Forest Service lands with 2 mi/mi^2 of roads, as typifies many portions of potential connective habitat, including in Management Zones 1 and 2 of the Helena National Forest. Ideally, road densities would be quite low—well <1 mi/mi^2—to foster survival of dispersing grizzly bears through these Management Zones, with the goal of promoting eventual connectivity among grizzly bear populations.

22. Although young male bears constitute most early dispersers, and are at the typical forefront of grizzly bear population expansion, young females are key to expanding the area within which breeding bears establish, which is, in turn, necessary for establishing demographic connectivity among populations. Although adolescent female grizzlies tend to survive at higher average rates compared to adolescent males (Schwartz et al. 2006, Mace et al. 2012), maintenance of high survival rates for this cohort is critical to permanent occupancy of new habitats given that colonization rates for females are so slow; dispersal distances of females from natal ranges are, on average, only one-fifth that that of males (McLellan & Hovey 2001b, Proctor et al. 2004, Lamb et al. 2020). Put another way, slow dispersal and colonization rates among females need to be compensated for by exceptionally high survival rates logically fostered by low road densities and large areas of secure habitat.

23. *Impacts of Roads on Bear Behavior.* – The lethal environs of roads and highways translate into longer-term effects on distributions of bear populations (through attrition of bears near roads) and behaviors of individual bears (through lineages of learned behaviors). One of the most straight-forward manifestations of these effects is well-documented as well as widespread avoidance and under-use of areas near roads by grizzly bears. Summarized for numerous studies, the median area of underuse and avoidance extends out 300 m from roads and highways, with 75% of results

falling within 500 m (Mattson et al. 1987, McLellan & Shackleton 1988, Kasworm & Manley 1990, Yost & Wright 2001, Benn & Herrero 2002, Mueller et al. 2004, Waller & Servheen 2005, Northrup et al. 2012). There is not the space here to exhaustively cover the corpus of research related to how bears respond to roads, although effects manifest not only in habitat selection, but also diel activity patterns, speed of movements near roads, and direction and related frequency of road crossings. More importantly, there is evidence that avoidance increases with levels of traffic on forest roads (Archibald et al. 1987, Mace et al. 1999, Martin et al. 2010, Roever et al. 2010, Northrup et al. 2012, Proctor et al. 2017, Ladle et al. 2018, Lamb et al. 2018) and in more open areas (Parsons et al. 2020, 2021) – the latter relevant to maintaining forest cover for purposes of enhancing grizzly bear habitat security (see above).

24. *Core Security*. – Prescriptions for management of grizzly bear habitat in the Northern Continental Divide's Primary Conservation Area (also referred to as the Recovery Zone) and Management Zone 1 recognize the importance of not only preserving legacy road densities, but also maintaining legacy areas without any roads for conservation of the ecosystem's grizzly bear population. These prescriptions are precautionary in that human impacts were historically reckoned for the Primary Conservation Area out to 500 m from roads. Core security areas were also required to be ≥1,012 ha (2,500 acres). This size comports with the analyses of Mattson (1993) and Gibeau et al. (2001) who recommend that core areas be >500 m from roads and >250-900 ha in size.

25. However, there are no prescriptions explicitly designed to benefit grizzly bears either by managing bear habitat or limiting road densities in Management Zone 2. Even so, limits on open road densities included in the Helena National Forest's big game standards – Standard 4a, in

particular – have predictably benefited grizzly bears and provided *de facto* maintenance of secure core areas for grizzly bears throughout the Forest. Figure 4 shows the extent of these *de facto* protections, which vary allowable road densities as a function of big game hiding cover. The point here is that the 1986 Helena NF big game standards have undoubtedly benefited grizzly bears over a wide range of historical and current conditions.

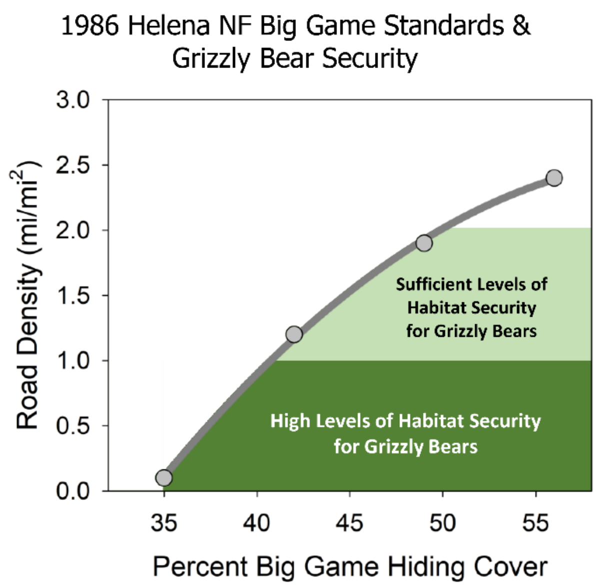

Figure 4. This figure illustrates the extent to which big game standards, as codified in the 1986 Helena NF Plan, provided important security for grizzly bears by imposing meaningful limits on road densities over a wide range of forest hiding cover. Historically, grizzly bear standards applied to the NCDE PCA (Recovery Area) limited open road densities to 1 mi/mi^2 and total road densities to 2 mi/mi^2.

26. Absent big game standards to limit open road densities in Management Zone 2 of the Helena NF, grizzly bear habitat security would be predictably eroded, even with the objective of maintaining legacy road conditions in the PCA (Recovery Zone) and Management Zone 1. This same point holds, moreover, for Management Zone 1 given that conditions here do not reflect historical provisions for maintaining core security areas, as in the PCA. More specifically, even under a favorable scenario where road densities were 1 mi/mi^2, the security of roughly 60% any

given km^2 of habitat would be impacted. With 2 mi/mi^2 of roads, all habitat security within a given km^2 would be impaired, with prospective spill-over effects on adjacent habitat.

27. It is my expert opinion that assumptions imbedded in the Northern Continental Divide Ecosystem Conservation Strategy and related 2018 Grizzly Bear Amendments are flawed.

28. Current and prospective prescriptions for management of grizzly bear habitat on Forest Service lands rest on the assumption that the Northern Continental Divide Ecosystem grizzly bear population has grown without pause during the last 20+ years, and will continue to do so for the foreseeable future, albeit contingent on (more-or-less) maintaining conditions that prevailed within the PCA during 2011. Without presenting the full details of my critique here, there is good reason to think that this assumption is untenable and that estimates of population growth for the Northern Continental Divide Ecosystem grizzly bear population are flawed and overly optimistic (see Mattson [2019] for my full analysis and critique). If this critique holds, then maintaining current habitat conditions will not, in fact, guarantee continued growth and conservation of the Northern Continental Divide Ecosystem grizzly bear population.

29. Aside from this critique, the arguments used to legitimize the current approach to managing grizzly bear habitats in Management Zones 1 and 2 (as per the 2018 Grizzly Bear Amendments) come across as bald assertions rather than statements based on evidence or logic.

30. For example, the argument for maintaining status quo conditions in Management Zone 1 rather than managing for improved security rests on a single peculiar assertion that current conditions "have not precluded an increasing grizzly bear population." Aside from the veracity of assuming that there has been an increasing population, this leaves open the question of whether conditions in Management Zone 1 actually *contributed to* any of the presumed growth. As stated,

one could just as well assert that the grizzly bear population increased *despite* status quo conditions in Management Zone 1.

31. Similar failings attend claims related to Management Zone 2. Here the edifice of management direction rests on this peculiar statement: “Existing public land management direction has not precluded grizzly bears from occurring in this area.” Similar to claims regarding causal connections between habitat conditions and grizzly bear population status in Management Zone 1, one could perhaps more plausibly argue that grizzly bears have been observed in Management Zone 2 *despite* current habitat conditions, and that current conditions limit rather than foster the survival and movements of bears that do manage to occupy or pass through this zone. As a bottom line, it is dubious, at best, to rest grizzly bear habitat management on two assertions that conflate the simple observation of bears with causal connections and furthermore offer substantiating arguments in the form of a double negative. More skeptically—and perhaps defensibly—one could conclude that habitat conditions in Management Zones 1 and 2 are not sufficient to achieve long-term grizzly bear conservation, and that any safety net providing *de facto* habitat security for grizzly bears (e.g., the previous Helena National Forest Plan’s binding big game standards) need to be maintained if not improved.

32. In my expert opinion, the Helena National Forest sits astride habitat critical to connecting the Northern Continental Divide and Greater Yellowstone grizzly bear populations.

Grizzly Bear Dispersal, Distribution, and Suitable Habitat in the Northern Rockies

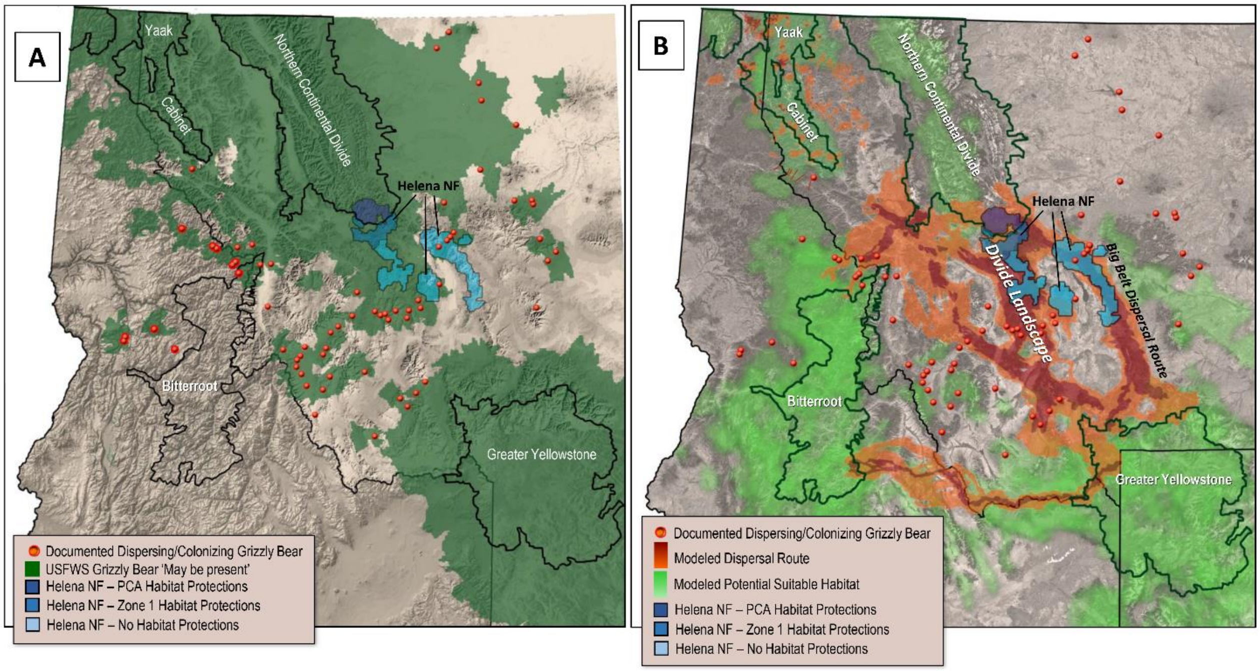

Figure 5. These maps show the Helena National Forest (NF) relative to US Fish & Wildlife Service (USFWS) Grizzly Bear Recovery Areas & Primary Conservation Areas (PCA), various estimates of current grizzly bear distribution, modeled grizzly bear dispersal routes, and modeled potential suitable grizzly bear habitat. Lands encompassed by the Helena NF are shown in shades of blue in both maps, with areas shaded darkest blue and intermediate falling within the Northern Continental Divide PCA (Recovery Area) and Management Zone 1, respectively. Map (**A**) shows the distribution of dispersing/colonizing grizzly bears documented outside the bounds of Demographic Monitoring Areas since 2005 as red-orange dots, overlain on map published by the USFWS in December 2020 showing in dark green where grizzly bears "may be present." Map (**B**) shows the distribution of potential suitable habitat (in shades of green) and potential dispersal routes (in shades of orange) modeled by various researchers for grizzly bears in the U.S. Northern Rocky Mountains, together with the distribution of dispersing/colonizing grizzly. Potential suitable habitat is based on models that incorporate habitat productivity and remoteness from humans, with darker green indicating greater replication of results (from Merrill et al. [1999]; Carroll et al. [2001, 2003]; Merrill & Mattson [2003]; Mattson & Merrill [2004]; Merrill [2005]; and Craighead et al. [2005]). Dispersal routes were modeled by Walker & Craighead (1997), Servheen et al. (2001), Proctor et al. (2015), and Peck et al. (2017). Documented locations of dispersers/colonizers are from Nokkentved (2007), Costello et al. (2014, 2019), Barker (2020), Backus (2020), Phillips (2020), Angelamontana (2020), Kasworm et al. (2020), and USFWS (2021).

33. The Helena National Forest encompasses public lands comprising a significant portion of comparatively remote north-south trending mountains contiguous with or nearby the Beaverhead-Deerlodge and Custer-Gallatin National Forests, both of which encompass areas occupied by grizzly bears from the Greater Yellowstone Ecosystem population. Various lines of evidence suggest that these north-south highlands (i.e., the Divide Landscape) will be critical to establishing genetic and even demographic connectivity between the Northern Continental Divide and Greater Yellowstone Ecosystem grizzly bear populations, with the Helena National Forest

located in a critical piece of geography with habitat suitable not only for dispersal, but also occupancy by bears.

34. *Dispersal Routes*. – Figure 5b summarizes the results of efforts by several researchers to model dispersal routes and habitat suitable for occupancy by grizzly bears in the northern U.S. Rocky Mountains; sources are given in the figure caption. Dispersal routes are shown in shades of orange or burgundy, with burgundy denoting areas where grizzly bears are most likely to move. These data-informed models projected where grizzly bears were most likely to move in a step-wise sequential manner as a function of both habitat productivity and remoteness.

35. The Helena National Forest stands out as being located at the confluences of several major streams of projected movement, presumably gathering bears originating in southeastern portions of the Northern Continental Divide Ecosystem PCA and funneling them primarily along the Divide Landscape and the Big Belt Mountains. There is no other area in the northern Rockies were this kind of modeled potential for dispersal is as great. Although odds are lower that grizzly bears would disperse from the Helena NF to the Bitterroot Recovery Area, potential for such movements does clearly exist.

36. *Potential Suitable Habitat*. – Dispersal models emphasize sequential stepwise movements whereas models of potential suitable habitat seek to predict where colonizing grizzly bears could survive and reproduce well enough to be permanent residents, emphasizing occupancy by female bears. The areas shaded green in Figure 5b show where these kinds of models predict that conditions would be biophysically suitable for grizzly bear occupancy, with darker green denoting greater replication of results from different studies. Although these green areas are obscured by

modeled dispersal routes in Figure 5b, the overlap between dispersal routes and potential suitable habitat is almost complete.

37. As is the case of dispersal routes, much of the Helena National Forest stands out as being biophysically suitable for occupancy by grizzly bears. Notably, the Forest itself is contiguous with a large swath of potentially suitable habitat in the Little Belt and Crazy Mountains, the former in the Lewis & Clark National Forest, and the latter in the Custer-Gallatin National Forest. The upshot is that a person need not imagine connectivity between the Northern Continental Divide Ecosystem and Greater Yellowstone Ecosystem through the Helena National Forest being dependent on bears sprinting back and forth, but rather on the plausible prospect that a contiguous population of interbreeding resident bears could be established.

38. *Documented Dispersing/Colonizing Bears*. – The veracity of models predicting the location of dispersal routes and biophysically suitable grizzly bear habitat is being partly confirmed by the documented locations of dispersing/colonizing grizzly bears in areas outside current population distributions, shown as red dots in Figure 5. However, these locations are also cautionary. For one, they suggest that the models are conservative relative to predicting where grizzly bears might be observed by a person. As important, these locations also suggest that the mere presence of a grizzly bear may not convey much information about whether the route it took getting there was secure and productive, or whether, once present, the bear will be able to survive. Even so, these observations confirm that much of Management Zones 1 and 2 on the Helena National Forest are being transected and perhaps even occupied by grizzly bears. The map of where grizzly bears "may

be present," produced by the USFWS in (2021), shown in Figure 5a, supports much the same conclusion.

39. *Management Direction v Presence and Potential.* – Even though modeled potential and the presence of dispersing bears are cause for optimism about establishing and sustaining a subpopulation of grizzly bears in Management Zones 1 and 2 of the Helena National Forest, this type of evidence provides no assurances that current conditions are, indeed, adequate; that currently favorable conditions will persist; or that there will be an impetus to improve habitat security for bears, if needed. As I point out in 29-31, above, bald assertions about adequacy of habitat security provide no assurances regarding actual adequacy of current conditions or prospects

for maintaining and improving existing levels of security, especially relative to achieving any goal more ambitious than simply "not precluding."

40. *Meaningful Genetic & Demographic Recovery*. – The importance of maintaining if not improving conditions favorable to grizzly bear dispersal and occupancy on the Helena NF is thrown into relief by the best available science regarding requirements for population viability. The current consensus regarding long-term population viability is realistically defined as conditions required to achieve roughly 99% probability of persistence for a period of approximately 40 generations (Reed et al. 2003, Frankham & Brook 2004, Reed & McCoy 2013). For grizzly bears, with average generation lengths of approximately 10 years, this time frame equates to around 400 years.

41. Given this framework, current research suggests that for a species such as the grizzly bear, with a low reproductive rate and a low ratio of effective to total population size, around 2,500-9,000 animals in a contiguous inter-breeding population are needed to attain long-term, evolutionarily meaningful, viability (Lande 1995; Reed et al. 2003; Cardillo et al. 2004, 2005; Frankham 2005; Brook et al. 2006; O'Grady et al. 2006; Traill et al. 2007; Frankham et al. 2014). We are still far from reaching this benchmark for grizzly bears in the contiguous United States.

42. Because the Helena National Forest's location is key to achieving genetic and demographic connectivity between the Northern Continental Divide Ecosystem and Greater Yellowstone Ecosystem grizzly bear populations, there is an imperative not only to maintain any existing standards that intentionally or otherwise provide habitat security for grizzly bears – including those designed to benefit big game, as per 25 above – but also develop management directions that more directly and substantively meet the needs of bears. As I outline in 5-26, above,

these include measures related to forest cover as well as access-related security from humans. Under current circumstances, big game standards that applied under the 1986 Helena Forest Plan are the best available safeguards for grizzly bear habitat.

43. In my expert opinion, the big game standards codified in the 1986 Helena Forest Plan (as amended), particularly the standards that protect forest cover and limit open road densities, are important for conserving grizzly bears on the Helena National Forest, facilitating connectivity between grizzly bear populations in the Northern Continental Divide Ecosystem and Greater Yellowstone Ecosystem, and ultimately achieving meaningful recovery of grizzly bears in the contiguous United States.

44. Absent any directives to reliably assess adequacy of cover or security for grizzly bears on the Helena National Forest—much less improve conditions if needed—the Helena National Forest's big game standards were the only basis for compelling management actions in many areas that would have otherwise not maintained conditions favorable for grizzlies. This is particularly true in areas of the Helena National Forest, including the Divide Landscape, that are occupied by grizzly bears and important for connectivity, but fall within Management Zone 2 where no grizzly standards apply. More specifically, binding big game standards from the Helena Forest Plan that required maintenance of adequate hiding and thermal cover at specific numeric thresholds and the standards that restricted open road densities depending on the amount of available cover unequivocally benefited grizzly bears where none had previously been documented.

45. It is my expert conclusion that the big game standards codified by the 1986 Helena National Forest Plan are critical to conserving grizzly bears on this Forest, especially absent any standards directing actions to protect or improve habitat conditions specifically for grizzly bears. As

a corollary, the 2021 Revised Forest Plan, which removed all binding, big game standards and replaced them with largely voluntary desired conditions, goals, and guidelines, unambiguously impairs prospects for maintaining and, if needed, improving habitat security and connectivity for grizzly bears.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 12th day of April, 2023.

David J. Mattson

DECLARATION OF DAVID J. MATTSON

ATTACHMENT 1 – REFERENCED DOCUMENTS & SCIENTIFIC LITERATURE

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